SB

32

For Mary

Listing of SB 32 stuff on file. Sen. Fischer's office

Contact Dave Moses.

1. Marijuana and Health, Institute of Medicine, Nat. Academy Press. (A:Mari. txt)
2. ACLU - Ravin Decision.
3. Marijuana: The Myth of Harmlessness goes up in Smoke.
4. Patterns of Drug Use: School Survey. (Back Up) SB 32.
5. Anchorage Police Dept. (1987) Del Smith Support.
6. Togiak City Council. 1987 letter of Support.
7. Analysis of Marijuana Policy, 1982, Nat. Academy Press.
8. House Research Agency, 1987
9. Findin on Senate Bill 32.
10. Ketchikan Gateway Borough School Dist. Res. in Support of SB 32.
11. Department of Law (Feb. 88' Fiscal Note)and Opinion.
12. Senate Comm. Report. Fiscal Notes.
13. File- Fiscal Notes and Opinions * Very Good Stuff.
14. Marijuana Bill 12/2/88. Rep. Alyce Hanley.
15. Norml Letter. 2/10/88
16. Yellow Book w/ SB 32 original, Cssb 32 (Hess) Sectional analysis, fiscal notes, resolutions in Support, index of studies, Articles and publications, synopsis of S. Hess Comm. Action.
17. Memo to Senate Judiciary and Finance Committee Res. of Support.
18. Resolutions- Hard Copy in Support.
19. House Research Agency 1987 findings and opinion.
20. References for legislative findings to cssb 32.
21. Haines Borough Resolution in Support.
22. Ravin Points against.
23. Fairbanks Newsminer March 4, 1988.
24. Support letters Ak for Drug free youth.
25. PTA Alaska.
26. National Marijuana Laws by state
27. Memo - Judiciary Committee Memebers 4/30/87.
28. Listiing of Scientific Studies.
29. Local District D support.
30. News Release - Nancy Reagan.
31. Reproduction and Pot.
32. House Research Agency, (Possession of Pot)
33. Rep. Koppenen- Minutes of SB 32 House Side Hearing.4/21/88.
34. Anchorage Chamber of Commerce, Crime Commission Marijuana Study.
35. Alaska Peace Officers Association, 15th Legislature Report.
36. Betty Wilson - Ketchikan- 4/30/88 Major Petition.
37. The White House- Washington 9/8/86.
38. Anchorage Crime Commission Report. Nov. 85.
40. Adolecent Drug taking Behavior, Follow-up study. Dec. 87.
41. The Purpose of Pleasure.- Richard Healey, 1983, Independent School Press.
42. Getting Tough on Gateway Drugs, Robert Dunlop, American Psychiatric Press. 1984.
43. Marijuana Alert, Peggy Mann, McGraw Hill Books, 1985.

ANCHORAGE POLICE DEPARTMENT

4501 SOUTH BRAGAW STREET • ANCHORAGE, ALASKA 99507-1599
TELEPHONE (907) 786-8500

TONY KNOWLES
MAYOR

RONALD L. OTTE
CHIEF

March 13, 1987

MAR 18 1987

Senator Paul Fischer
Chairman, H.E.S.S. Committee
Alaska State Legislature
Pouch V (MS 3100)
Juneau, Alaska 99811

Dear Senator Fischer,

The purpose of this letter is to inform you of our support for Senate Bill 32 addressing the recriminalization of marijuana.

We believe that recent research may indicate that marijuana is more of a health hazard than originally thought. We believe that the legislature of the State of Alaska should take a serious look at recriminalization and hold hearings regarding its potential medical effects upon the populace. In addition, we believe that the youth of Alaska receive a mixed signal regarding the appropriateness of drug usage when marijuana is essentially legal in this state. In addition to that, we feel that the populace develops a scoff law attitude when the possession of marijuana is legal, but the purchase of and transportation of is illegal.

We urge that the recriminalization of marijuana be brought from the committee and addressed on the floor of the State Legislature.

If we can be of any further assistance regarding this issue or any other law enforcement related issue that you wish to call upon us for, feel free to do so.

Sincerely,

Del Smith
Deputy Chief of Operations

DS:dl

Statements of Support

City of Ketchikan
Police Department

334 Front Street
Ketchikan, Alaska 99901
907-225-3111

February 24, 1987

Senator Paul Fisher
Chairman, Hess Committee
Pouch V
Juneau, Alaska 99811

Dear Senator Fisher:

Substance abuse problems of all types are significant in Ketchikan as well as throughout the State of Alaska. The attached figures - obtained from the Alaska Department of Public Safety - represents arrests for substance abuse problems and provide some indicators of the scope of the problems.

For a number of years, law enforcement officers throughout the state have been concerned that a contributing factor to substance abuse has been the permissive Alaska State Statutes allowing the possession and use of marijuana in certain circumstances. Those statutes are inconsistent with Federal marijuana laws. The primary reason for law enforcement concern is that those inconsistencies provide conflicting messages to the public regarding the acceptability of the use of illegal substances.

Senate Bill 32 supports recriminalization of marijuana in the state of Alaska which will make state drug law consistent with the rest of the United States. That recriminalization is supported by the Alaska Association of Chiefs of Police and the Alaska Peace Officers Association as well as this Department. I would urge your support of SB32 and request your action to get the bill out of committee to the floor for a vote. If I can provide any further information in support of this bill, please contact me.

Sincerely,

D. A. Anslinger, III
Chief of Police

DAA:mp
Attachments

cc: Senator Lloyd Jone
Representative John Sund
Representative Robin Taylor
Representative Terry Martin

SUBSTANCE ABUSE ARREST SUMMARY

SOUTHEAST ALASKA

CONTROLLED SUBSTANCE AND ALCOHOL OFFENSES

	1979	1980	1981	1982	1983	1984	1985	*1986
Ketchikan P.D.								
Controlled Substance	23	12	43	34	74	70	56	93
Alcohol	219	235	443	322	306	358	398	548
TOTAL Ketchikan P.D.	242	247	486	356	380	428	454	641
Juneau P.D.								
Controlled Substance	27	43	23	34	43	30	48	
Alcohol	273	348	379	428	328	352	396	
TOTAL Juneau P.D.	300	391	402	462	371	382	444	
Sitka P.D.								
Controlled Substance	30	12	27	2	5	5	4	
Alcohol	261	263	185	212	280	197	115	
TOTAL Sitka P.D.	291	275	212	214	285	202	119	
Wrangell P.D.								
Controlled Substance	10	6	14	11	12	-	6	
Alcohol	87	81	114	84	83	72	83	
TOTAL Wrangell P.D.	97	87	128	95	95	72	89	
Petersburg P.D.								
Controlled Substance	1	2	2	10	14	3	4	
Alcohol	46	39	42	34	30	69	49	
TOTAL Petersburg P.D.	47	41	44	44	44	72	53	

* NOTE 1986 SUMMARIES NOT AVAILABLE FOR CITIES OTHER THAN KETCHIKAN

PD00000001/MEMOSDEPTS/MGRSEC

SUBSTANCE ABUSE ARREST ANALYSIS

SOUTHEAST ALASKA

CONTROLLED SUBSTANCE AND ALCOHOL OFFENSES

	1979	1980	1981	1982	1983	1984	1985	*1986
Ketchikan P.D.								
Juvenile Controlled Substance								18
Marijuana	8	1	12	7	11	15	13	
Cocaine	-	-	-	-	-	-	-	
Other	-	-	2	1	1	2	-	
Adult Controlled Substance								75
Marijuana	6	6	12	12	51	39	35	
Cocaine	5	2	11	12	6	12	8	
Other	4	3	6	2	5	2	-	
Juvenile DWI	2	5	6	4	8	3	8	8
Adult DWI	82	86	127	130	133	134	107	115
Juvenile Alcohol	71	74	152	92	71	94	125	185
Adult Alcohol	64	72	131	96	94	127	158	240
TOTAL Ketchikan P.D.	242	247	486	356	380	428	454	641
Juneau P.D.								
Juvenile Controlled Substance								
Marijuana	17	17	5	9	11	8	13	
Cocaine	-	-	-	3	-	1	2	
Other	-	2	-	-	-	2	1	
Adult Controlled Substance								
Marijuana	10	21	17	15	19	19	32	
Cocaine	-	-	-	6	13	-	-	
Other	-	3	1	1	-	-	-	
Juvenile DWI	6	4	4	6	2	3	2	
Adult DWI	91	82	70	133	137	172	193	
Juvenile Alcohol	98	166	161	138	100	89	93	
Adult Alcohol	78	96	144	151	89	88	108	
TOTAL Juneau P.D.	300	391	402	462	371	382	444	
Sitka P.D.								
Juvenile Controlled Substance								
Marijuana	9	1	2	1	3	-	2	
Cocaine	1	1	1	-	-	-	-	
Other	1	-	1	-	-	-	-	
Adult Controlled Substance								
Marijuana	10	7	3	1	2	3	-	
Cocaine	3	3	14	-	-	2	2	
Other	6	-	6	-	-	-	-	
Juvenile DWI	4	11	3	10	6	4	1	
Adult DWI	87	142	92	81	123	126	59	
Juvenile Alcohol	108	84	48	78	102	30	25	
Adult Alcohol	62	26	42	43	49	37	30	
TOTAL Sitka P.D.	291	275	212	214	285	202	119	

Mayor and City Council
Substance Abuse Arrest Analysis
January 2, 1987

	1979	1980	1981	1982	1983	1984	1985	*1986
Wrangell P.D.								
Juvenile Controlled Substance								
Marijuana	2	4	7	3	2	-	6	
Cocaine	-	-	-	-	-	-	-	
Other	4	-	-	-	-	-	-	
Adult Controlled Substance								
Marijuana	4	2	4	4	8	-	-	
Cocaine	-	-	3	3	2	-	-	
Other	-	-	-	1	-	-	-	
Juvenile DWI	-	-	-	-	2	1	-	
Adult DWI	5	7	13	36	55	32	22	
Juvenile Alcohol	57	58	88	32	15	22	32	
Adult Alcohol	25	17	13	16	11	17	29	
TOTAL Wrangell P.D.	97	87	128	95	95	72	89	
Petersburg P.D.								
Juvenile Controlled Substance								
Marijuana	-	1	-	4	11	-	-	
Cocaine	-	-	-	-	-	-	-	
Other	-	-	-	-	-	-	-	
Adult Controlled Substance								
Marijuana	1	1	2	3	1	3	2	
Cocaine	-	-	-	3	-	-	1	
Other	-	-	-	-	2	-	1	
Juvenile DWI	1	-	-	6	-	3	1	
Adult DWI	18	18	25	19	18	24	25	
Juvenile Alcohol	21	16	14	-	5	28	8	
Adult Alcohol	6	5	3	9	6	14	15	
TOTAL Petersburg P.D.	47	41	44	44	44	72	53	

* NOTE 1986 ANALYSIS NOT AVAILABLE FOR CITIES OTHER THAN KETCHIKAN

PD00000002/MEMOSDEPTS/MGRSEC

KETCHIKAN GATEWAY BOROUGH SCHOOL DISTRICT

Darroll Hargraves
SUPERINTENDENT

Resolution No. 210
Ketchikan Gateway Borough School District

A REQUEST FOR CHANGING THE
STATE STATUTES TO MAKE THE POSSESSION AND USE OF
MARIJUANA ILLEGAL

WHEREAS, the State of Alaska allows legal private possession and use of marijuana,

WHEREAS, Alaska's present statutes regarding possession and use of marijuana appear to be in conflict with the laws of the United States, and

WHEREAS, the problem of drug and alcohol abuse in our schools and our society appears to be on the rise, and

WHEREAS, the President of the United States initiated a national crusade to counter the current drug problem, and

WHEREAS, many students find easy access to illegal drugs, particularly marijuana, and

WHEREAS, Alaska statutes present a mixed message by currently allowing the use and possession of marijuana in the home, and

WHEREAS, current research and medical opinion concerning marijuana indicates that marijuana is harmful and does present a serious health problem, and

WHEREAS, the utilization of marijuana possession in Alaska sends the message to outside suppliers that Alaska is an open state which condones the "personal use" of marijuana, and

WHEREAS, a show of community resolve against the legal possession and use of marijuana sends a message to the state legislature and the governor's office,

POUCH Z • KETCHIKAN, ALASKA 99901-5026 • (907) 225-2118

KETCHIKAN SCHOOL DIST.

RESOLUTIONS IN SUPPORT OF RECRIMINALIZATIONSB 31 - CAPITAL

1

THEREFORE BE IT RESOLVED by the Ketchikan Gateway Borough School District that:

1. The School District encourages and supports the reinactment of statutes which will recriminalize the possession of marijuana.

2. The School District makes this position one of public record so that all in the community, in other school districts, and across the state will understand our position that the present statutes in Alaska governing marijuana are not in the best interest of its citizens.

3. The School District requests our legislators, locally and across the state, to give the recriminalization of marijuana immediate attention during the 1st session of the 15th legislature so that effective July 1, 1987 the possession and use of marijuana will be illegal and carry consequences.

PASSED, APPROVED, AND ADOPTED BY THE BOARD OF EDUCATION OF THE KETCHIKAN GATEWAY BOROUGH SCHOOL DISTRICT OF KETCHIKAN, ALASKA THIS _____ DAY OF _____, 1987.

_____
President of the Board

_____
Clerk-Treasurer of the Board

Submitted by: Assemblyman
Brad Bradley

Prepared by: Assemblyman
Brad Bradley

AMENDED AND APPROVED
Date 12-9-86

For Reading: November 25, 1986

AR No. 86-284

A RESOLUTION OF THE MUNICIPALITY OF ANCHORAGE SUPPORTING REPEAL OF AS 11.71.070 AND AMENDMENT OF AS 11.71.060(a) TO MAKE MARIJUANA ILLEGAL

WHEREAS, Alaska is the only state in the union with a permissive statute for personal possession of marijuana, and

WHEREAS, findings of local, state and federal authorities conclude that marijuana is detrimental to the health, welfare and public safety of all people, and

WHEREAS, the Supreme Courts of other states and the U.S. Supreme Court have upheld state statutes prohibiting the use and possession of marijuana, and

WHEREAS, current Alaska state statutes are not in conformity with federal drug enforcement laws controlling drug abuse, and

WHEREAS, the conflict between federal and state law pertaining to marijuana causes unnecessary barriers for local police and Alaska State Troopers in protecting the public from drug abusers, and

WHEREAS, the Anchorage Crime Commission has for the past three years concluded that Alaska's permissive laws on marijuana should be repealed, and

ANCHORAGE ASSEMBLY

WHEREAS, representatives of 60 Alaskan high schools at the Alaska Association of School Governments' Annual Fall Conference on October 18 of this year unanimously passed a resolution to repeal the current marijuana law and make the drug in all its forms illegal in Alaska.

NOW THEREFORE, the Anchorage Assembly resolves:

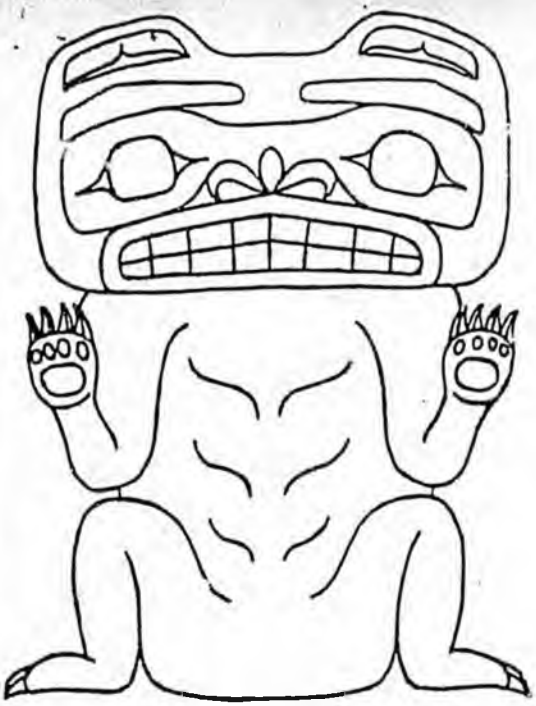
That the Governor of the State of Alaska, the Alaska State Legislature and the Alaska Supreme Court ~~is~~ are petitioned to take immediate steps to repeal/ ~~AS 11.71.070 and amend~~ statutory and constitutional protections for the ~~AS 11.71.060 at a time to make~~ use and possession of marijuana ~~illegal~~ in order in the State of Alaska/to promote the general health, welfare and public safety of the citizens of Anchorage and the State of Alaska.

PASSED AND APPROVED by the Anchorage Assembly this 9th day of December, 1986.

Chairman

ATTEST:

Municipal Clerk







City of Saxman

Rt. 2, Box 1
Saxman, Alaska 99901
907-225-4166

CITY OF SAXMAN

RESOLUTION NO. 87-01-030

A RESOLUTION OF THE CITY OF SAXMAN, ALASKA, SUPPORTING REPEAL OF A.S. 11.71.070 AND AMENDMENT OF A.S. 11.71.060(a) TO MAKE MARIJUANA ILLEGAL AND ESTABLISHING AN EFFECTIVE DATE.

WHEREAS, Alaska is the only state in the union with a permissive statute for personal possession of marijuana; and

WHEREAS, findings of local, state and federal authorities conclude that marijuana is detrimental to the health, welfare and public safety of all people and of all ages; and

WHEREAS, the Supreme Courts of other states and the U.S. Supreme Court have upheld state statutes prohibiting the use and possession of marijuana; and

WHEREAS, current Alaska state statutes are not in conformity with federal drug enforcement laws controlling drug abuse; and

WHEREAS, the conflict between federal and state law pertaining to marijuana causes unnecessary barriers for local police and Alaska State Troopers in protecting the public from drug abusers; and

WHEREAS, Ketchikan Youth Service, Families in Action and other concerned local citizens have expressed concern over the drug abuse problem in the community; and

WHEREAS, representatives of sixty (60) Alaska high schools at the Alaska Association of School Governments' Annual Fall Conference held on October 18, 1986, unanimously passed a resolution to repeal the current marijuana law and make the drug in all its forms illegal in Alaska.



GALENA CITY SCHOOL DISTRICT
GALENA, ALASKA 99741
PHONE (907) 656-1205
SUPERINTENDENT'S OFFICE

January 7, 1987

Representative Terry Martin
P.O. Box V
Mail Stop 3100
Juneau, Alaska 99811

Dear Representative Martin:

The Board of Education for the Galena City School District is appalled at the free uncontrolled flowing use of controlled drugs including marijuana.

We are aware of the detrimental effect that drugs have on the education of students who use drugs and that schools are held accountable for the learning that should take place. Therefore, it is very important that those negative effects on learning be eliminated.

One of the big reasons that larger and larger numbers of students are failing in school is the use of drugs and marijuana.

Our School Board strongly encourages you to support stricter laws on possession, sale and use. Further, we would ask for your support laws that will facilitate the arrest and conviction of dealers.

We appreciate your positive attitude and support.

Sincerely,

Carole C. Huntington

Carole C. Huntington, President
Board of Education

CCH/elb
069/87

cc: School Board Members
Galena City School District

GALENA SCHOOL DIST



Alaska Association of School Governments

RESOLUTION: ALASKA ASSOCIATION OF SCHOOL GOVERNMENTS
FALL CONFERENCE
DIMOND HIGH SCHOOL
October 18, 1986

Whereas the student leaders of Alaska recognize that there is a severe Drug and Alcohol problem in Alaska,

Whereas the student leaders of Alaska recognize this problem exists in the Alaskan elementary, junior and senior high schools,

Whereas the students believe it is necessary for them to take a united stand against Drugs and Alcohol,

Therefore, be it resolved that the students representing the Alaska Association of School Governments (AASG), endorse the nationally known "Just Say No" Drug Prevention Program

Be it further resolved the AASG students will present a flag to Governor Sheffield to be flown over the capitol building that states: "Alaska Students/Just Say No" and

Be it further resolved the AASG students request the Governor and the Alaska Legislature to repeal the current marijuana law and make marijuana illegal in this state.

Resolution passed unanimously by 60 alaskan high schools in attendance at the AASG fall conference.

ALASKA ASSOCIATION OF STUDENT GOVTS.

WILLIAM G KLEIN
CHIEF OF POLICE
106TH SESSION

WRANGELL POLICE DEPARTMENT

CITY OF WRANGELL, ALASKA
POST OFFICE BOX 531 • WRANGELL, ALASKA 99929
(907) 874-3304

March 4, 1987

MAR 5 1987

Senator Paul Fisher
Hess Committee Chairman
P.O. Box V
Juneau, Alaska 99811 (Mail Stop 3100)

Dear Senator Fisher:

On behalf of this department and the concerned members of this community, I sincerely urge that all possible efforts and support be afforded to Senate Bill 32, Recriminalization of Marijuana, in order that said bill be brought to the floor of the Senate and House for a vote.

As an Alaska law enforcement officer for the past 21 years I can state without reservation that one of the greatest errors consumated by a legislative body was the decriminalization of marijuana. Not only is it in violation of Federal Law, its usage among the youth of this state has escalated like a malignant growth.

In all frankness, I must state that the time is long overdue for positive action on behalf of our elected officials to combat and control this statewide problem. Give law enforcement in the State of Alaska the weapons, in the form of realistic and effective laws, and we will do our part.

Respectfully submitted,

William G. Klein
Chief of Police

WGK:rrk

cc: Representative Terry Martin
Senator Lloyd Jones
Representative Robin Taylor
Representative John Sund

BILL NO: HB 55
TITLE: "An Act relating to marijuana; and providing for an effective date"
DATE: 3/4/87

The Juneau Police Department is supportive of this legislation.

The purpose of HB 55 is to recriminalize the possession of any amount of marijuana. By achieving this end a number of purposes will be served.

Increasingly it has been shown that the long term consumption of marijuana poses a health hazard of serious consequence. A number of medical studies substantiate this fact. It is necessary to reflect that the possession of any amount of marijuana will not be tolerated so as to reinforce the concept that health hazards do exist when marijuana is used. Marijuana has been targeted as the single best predicator of other future illegal drug use.

The present conflict that exists between current state and federal law tends to create confusion in the mind of the public. This conflict creates apathy on the part of the public and flies in the face of the need for consistency in the law. Disregard and apathy are most readily apparent in the minds of the young people of the community. This conflict also creates impediments in the discharge of local police responsibilities in addressing the problem of drug traffickers.

The relaxed attitude toward marijuana in Alaska creates in the minds of people that this is a state that condones this and other types of drug usage. It creates a marked placed for a substance that is legal here but illegal in all other states.

The recriminalization of marijuana would not, as some sources are concerned, create a large scale impact on the criminal justice system. The primary focus is and will continue to be on interception, interdiction and prosecution of drug sources. This is a demonstrated philosophy that provides cost effective results for resources expended.

Michael S. Gelston
Chief of Police
Juneau Police Department

MSG/ps6

ROTARY CLUB

MAR 9 1987

February 26, 1987

Senator Paul Fisher
Pouch V (Mail Stop 3100)
Juneau, AK 99811

Dear Senator Fisher:

The Rotary Club of Valdez supports the City of Valdez Resolution No.8711 which urges the repeal of laws allowing for the personal use of marijuana.

Sincerely,

Patrick M. Shely
President
P.O. Box 307
Valdez, AK 99686

Cook Inlet Council On Alcohol And Drug Abuse

"A PRIVATE NON-PROFIT CORPORATION"

MAIN OFFICE
255 Willow Street, Rm. 203
KENAI PROFESSIONAL BUILDING

P.O. Box 882
Kenai, Alaska 99611

PHONE:
283-3658

LAKE STREET CENTER
P.O. Box 2362
Homer, Alaska 99603

PHONE:
235-8001

MAR 24 1987

A RESOLUTION OF THE COOK INLET COUNCIL ON ALCOHOL AND DRUG ABUSE OF KENAI, ALASKA, URGING THE ALASKA LEGISLATURE TO REPEAL LAWS ALLOWING FOR THE PERSONAL POSSESSION AND USE OF MARIJUANA.

WHEREAS, the Cook Inlet Council on Alcohol and Drug Abuse is committed to the education, the prevention and treatment of drug abuse: and

WHEREAS, we believe countless lives are distorted through the availability and use of drugs, most particularly the lives of our young people; and

WHEREAS, socially responsible states are recognizing the need for limited access to dangerous drugs; and

WHEREAS, Federal law mandates criminal penalties for possession and use of marijuana; and

WHEREAS, current Alaska statutes threaten the State of Alaska's eligibility for federal funds for control of narcotics:

BE IT THEREFORE RESOLVED that laws shall be enacted in the State of Alaska to establish criminal penalties for the use and possession of marijuana.

DATED at Kenai, Alaska, this sixteenth day of March, 1987.

COOK INLET COUNCIL ON ALCOHOL
AND DRUG ABUSE

Roger Seibert

Roger Seibert, President
Board of Directors

ATTEST:

Kay Mayes

Kay Mayes, Secretary
Board of Directors

Anchorage Chamber of Commerce

Crime Commission

RECRIMINALIZATION OF MARIJUANA

The Anchorage Crime Commission is a public group that wishes to present information on the issue of recriminalization of marijuana.

In 1985 the Anchorage Crime Commission compiled a bibliographical summary of numerous professional evaluations and opinions regarding the health hazards associated with marijuana usage. Based on this data the 1985 Crime Commission strongly endorsed the recriminalization of marijuana.

The 1986 Anchorage Crime Commission (with the generous support of the Anchorage Times and Carr's Quality Centers) conducted an area wide public opinion survey dealing with public attitudes on a wide range of crime related issues.

Although the final survey analysis and subsequent recommendations are not scheduled for release until early 1987, an extract of the survey provides statistical information regarding public attitude on two relevant questions directly related to the issue of marijuana recriminalization.

The citizens of Anchorage indicated their strong desire for the recriminalization of marijuana.

The Anchorage Crime Commission extends its support to the Municipal Assembly in accepting the challenges related to addressing this issue. Should further support or definition be needed, we would be happy to assist.

Harold C. Heinze

Harold C. Heinze
Chairman

A Committee of the
Anchorage Chamber
of Commerce

415 F Street
Anchorage AK 99501
(907) 272-2401

ANCHORAGE CRIME COMMISSION

KIWANIS CLUB OF ANCHORAGE
P.O. BOX 101404
ANCHORAGE, ALASKA 99510

Anchorage Assembly

Whereas, it is a major emphasis of Kiwanis International to enrich the lives of our youth, and

Whereas, the Kiwanis Club Of Anchorage is currently participating in a nationally promoted activity of drug abuse prevention and education through the Just Say No Foundation, and

Whereas, the current laws in Alaska do not consider it a crime to possess certain combinations of controlled substances in certain amounts, which is counterproductive to our efforts in the Just Say No [to drugs] Program,

Now therfore, be it resolved that the Kiwanis Club of Anchorage hereby encourages the Anchorage Municipal Assembly to adopt a resolution in support of changing our statutes to make possession of a controlled substance, other than by prescription, a crime.

Jeff Thon
President

KIWANIS RESOLUTION

CITY OF VALDEZ, ALAKSA

RESOLUTION NO. 8711

A RESOLUTION OF THE CITY OF VALDEZ URGING THE ALASKA LEGISLATURE TO REPEAL LAWS ALLOWING FOR THE PERSONAL USE OF MARIJUANA.

WHEREAS, the State of Alaska is eligible for certain Federal grants for control of narcotics; and

WHEREAS, the dangerous and grievous use of unlawful narcotics threatens the lives and well-being of many citizens of Alaska, especially, our young people; and

WHEREAS, the Alaska State Statutes allow for personal possession and use of amounts of contraband and dangerous substances that would otherwise be illegal under Federal and State laws; and

WHEREAS, these peculiar provisions of State law threaten the State of Alaska's eligibility for Federal funds for control of narcotics; and

WHEREAS, these provisions serve no useful purpose in a society that is outraged at the suffering and expense caused by drug abuse; and

WHEREAS, the right to privacy in the home in Alaska is a constitutional protection and that right can be protected by allowing the exception to be a lawfully obtained search warrant,

NOW, THEREFORE, BE IT RESOLVED that the Valdez City Council urges the Legislature of the State of Alaska to repeal those sections of the Alaska Statutes which allow personal possession and use of marijuana and support the recriminalization of marijuana.

PASSED AND APPROVED BY THE COUNCIL OF THE CITY OF VALDEZ, ALASKA this 17th day of February, 1987.

CITY OF VALDEZ, ALASKA

BY: John Devens
John Devens, Mayor

ATTEST:

BY: John Thorp
John Thorp
Acting City Manager



American Civil Liberties Union

Alaska Civil Liberties Union -Legislative Committee-217 Second St. #204-Juneau, Alaska 99801

ACLU POSITION ON MARIJUANA AND THE RIGHT TO PRIVACY

The Alaska Civil Liberties Union is the local affiliate of the American Civil Liberties Union, representing approximately 900 members in Alaska. The ACLU opposes proposed legislation to recriminalize the personal possession and consumption of marijuana.

The use of marijuana involves protected constitutional rights, including the right to privacy which is explicitly guaranteed in Article I, Section 22 of the Alaska Constitution. Intrusion by government on such a constitutionally protected act places a burden of justification upon government. That burden has not been met with respect to federal and state laws that impose penalties on the use and possession of personal use quantities of marijuana.

ACLU opposes the definition of behavior as criminal when such behavior, engaged in either alone or with other consenting adults, does not in and of itself harm another person or force another person to act unwillingly in any way. Private personal possession and consumption of marijuana falls within this protected sphere of private personal activity.

The showings of government interest in regulating marijuana use, upon which the proposed legislation rests, are neither clear nor conclusive, as the Alaska Supreme Court has ruled in the case of Ravin v. State. The present state of scientific knowledge fully supports the rationale of the Ravin decision; there have been no scientific developments since Ravin which would change the constitutional basis for that decision. The medical findings contained in HB 55 and SB 32 are innacurate, selective, and misleading. The sentences of imprisonment and large fines called for under the proposed legislation are excessive and unconstitutional interventions into personal and private rights.

The sale of marijuana to adults over 18 should not be subject to criminal penalties. However, reasonable regulation and taxation of the sale of marijuana does not in and of itself constitute a violation of civil liberties. ACLU strongly supports educational efforts aimed at teaching all persons, and in particular minors, about the dangers of drug use and abuse.

The ACLU opposes laws which criminalize the possession, use and sale of marijuana, for these reasons:

1. They impose arbitrary, often harsh, and cruel penalties for private conduct for which no criminal penalty at all is appropriate.
2. They impose all of the hardships of an arrest, and arrest record, and often a prison term on otherwise law-abiding young people.
3. They are selectively enforced.
4. Their enforcement relies on entrapment, illegal searches, and other police conduct which violates civil liberties.
5. They encourage police corruption.
6. They divert law enforcement money and manpower from the enforcement of laws against serious crimes.
7. They engender contempt for the law.
8. They interfere with honest efforts to educate young people about the dangers of drug use and to combat the problems of drug abuse.

ACLU urges the defeat of legislation which would impose criminal penalties for the use or possession of marijuana.

Submitted by: Assemblyman
Brad Bradley

Prepared by: Assemblyman
Brad Bradley

AMENDED AND APPROVED
Date 12-9-86

For Reading: November 25, 1986

AR No. 86-284

A RESOLUTION OF THE MUNICIPALITY OF ANCHORAGE SUPPORTING REPEAL OF AS 11.71.070 AND AMENDMENT OF AS 11.71.060(a) TO MAKE MARIJUANA ILLEGAL

WHEREAS, Alaska is the only state in the union with a permissive statute for personal possession of marijuana, and

WHEREAS, findings of local, state and federal authorities conclude that marijuana is detrimental to the health, welfare and public safety of all people, and

WHEREAS, the Supreme Courts of other states and the U.S. Supreme Court have upheld state statutes prohibiting the use and possession of marijuana, and

WHEREAS, current Alaska state statutes are not in conformity with federal drug enforcement laws controlling drug abuse, and

WHEREAS, the conflict between federal and state law pertaining to marijuana causes unnecessary barriers for local police and Alaska State Troopers in protecting the public from drug abusers, and

WHEREAS, the Anchorage Crime Commission has for the past three years concluded that Alaska's permissive laws on marijuana should be repealed, and

WHEREAS, representatives of 60 Alaskan high schools at the Alaska Association of School Governments' Annual Fall Conference on October 18 of this year unanimously passed a resolution to repeal the current marijuana law and make the drug in all its forms illegal in Alaska.

NOW THEREFORE, the Anchorage Assembly resolves:

That the Governor of the State of Alaska, the Alaska State Legislature and the Alaska Supreme Court ~~is~~ are petitioned to take immediate steps to repeal/ ~~AS 11.71.070 and amend AS 11.71.060 at to make~~ statutory and constitutional protections for the use and possession of marijuana ~~illegal~~ in order in the State of Alaska/to promote the general health, welfare and public safety of the citizens of Anchorage and the State of Alaska.

PASSED AND APPROVED by the Anchorage Assembly this 9th day of December, 1986.

Chairman

ATTEST:

Municipal Clerk

CITY OF HAINES

RESOLUTION 86/87-18

A RESOLUTION OF THE CITY OF HAINES, ALASKA, SUPPORTING REPEAL OF AS 11.71.070 AND AMENDMENT OF AS 11.71.060(a) TO MAKE MARIJUANA ILLEGAL.

BE IT RESOLVED BY THE COUNCIL OF THE CITY OF HAINES, ALASKA.

WHEREAS, Alaska is the only state in the union with a permissive statute for personal possession of marijuana, and

WHEREAS, findings of local, state and federal authorities conclude that marijuana is detrimental to the health, welfare and public safety of all people, and

WHEREAS, the Supreme Courts of other states and the U.S. Supreme Court have upheld state statutes prohibiting the use and possession of marijuana, and

WHEREAS, current Alaska state statutes are not in conformity with federal drug enforcement laws controlling drug abuse, and

WHEREAS, the conflict between federal and state law pertaining to marijuana causes unnecessary barriers for local police and Alaska State Troopers in protecting the public from drug abusers, and

WHEREAS, the Anchorage Crime Commission has for the past three years concluded that Alaska's permissive laws on marijuana should be repealed, and

WHEREAS, representatives of 60 Alaskan high schools at the Alaska Association of School Governments' Annual Fall Conference on October 18, 1986 unanimously passed a resolution to repeal the current marijuana law and make the drug in all its forms illegal in Alaska.

NOW, THEREFORE, BE IT RESOLVED by the Council of the City of Haines, Alaska that the Governor of the State of Alaska, the Alaska State Legislature and the Alaska Supreme Court are petitioned to take immediate steps to repeal statutory and constitutional protections for the use and possession of marijuana in the State of Alaska in order to promote the general health, welfare and public safety of the citizens of Haines and the State of Alaska.

PASSED AND APPROVED THIS 21st DAY OF JANUARY, 1987.

April S. Lapham, Mayor

ATTEST: Susan V. Hedrick
Susan V. Hedrick, City Clerk

S E A L:

CITY OF KETCHIKAN

RESOLUTION NO. 87-1498

A RESOLUTION OF THE CITY OF KETCHIKAN, ALASKA, SUPPORTING REPEAL OF A.S. 11.71.070 AND AMENDMENT OF A.S. 11.71.060(a) TO MAKE MARIJUANA ILLEGAL AND ESTABLISHING AN EFFECTIVE DATE

WHEREAS, Alaska is the only state in the union with a permissive statute for personal possession of marijuana, and

WHEREAS, findings of local, state and federal authorities conclude that marijuana is detrimental to the health, welfare and public safety of all people and of all ages, and

WHEREAS, the Supreme Courts of other states and the U.S. Supreme Court have upheld state statutes prohibiting the use and possession of marijuana, and

WHEREAS, current Alaska state statutes are not in conformity with federal drug enforcement laws controlling drug abuse, and

WHEREAS, the conflict between federal and state law pertaining to marijuana causes unnecessary barriers for local police and Alaska State Troopers in protecting the public from drug abusers, and

WHEREAS, Ketchikan Youth Services, Families in Action and other concerned local citizens have expressed concern over the drug abuse problem in the community, and

WHEREAS, representatives of sixty (60) Alaskan high schools at the Alaska Association of School Governments' Annual Fall Conference held on October 18, 1986, unanimously passed a resolution to repeal the current marijuana law and make the drug in all its forms illegal in Alaska.

NOW, THEREFORE, BE IT RESOLVED BY THE COUNCIL OF THE CITY OF KETCHIKAN, ALASKA as follows:

Section 1. The City Council of the City of Ketchikan, Alaska hereby petitions the Governor of the State of Alaska, the Alaska State Legislature and the Alaska Supreme Court to take immediate steps to repeal statutory and constitutional protections for use and possession of marijuana in the State of Alaska in order to promote the general health, welfare and public safety of the citizens of Ketchikan and the State of Alaska.

Section 2. The City Clerk is hereby directed to send copies of this resolution to Governor Cowper, Senator Jones, Representative Taylor, Representative Sund, the Attorney General and the Alaska Municipal League.

Section 3. This resolution shall become effective immediately upon passage.

PASSED AND APPROVED this 8th day of January, 1987.

Ted Ferry, Mayor

ATTEST:

Karen Miles, CMC
City Clerk

City of Ketchikan

334 Front Street
Ketchikan, Alaska 99901
907-225-3111

10/13/86

MAYOR AND COUNCIL

Mayor	Mailing Address	Home Address	Work Phone	Home Phone
Ted Ferry	Box 7755	1616 Water		225-2276
Councilmembers				
Alarie Stanton (Vice-Mayor)	3817 Fairview	3817 Fairview	225-3780	225-3406
Paul Boyd	Box 7318	391 Bawden	225-4108	225-3231
Tom Friesen	Box 5118	2031 Second	225-3146	225-4905
Val Jackson	Box 6315	500 Front		225-5414
Georgia C. Skannes	519 Buren	519 Buren		225-2459
Donald F. Hoff, Jr.	2438 First Ave.			225-6376
Edward W. Zastrow	3530 Denali	3530 Denali	225-2151 Ext.202	225-2814

City Manager James A. Van Altvorst	334 Front St.	225-3111	225-2410
Utilities Manager Richard A. Southworth	334 Front St.	225-1000	225-2201
City Clerk Karen Miles	334 Front St.	225-3111	225-3249

Alaska State Legislature
Senate

Official Business

Pouch V
State Capitol
Juneau, Alaska 99811

MEMORANDUM

TO: Representative Alice Hanley

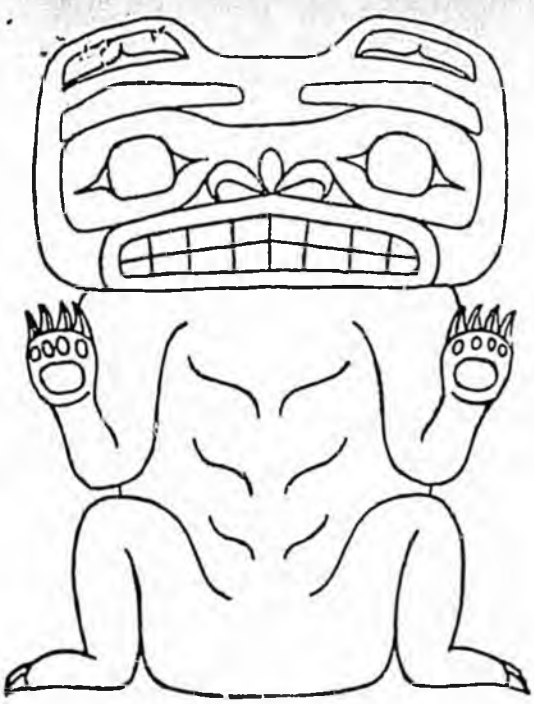
FROM: Senator Lloyd Jones

RE: Saxman resolution on Marijuana

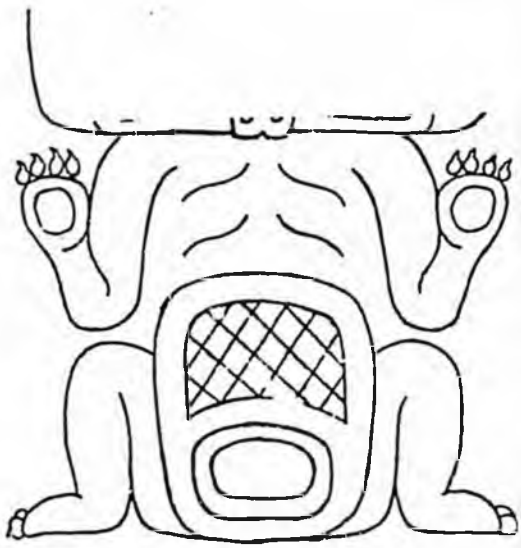
DATE: January 27, 1987

Attached for your perusal is a resolution that has been sent to my office from the City of Saxman.

Should you have any questions, please give me a call.







City of Saxman

Rt. 2, Box 1
Saxman, Alaska 99901
907-225-4166

CITY OF SAXMAN

RESOLUTION NO. 87-01-030

A RESOLUTION OF THE CITY OF SAXMAN, ALASKA, SUPPORTING REPEAL OF A.S. 11.71.070 AND AMENDMENT OF A.S. 11.71.060(a) TO MAKE MARIJUANA ILLEGAL AND ESTABLISHING AN EFFECTIVE DATE.

WHEREAS, Alaska is the only state in the union with a permissive statute for personal possession of marijuana; and

WHEREAS, findings of local, state and federal authorities conclude that marijuana is detrimental to the health, welfare and public safety of all people and of all ages; and

WHEREAS, the Supreme Courts of other states and the U.S. Supreme Court have upheld state statutes prohibiting the use and possession of marijuana; and

WHEREAS, current Alaska state statutes are not in conformity with federal drug enforcement laws controlling drug abuse; and

WHEREAS, the conflict between federal and state law pertaining to marijuana causes unnecessary barriers for local police and Alaska State Troopers in protecting the public from drug abusers; and

WHEREAS, Ketchikan Youth Service, Families in Action and other concerned local citizens have expressed concern over the drug abuse problem in the community; and

WHEREAS, representatives of sixty (60) Alaska high schools at the Alaska Association of School Governments' Annual Fall Conference held on October 18, 1986, unanimously passed a resolution to repeal the current marijuana law and make the drug in all its forms illegal in Alaska.

NOW THEREFORE, BE IT RESOLVED THAT THE COUNCIL OF THE CITY OF SAXMAN, ALASKA does hereby petition the Governor of the State of Alaska, the Alaska State Legislature and the Alaska Supreme Court to take immediate steps to repeal statutory and constitutional protection for use and possession of marijuana in the State of Alaska in order to promote the general health, welfare and public safety of the citizens of Saxman and the State of Alaska; and

DO HEREBY FUTHER DIRECT the City Clerk to send copies of this resolution to Governor Cowper, Senator Jones, Representative Taylor, Representative Sund, Tlingit and Haida Central Council, the Attorney General and the Alaska Municipal League.

CERTIFICATION: Approved by a vote of 5 for and 1 against on this 19th day of January, 1987, constituting a majority of the member of the Council.

James E. Swink, Mayor

Nora DeWitt
Administrative City Clerk

TOGIAK CITY COUNCIL

P.O. Box 99
Togiak, Alaska 99678
(907) 493-5820

April 15, 1987

Representative Alyce Hanley
4007 Brentwood Circle
Anchorage, Alaska 99502

Dear Ms. Hanley,

I am writing to tell you that I am grateful for your support on the recrimination of marijuana. I really appreciate what you are trying to do about the issue.

Would you please keep me informed on the issue? I would really appreciate that.

Thank you for your time.

Sincerely,

Moses Kritz
Togiak Mayor

MK/lma

Alaska State Legislature

House of Representatives

4007 BRENTWOOD CIRCLE
ANCHORAGE, ALASKA 99502
(907) 243-7574

REPRESENTATIVE
ALYCE HANLEY
DISTRICT 9, SEAT B

WHILE IN JUNEAU
BOX J
JUNEAU, ALASKA 99811
(907) 465-4939

MEMBER
HEALTH, EDUCATION AND
SOCIAL SERVICES COMMITTEE
REGULATION REVIEW COMMITTEE

April 6, 1987

Mayor Moses Kritz
Mr. James Forbes
Togiak City Council
P. O. Box 99
Togiak, Alaska 99811

Dear Sirs:

Thanks for your letter expressing your concerns with marijuana. I am writing to tell you that I haven't given up and will continue to fight for the recriminalization of marijuana.

I thought you might be interested in the letter I have just completed to Governor Cowper. There are several legislators here in Juneau who are determined to continue this battle throughout the two years of this session.

I appreciate having your suggestions and knowing of your concerns. Thank you again for taking the time to write.

Sincerely,

Alyce

Alyce Hanley
Representative

AAH:cas

Enclosure (1)

TOGIAK CITY COUNCIL

P.O. Box 99
Togiak, Alaska 99678
(907) 493-5820

February 25, 1987

Representative Alyce Hanley
Alaska State Legislature
Pouch V
Juneau, Alaska 99811

Dear Mr. Hanley:

So recrimnalization of marijuana is out for Alaska. It seems the private rights of some are more important than the future generation of Alaskans.

Well, okay. Then how about if we look at the dope situation from a different approach. In Alaska, to sell alcoholic beverages, you must have a liquor license and in Canada you go to a state liquor store to buy liquor. Since marijuana is a drug, why not at least have it licensed so we can get it out of the hands of dope dealers and criminals.

Here in the village of Togiak, the kids pay $10.00 for about $.50 worth of marijuana in one tiny cigarette.

If the city here was selling the drug out of the clinic at the price of $2.00 ($1.00 cost, $1.00 city tax, $1.00 state tax) then the dope business could be taken out of the hands of the criminals and dope dealers who are ripping off all of us.

Yes, all of us. They pay no taxes because they show no income. This also allows them to sit back on welfare, energy assistance, and food stamps so the state is already financing the dope business. Also, by charging such high prices for an addictive substance, our local economy is going up in smoke.

Another point which should be brought up is if the legislature is really concerned about peoples' rights is the quality of the marijuana. I think it should be tested for pesticides and other harmful polutents. It should also be tested for impurities or more harmful drugs which may be mixed into the marijuana.

It seems to me if you legislatures can't make marijuana illegal, the least you can do is make it a controlled substance which is controlled by the state just like alcohol.

Sincerely,

Moses Kritz
Mayor

James Forbes
Local Resident

CITY OF VALDEZ, ALAKSA

RESOLUTION NO. 8711

A RESOLUTION OF THE CITY OF VALDEZ URGING THE ALASKA LEGISLATURE TO REPEAL LAWS ALLOWING FOR THE PERSONAL USE OF MARIJUANA.

WHEREAS, the State of Alaska is eligible for certain Federal grants for control of narcotics; and

WHEREAS, the dangerous and grievous use of unlawful narcotics threatens the lives and well-being of many citizens of Alaska, especially, our young people; and

WHEREAS, the Alaska State Statutes allow for personal possession and use of amounts of contraband and dangerous substances that would otherwise be illegal under Federal and State laws; and

WHEREAS, these peculiar provisions of State law threaten the State of Alaska's eligibility for Federal funds for control of narcotics; and

WHEREAS, these provisions serve no useful purpose in a society that is outraged at the suffering and expense caused by drug abuse; and

WHEREAS, the right to privacy in the home in Alaska is a constitutional protection and that right can be protected by allowing the exception to be a lawfully obtained search warrant,

NOW, THEREFORE, BE IT RESOLVED that the Valdez City Council urges the Legislature of the State of Alaska to repeal those sections of the Alaska Statutes which allow personal possession and use of marijuana and support the recriminalization of marijuana.

PASSED AND APPROVED BY THE COUNCIL OF THE CITY OF VALDEZ, ALASKA this 17th day of February, 1987.

CITY OF VALDEZ, ALASKA

BY: John Devens
John Devens, Mayor

ATTEST:

BY: John Thorp
John Thorp
Acting City Manager

NORTHWEST ARCTIC BOROUGH

RESOLUTION 87-26

A RESOLUTION OF THE NORTHWEST ARCTIC BOROUGH ASSEMBLY SUPPORTING RECRIMINALIZING THE POSSESSION AND USE OF MARIJUANA.

WHEREAS, drug abuse has become a major problem in the villages of rural Alaska; and

WHEREAS, the State Legislature has decriminalized the use and possession of marijuana; and

WHEREAS, research has shown the harmful effect of marijuana use; and

WHEREAS, many people look at marijuana as a starting point for drug use; and

WHEREAS, the current law concerning use and possession of marijuana is giving our youth the message that it is O.K. to use drugs.

NOW THEREFORE BE IT RESOLVED: that the Northwest Arctic Borough Assembly and the Northwest Arctic Borough School District by their Resolution 088-002 go on record in support of recriminalizing the possession and use of marijuana and request the State Legislature to reevaluate the current law and pass legislation to change the current law making possession and use of marijuana illegal.

PASSED AND ADOPTED THIS 13th DAY OF October, 1987.

Borough Clerk

ATTEST:

SIGNED AND APPROVED THIS 14th DAY OF October, 1987.

Mayor

City and Borough of Sitka

304 LAKE STREET. SITKA, ALASKA. 99835

March 26, 1987

Senator Paul Fischer, Chairman
Health, Education, & Social Services Comm.
Box V
Juneau, Alaska 99811

Dear Senator Fischer:

Enclosed is our Resolution No. 87-341 which urges the enactment of Senate Bill 32. Thank you for considering our comments on this very important legislation.

Sincerely yours,

Richard Anderson
Administrator

enclosure

cc: Senator Lloyd Jones/encl.

C I T Y A N D B O R O U G H O F S I T K A

RESOLUTION NO. 87-341

A RESOLUTION OF THE ASSEMBLY OF THE
CITY AND BOROUGH OF SITKA
URGING THE ALASKA LEGISLATURE
TO ENACT SENATE BILL 32

WHEREAS, the use of marijuana is damaging to the human mind and body; and

WHEREAS, marijuana represents a special danger to our children, our most important asset; and

WHEREAS, our society needs to express its abhorrence for the possession and use of this drug; and

WHEREAS, our authorities need the means to combat the possession and use of marijuana,

NOW, THEREFORE, BE IT RESOLVED by the Assembly of the City and Borough of Sitka that the Legislature of the State of Alaska is urged to enact Senate Bill 32.

PASSED, APPROVED, AND ADOPTED by the Assembly of the City and Borough of Sitka, Alaska this 24th day of MARCH, 1987.

Dan Keck, Mayor

A T T E S T:

Dolores Ingwersen,
Municipal Clerk

CITY of WRANGELL, ALASKA

INCORPORATED JUNE 15, 1903

BOX 531, 99929 (907) 874-2381

ADOPTED AUGUST 1972

February 11, 1987

The Honorable Steve Cowper
Governor of Alaska
Pouch A
Juneau, Alaska 99801

Dear Governor Cowper:

Attached hereto is a copy of the City of Wrangell Resolution No. 02-87-263 urging the Alaska Legislature to criminalize the act of possession of marijuana in any amount.

The Wrangell City Council respectfully request your support in this matter.

Sincerely,

Joyce Rasler

Joyce Rasler
City Manager

Attachment:

cc: Representative Taylor
Representative Sund
Senator Jones

CITY OF WRANGELL, ALASKA

RESOLUTION NO. 02-87-263

A RESOLUTION OF THE COUNCIL OF THE CITY OF WRANGELL, ALASKA, URGING THE ALASKA LEGISLATURE TO CRIMINALIZE THE ACT OF POSSESSION OF MARIJUANA IN ANY AMOUNT.

WHEREAS, THC is the ingredient in marijuana that goes into the fatty tissues of the brain and other internal organs and takes thirty days to be eliminated from the body; and

WHEREAS, THC is reported to cause effects to a person that may result in the birth of deformed or undersized offspring; and

WHEREAS, the THC content of a marijuana cigarette is as high as ten percent today as compared to one percent ten years ago; and

WHEREAS, numerous psychological and physical reactions result from the use of marijuana which impair the health and well being of the public; and

WHEREAS, Alaska's law which allows the possession of certain amounts of marijuana is contrary to the Federal Government's laws and the "war on drugs" being waged across the nation by Cities and States.

NOW, THEREFORE BE IT RESOLVED BY THE COUNCIL OF THE CITY OF WRANGELL, ALASKA, that the Alaska Legislature is urged to amend the law to criminalize the act of possession of marijuana in any amount in the best interests of the public, except as authorized in AS 17.301. Be it further resolved that copies of this Resolution be forwarded to Governor Steve Cowper, Senator Lloyd Jones, Representative Robin Taylor and Representative John Sund.

PASSED AND APPROVED February 10, 1987

MAYOR

ATTEST: Kenneth Pinderson
CITY CLERK

SENATE COMMITTEE REPORT

FIRST COMMITTEE OF REFERRAL

Date of 2/16/87 5-DAY NOTICE
IN ACCORDANCE WITH UNIFORM RULE 23

FURTHER: JUDICIARY
Finance

**FISCAL NOTE(S) ATTACHED 5 **
IN ACCORDANCE WITH AS 24.08.035
(see below)

1/19/87

DATE TURNED INTO OFFICE 3/31/87

Mr. President:

HESS Committee considered SB 32

~~relating to~~ marijuana; efd.

and recommended:

[X] replace with CS SB 32 (HESS) [X] same title [ ] new title

[ ] attached amendment(s) and

[X] do pass

[ ] do not pass

[ ] no recommendation

[ ] individual recommendations

[ ] further referral to _____

[ ] letter of intent adopted and attached

** Committee [X] attached or [ ] adopted fiscal note(s)
2 [X] zero 3 [X] fiscal impact

MEMBERS SIGNING DO PASS

OTHER RECOMMENDATIONS

Pete Hayford NO REC

Joe Josephson - Do not PASS UNLESS AMENDED AND WITHOUT FISCAL NOTE CHANGE

Carl Tinsley Do Pass
Chairman signature and recommendation

[ ] Committee Backup Attached

#12

STATE OF ALASKA
1988 LEGISLATIVE SESSION

BILL VERSION: CSSB 32 (HESS)
PUBLISH DATE: _____

FISCAL NOTE

REQUEST:

Revision Date: February 17, 1988
Title: "An Act relating to marijuana..."

Agency Affected: Department of Law
BRU: Prosecution

Sponsor: Senate HESS
Requestor: Governor's Office/OMB

Components: Third District, Fourth District, Criminal Justice Litigation

EXPENDITURES/REVENUES: (Thousands of Dollars)

OPERATING	FY 88	FY 89	FY 90	FY 91	FY 92	FY 93
PERSONAL SERVICES		160.9	165.7	170.7	175.8	181.1
TRAVEL		5.4	5.6	5.8	6.0	6.2
CONTRACTUAL		53.7	36.5	11.9	12.3	12.7
SUPPLIES		12.6	9.3	9.6	9.9	10.2
EQUIPMENT		4.5	-0-	-0-	-0-	-0-
LAND & STRUCTURES						
GRANTS, CLAIMS						
MISCELLANEOUS						
TOTAL OPERATING		237.1	217.1	198.0	204.0	210.2
CAPITAL						
REVENUE						

FUNDING: (Thousands of Dollars)

GENERAL FUND		237.1	217.1	198.0	204.0	210.2
FEDERAL FUNDS						
OTHER						
TOTAL						

POSITIONS:

FULL-TIME		2	2	2	2	2
PART-TIME		1	1	1	1	1
TEMPORARY						

ANALYSIS: (Attach a separate page if necessary)

Please see attached analysis.

Richard T. Pegues

Prepared by: Richard T. Pegues, Director
Phone: 465-3672
Division: Administrative Services
Date: February 17, 1988

Richard T. Pegues [FOR]

Approved by Commissioner: Grace Berg Schaible, Atty. Gen.
Date: February 17, 1988
Agency: Department of Law

Distribution (by preparer):
Legislative Finance
Legislative Sponsor
Requestor
Office of Management and Budget
Impacted Agency(ies)

SB 32 is a blanket provision which would make possession or use of less than one-half pound of marijuana by anyone a class B misdemeanor. Some of the conduct which this bill would cover (such as use or display of any amount in a public place, possession of any amount while operating a motor vehicle, or possession of more than four ounces of marijuana anywhere) is a class B misdemeanor under existing law. See AS 11.71.060. Some of the conduct which this bill would make a crime (such as delivery of less than one-half ounce or possession of less than one ounce in public) is classified under current law as a "violation", punishable by a fine. See AS 11.71.070. The penalties under current law for other conduct such as delivery of one-half ounce or more, delivery to a minor, or possession of any amount on school grounds would not be altered. Penalties under existing law for these offenses range from A misdemeanor to B felony level. See AS 11.71.030, .040, and .050.

The passage of SB 32 would have fiscal impact on the Department of Law in three general areas: (1) the cost of defending the new law against constitutional challenge; (2) the cost of processing the resulting additional criminal cases; and (3) the cost of educating the public about the new law. These three areas are discussed separately below.

1. Defending the New Law

In 1975 the Alaska Supreme Court in the case of Ravin v. State, 537 P.2d 497 (Alaska 1975), ruled that under Art. I, Sec. 22 of the Alaska Constitution the state could not prohibit possession of marijuana by adults in their own homes for personal use. The court held that the state had not demonstrated the existence of a legitimate state interest which was strong enough to justify the regulation of this conduct.

Since passage of SB 32 would make it a crime for an adult to possess any amount of marijuana anywhere, including in his or her own home, the constitutionality of the new law is certain to be challenged. An appellate court will have to decide whether the state has proved that there is a "compelling state interest" in the prohibition of the use of marijuana which is sufficient to outweigh an individual's right to privacy under the state constitution. It is extremely important, therefore, that the legislature's consideration of this bill include extensive public hearings, debate on the social policy merits of the proposal, and the collection of the results of the most recent scientific, medical, and pharmacological studies regarding the physical, emotional, and social effects of marijuana usage.

In addition to the necessary legislative hearings, evidentiary hearings at the trial court level can be expected when a challenge to the new law is filed. Challenges to the new law will most likely arise in the context of a defendant's pretrial motion to dismiss a criminal prosecution. When responding to such a defense motion, the prosecutor

would, in essence, have to convince a court to reverse the ruling in the Ravin case. In order to demonstrate that the result in Ravin is no longer correct, the prosecutor would have to present convincing, scientifically accurate, evidence that the effects of marijuana usage are so injurious to a person's mental and physical health as to justify the legislative decision to totally prohibit use of marijuana by anyone at any time (as opposed to use by minors or use by a person who is operating a motor vehicle--both of which are already prohibited under current law).

The presentation of this convincing evidence will require the prosecution to present expert testimony from authorities who have conducted recent research in this area. Out-of-state witnesses in medical and scientific fields charge a fee for their services. These fees will vary from individual to individual, but are expected to average at least $100 per hour. This would include services for consultation, witness preparation and actual testimony. Costs will be incurred for expert witness transportation, food and lodging, and other incidental expenses. Additionally, there will be some costs for preparation of exhibits and written reports. To the extent possible, the Department of Law would attempt to present written testimony in situations where it is not feasible to fly a person to Alaska to testify in person. We estimate that a minimum of six expert witnesses will be required to attempt to successfully defend the new law at the trial court level.

Hearings at the trial court level can reasonably be expected to take several days. A substantial commitment of attorney time will be required for scientific and legal research in preparation for the hearings, actual court time, legal briefing, and the preparation of proposed findings of fact. Since prosecutions under the new law will occur statewide, defense challenges may be raised at the same time in different parts of the state. The extensive hearings described above may have to be held in more than one judicial district in the state.

Regardless of which side prevails at the trial court level, the lower court ruling would almost certainly be followed by an appeal. At a minimum, such an appeal (or appeals) would required additional legal research, a thorough review of the record, the drafting of briefs, and oral argument before the appellate court.

2. New Criminal Cases

Although some of the conduct included within the scope of SB 32 is already against the law, much behavior which is now classified as a "violation" or which is not now an offense of any sort will become a misdemeanor crime. It is difficult to accurately predict in advance the impact which the passage of SB 32 will have on the criminal justice system.

Some law enforcement officers who work primarily in the drug enforcement area believe that the new law could potentially result in "thousands" of new misdemeanor cases a year. They believe that the bill would cause an increased enforcement effort both in the areas not now covered by existing law and against persons who commit minor offenses which are already against the law. A great number of the new cases would arise from situations where law enforcement officers now commonly discover small amounts of marijuana (as when an officer responds to a domestic disturbance call and sees some marijuana plants in a person's home, or when a person is arrested for a minor offense and a routine search for weapons reveals some marijuana cigarettes in the person's pocket, for example). Incidents of this sort occur frequently now, but do not generally result in any criminal prosecution for the marijuana possession. Many of these cases are likely to be referred for criminal prosecution if SB 32 becomes law.

Prosecutors generally predict a lesser number of new potential criminal cases under SB 32 than do police. Once the public becomes aware of the new law, people are likely to be more careful about not allowing marijuana or smoking paraphernalia to be exposed in plain view in their homes, for example. Judging from the number of minor marijuana offenses prosecuted prior to the Ravin decision in 1975, prosecutors expect a "few hundred" new criminal cases a year.

Cases which are accepted for prosecution will require attorney time both at trial and in preparation for trial (i.e., preparation of search warrants, response to defense motions, evaluation of results of laboratory analysis, pretrial witness preparation, etc.). To handle screening of the expected case referrals, and to prosecute the additional cases, the criminal division will require the addition of at least two Attorney III positions in Anchorage. It is anticipated that a half-time attorney will also be needed in the Fairbanks District Attorney's office.

This fiscal note reflects the fact that the pretrial diversion program was entirely eliminated in FY 88. Anticipating that more than fifty per cent of defendants would qualify for diversion, we must prepare for a gross increase in the number of cases that will go to trial.

3. Public Education

In order to inform the public of the changes in the law, the Department of Law will develop and disseminate public notices explaining the new law. These notices will include newspaper ads and brochures, and will be modeled upon the public education notices which were distributed statewide in connection with the new drug law in 1982 and the new DWI and drinking age laws in 1983. Based upon experience with these earlier notices, approximately $18,000 will be needed to cover the costs of writing, layout, typesetting, publication, and distribution.

Fiscal Analysis

1. Defending the New Law

Admin. & Support Component/Prosc. - BRU

Object	Total
Contractual Services -	
Professional fees scientific experts	
120 hrs. X $100 = $12,000	$12,000
Experts' staff support, preparation of exhibits, written testimony	
50 hrs. X $40 = $2,000	2,000
Experts' travel to attend hearings and offer testimony	
6 trips X 4 days X $80 = $1,920 subsistence	1,920
6 trips X $1,500 = $9,000 travel	9,000
	$24,920

This amount will be required for both FY 89 and FY 90, to cover both trials and appeals.

Fiscal Analysis - (cont'd)

2. New Criminal Cases

Third Judicial District - Anchorage

	Atty III (PFT)	Atty III (PFT)	Total
Personal Services	62.6	62.6	125.2
Travel - Witness travel subsistence, atty. travel	1.8	1.8	3.6
Contractual Services			
office commo. equip. repairs	2.4	2.4	4.8
copy - postage	1.2	1.2	2.4
			7.2
Commodities - Ongoing			
office consumables	1.8	1.8	3.6
Law library	1.2	1.2	2.4
Commodities - one time			
New position materials	1.2	1.2	2.4
			8.4
Equipment - one time			
New position equipment	1.5	1.5	3.0
	73.7	73.7	147.4

Fiscal Analysis - (cont'd)

Fourth Judicial District - Fairbanks

	Atty. III (PPT)	Total
Personal Services	35.7	35.7
Travel - Witness travel subsistence, Atty. travel	1.8	1.8
Contractual Services		
office commo., equip. repair	2.4	2.4
copy - postage	1.2	1.2
		3.6
Commodities - Ongoing		
office consumables	1.8	1.8
Law library	1.2	1.2
Commodities - one time		
New position materials	1.2	1.2
		4.2
Equipment - one time		
New position equipment	1.5	1.5
		46.8

Fiscal Analysis - (cont'd)

3. Public Education

Admin. & Support Component/Prosc. BRU

Object	Total
Contractual Services - one time writing, layout, typesetting, publication and distribution of public notices and information brochures describing the changes in the law.	18.0 18.0
	18.0

Summary of Expenses

	Defending the new law	New Criminal Cases	Public Education	Total
Personal Services		160.9		160.9
Travel		5.4		5.4
Contractual	24.9	10.8	18.0	53.7
Commodities		12.6		12.6
Equipment		4.5		4.5
	24.9	194.2	18.0	237.1

Costs beyond FY 89 include a 3 per cent inflation factor, less one-time items. The costs for defending the new law will occur in both FY 89 and FY 90 and they will be eliminated thereafter.

Position Title	No. of Positions	Range/Step	Barg. Unit
Attorney III	2	22A	PX

Time Status	Staff Months	Location	Election District
PFT	24	EBA - Anchorage	8

Type of Expenditure		Amount
1	2	3
Salary	98,380	
Benefits	26,834	
Premium Pay		
Other		
Total Personal Services		125,214
Travel		3,600
Contractual		7,200
Commodities		8,400
Equipment		3,000
Other		
Total Cost		147,414

Funding Source for Total Cost		
Federal Receipts	1002	
G. F. Match	1003	
General Fund	1004	147,414
I-A Receipts	1006	
CIP Receipts	1061	
Other		

Justification

These two full-time attorney positions are required at Anchorage to handle the influx of new cases that will result when marijuana violations, or any use of marijuana, which is not now a violation, become misdemeanor offenses. Prosecutors expect that at least a few hundred such offenses will occur each year as a result of the enactment of this bill. These positions will be responsible for prosecuting those new cases that are brought in the Third Judicial District and handling appellate briefs and appeals hearings. Because these new cases will be classed as misdemeanor offenses, allocation of the positions to the Attorney III level is appropriate.

Request For Position

Agency Department of Law

BRU Prosecution

Component Third Judicial District

Revised Date

FY 89

Position Title	No. of Positions	Range/Step	Barg. Unit
Attorney III	1	22A	PX

Time Status	Staff Months	Location	Election District
PPT	12	JBA - Fairbanks	16

Type of Expenditure		Amount
1	2	3
Salary	28,128	
Benefits	7,576	
Premium Pay		
Other		
Total Personal Services		35,704
Travel		1,800
Contractual		3,600
Commodities		4,200
Equipment		1,500
Other		
Total Cost		46,804

Funding Source for Total Cost		
Federal Receipts	1002	
G. F. Match	1003	
General Fund	1004	46,804
I-A Receipts	1006	
CIP Receipts	1061	
Other		

Justification

This permanent part-time position at Fairbanks is required to handle the influx of new cases that will result when marijuana violations, or any use of marijuana, which is not now a violation, become misdemeanor offenses. Prosecutors expect that at least a few hundred offenses will occur each year as a result of the enactment of this bill. This position will be responsible for prosecuting those new cases that are brought in the Fourth Judicial District. Because these new cases will be classed as misdemeanor offenses, allocation of the position to the Attorney III level is appropriate.

Request For
Position

Agency Department of Law

BRU Prosecution

Component Fourth Judicial District

STATE OF ALASKA 1987 LEGISLATIVE SESSION
FISCAL NOTE

REQUEST:

Bill Version : SB 32
Publish Date :

Revision Date:
Title :"An Act relating to marijuana..."

Agency Affected : Department of Law
BRU : Prosecution

Sponsor : Sen. Fischer
Requestor : Sen. Fischer

Components : Third Judicial District, Fourth Judicial District, Admin. & Support

EXPENDITURES/REVENUES: (Thousands of Dollars)

OPERATING	FY 87	FY 88	FY 89	FY 90	FY 91	FY 92
PERSONAL SERVICES		160.9	165.7	170.7	175.8	181.1
TRAVEL		5.4	5.6	5.8	6.0	6.2
CONTRACTUAL		53.7	36.5	11.9	12.3	12.7
SUPPLIES		12.6	9.3	9.6	9.9	10.2
EQUIPMENT		4.5	-0-	-0-	-0-	-0-
LAND & STRUCTURES						
GRANTS, CLAIMS						
MISCELLANEOUS						
TOTAL OPERATING		237.1	217.1	198.0	204.0	210.2
CAPITAL						
REVENUE						

FUNDING: (Thousands of Dollars)

GENERAL FUND		237.1	217.1	198.0	204.0	210.2
FEDERAL FUNDS						
OTHER						
TOTAL						

POSITIONS:

FULL-TIME		2	2	2	2	2
PART-TIME		1	1	1	1	1
TEMPORARY						

ANALYSIS : (Attach a separate page if necessary)

Please see attached analysis.

Richard L. Pegues

Prepared by : Richard I. Pegues, Director — Phone : 465-3672
Division : Administrative Services — Date : 3/11/87

Richard L. Pegues /AR1

Approved by Commissioner : Grace Berg Schaible, Atty. Gen. — Date : 3/11/87
Agency : Department of Law

Distribution (by preparer):
Legislative Finance
Legislative Sponsor
Requestor
Office of Management and Budget
Impacted Agency(ies)
Senate Secretary

Dept. of Law

SB 32 is a blanket provision which would make possession or use of less than one-half pound of marijuana by anyone a class B misdemeanor. Some of the conduct which this bill would cover (such as use or display of any amount in a public place, possession of any amount while operating a motor vehicle, or possession of more than four ounces of marijuana anywhere) is a class B misdemeanor under existing law. See AS 11.71.060. Some of the conduct which this bill would make a crime (such as delivery of less than one-half ounce or possession of less than one ounce in public) is classified under current law as a "violation", punishable by a fine. See AS 11.71.070. The penalties under current law for other conduct such as delivery of one-half ounce or more, delivery to a minor, or possession of any amount on school grounds would not be altered. Penalties under existing law for these offenses range from A misdemeanor to B felony level. See AS 11.71.030, .040, and .050.

The passage of SB 32 would have fiscal impact on the Department of Law in three general areas: (1) the cost of defending the new law against constitutional challenge; (2) the cost of processing the resulting additional criminal cases; and (3) the cost of educating the public about the new law. These three areas are discussed separately below.

1. Defending the New Law

In 1975 the Alaska Supreme Court in the case of Ravin v. State, 537 P.2d 497 (Alaska 1975), ruled that under Art. I, Sec. 22 of the Alaska Constitution the state could not prohibit possession of marijuana by adults in their own homes for personal use. The court held that the state had not demonstrated the existence of a legitimate state interest which was strong enough to justify the regulation of this conduct.

Since passage of SB 32 would make it a crime for an adult to possess any amount of marijuana anywhere, including in his or her own home, the constitutionality of the new law is certain to be challenged. An appellate court will have to decide whether the state has proved that there is a "compelling state interest" in the prohibition of the use of marijuana which is sufficient to outweigh an individual's right to privacy under the state constitution. It is extremely important, therefore, that the legislature's consideration of this bill include extensive public hearings, debate on the social policy merits of the proposal, and the collection of the results of the most recent scientific, medical, and pharmacological studies regarding the physical, emotional, and social effects of marijuana usage.

In addition to the necessary legislative hearings, evidentiary hearings at the trial court level can be expected when a challenge to the new law is filed. Challenges to the new law will most likely arise in the context of a defendant's pretrial motion to dismiss a criminal prosecution. When responding to such a defense motion, the prosecutor

would, in essence, have to convince a court to reverse the ruling in the Ravin case. In order to demonstrate that the result in Ravin is no longer correct, the prosecutor would have to present convincing, scientifically accurate, evidence that the effects of marijuana usage are so injurious to a person's mental and physical health as to justify the legislative decision to totally prohibit use of marijuana by anyone at any time (as opposed to use by minors or use by a person who is operating a motor vehicle--both of which are already prohibited under current law).

The presentation of this convincing evidence will require the prosecution to present expert testimony from authorities who have conducted recent research in this area. Out-of-state witnesses in medical and scientific fields charge a fee for their services. These fees will vary from individual to individual, but are expected to average at least $100 per hour. This would include services for consultation, witness preparation and actual testimony. Costs will be incurred for expert witness transportation, food and lodging, and other incidental expenses. Additionally, there will be some costs for preparation of exhibits and written reports. To the extent possible, the Department of Law would attempt to present written testimony in situations where it is not feasible to fly a person to Alaska to testify in person. We estimate that a minimum of six expert witnesses will be required to attempt to successfully defend the new law at the trial court level.

Hearings at the trial court level can reasonably be expected to take several days. A substantial commitment of attorney time will be required for scientific and legal research in preparation for the hearings, actual court time, legal briefing, and the preparation of proposed findings of fact. Since prosecutions under the new law will occur statewide, defense challenges may be raised at the same time in different parts of the state. The extensive hearings described above may have to be held in more than one judicial district in the state.

Regardless of which side prevails at the trial court level, the lower court ruling would almost certainly be followed by an appeal. At a minimum, such an appeal (or appeals) would required additional legal research, a thorough review of the record, the drafting of briefs, and oral argument before the appellate court.

2. New Criminal Cases

Although some of the conduct included within the scope of SB 32 is already against the law, much behavior which is now classified as a "violation" or which is not now an offense of any sort will become a misdemeanor crime. It is difficult to accurately predict in advance the impact which the passage of SB 32 will have on the criminal justice system.

Some law enforcement officers who work primarily in the drug enforcement area believe that the new law could potentially result in "thousands" of new misdemeanor cases a year. They believe that the bill would cause an increased enforcement effort both in the areas not now covered by existing law and against persons who commit minor offenses which are already against the law. A great number of the new cases would arise from situations where law enforcement officers now commonly discover small amounts of marijuana (as when an officer responds to a domestic disturbance call and sees some marijuana plants in a person's home, or when a person is arrested for a minor offense and a routine search for weapons reveals some marijuana cigarettes in the person's pocket, for example). Incidents of this sort occur frequently now, but do not generally result in any criminal prosecution for the marijuana possession. Many of these cases are likely to be referred for criminal prosecution if SB 32 becomes law.

Prosecutors generally predict a lesser number of new potential criminal cases under SB 32 than do police. Once the public becomes aware of the new law, people are likely to be more careful about not allowing marijuana or smoking paraphernalia to be exposed in plain view in their homes, for example. Judging from the number of minor marijuana offenses prosecuted prior to the Ravin decision in 1975, prosecutors expect a "few hundred" new criminal cases a year.

Cases which are accepted for prosecution will require attorney time both at trial and in preparation for trial (i.e., preparation of search warrants, response to defense motions, evaluation of results of laboratory analysis, pretrial witness preparation, etc.). To handle screening of the expected case referrals, and to prosecute the additional cases, the criminal division will require the addition of at least two Attorney III positions in Anchorage. It is anticipated that a half-time attorney will also be needed in the Fairbanks District Attorney's office.

This fiscal note reflects the fact that the pretrial diversion program will be entirely eliminated in FY 88. Anticipating that more than fifty per cent of defendants would qualify for diversion, we must prepare for a gross increase in the number of cases that will go to trial.

3. Public Education

In order to inform the public of the changes in the law, the Department of Law will develop and disseminate public notices explaining the new law. These notices will include newspaper ads and brochures, and will be modeled upon the public education notices which were distributed statewide in connection with the new drug law in 1982 and the new DWI and drinking age laws in 1983. Based upon experience with these earlier notices, approximately $18,000 will be needed to cover the costs of writing, layout, typesetting, publication, and distribution.

CONTINUATION of FISCAL NOTE ANALYSIS

For Bill/Resolution No. SB 32

In addition to the costs explained above, it is anticipated that the passage of this bill will result in increased costs to other components of the criminal justice system, including law enforcement, the courts, the public defender agency, and corrections.

CONTINUATION of FISCAL NOTE ANALYSIS

For Bill/Resolution No. SB 32

Fiscal Analysis

1. Defending the New Law

Admin. & Support Component/Prosc. - BRU

Object	Total
Contractual Services -	
Professional fees scientific experts	
120 hrs. X $100 = $12,000	$12,000
Experts' staff support, preparation of exhibits, written testimony	
50 hrs. X $40 = $2,000	2,000
Experts' travel to attend hearings and offer testimony	
6 trips X 4 days X $80 = $1,920 subsistence	1,920
6 trips X $1,500 = $9,000 travel	9,000
	$24,920

This amount will be required for both FY 88 and FY 89, to cover both trials and appeals.

CONTINUATION of FISCAL NOTE ANALYSIS

For Bill/Resolution No. SB 32

Fiscal Analysis - (cont'd)

2. New Criminal Cases

Third Judicial District - Anchorage

	Atty III (PFT)	Atty III (PFT)	Total
Personal Services	62.6	62.6	125.2
Travel - Witness travel subsistence, atty. travel	1.8	1.8	3.6
Contractual Services			
office commo. equip. repairs	2.4	2.4	4.8
copy - postage	1.2	1.2	2.4
			7.2
Commodities - Ongoing			
office consumables	1.8	1.8	3.6
Law library	1.2	1.2	2.4
Commodities - one time			
New position materials	1.2	1.2	2.4
			8.4
Equipment - one time			
New position equipment	1.5	1.5	3.0
	73.7	73.7	147.4

CONTINUATION of FISCAL NOTE ANALYSIS

For Bill/Resolution No. SB 32

Fiscal Analysis - (cont'd)

Fourth Judicial District - Fairbanks

	Atty. III (PPT)	Total
Personal Services	35.7	35.7
Travel - Witness travel subsistence, Atty. travel	1.8	1.8
Contractual Services		
office commo., equip. repair	2.4	2.4
copy - postage	1.2	1.2
		3.6
Commodities - Ongoing		
office consumables	1.8	1.8
Law library	1.2	1.2
Commodities - one time		
New position materials	1.2	1.2
		4.2
Equipment - one time		
New position equipment	1.5	1.5
		46.8

CONTINUATION of FISCAL NOTE ANALYSIS

For Bill/Resolution No. SB 32

Fiscal Analysis - (cont'd)

3. Public Education

Admin. & Support Component/Prosc. BRU

Object	Total
Contractual Services - one time writing, layout, typesetting, publication and distribution of public notices and information brochures describing the changes in the law.	18.0 18.0
	18.0

Summary of Expenses

	Defending the new law	New Criminal Cases	Public Education	Total
Personal Services		160.9		160.9
Travel		5.4		5.4
Contractual	24.9	10.8	18.0	53.7
Commodities		12.6		12.6
Equipment		4.5		4.5
	24.9	194.2	18.0	237.1

Costs beyond FY 88 include a 3 per cent inflation factor, less one-time items. The costs for defending the new law will occur in both FY 88 and FY 89 and they will be eliminated thereafter.

Position Title	No. of Positions	Range/Step	Barg. Unit
Attorney III	2	22A	PX

Time Status	Staff Months	Location	Election District
PFT	24	EBA - Anchorage	8

Type of Expenditure:		Amount
1	2	3
Salary	98,380	
Benefits	26,834	
Premium Pay		
Other		
Total Personal Services		125,214
Travel		3,600
Contractual		7,200
Commodities		8,400
Equipment		3,000
Other		
Total Cost		147,414

Funding Source for Total Cost		
Federal Receipts	1002	
G. F. Match	1003	
General Fund	1004	147,414
I-A Receipts	1006	
CIP Receipts	1061	
Other		

Justification

These two full-time attorney positions are required at Anchorage to handle the influx of new cases that will result when marijuana violations, or any use of marijuana, which is not now a violation, become misdemeanor offenses. Prosecutors expect that at least a few hundred such offenses will occur each year as a result of the enactment of this bill. These positions will be responsible for prosecuting those new cases that are brought in the Third Judicial District and handling appellate briefs and appeals hearings. Because these new cases will be classed as misdemeanor offenses, allocation of the positions to the Attorney III level is appropriate.

Request For New Position

Agency: Department of Law
BRU: Prosecution
Component: Third Judicial District

FY 88

Position Title	No. of Positions	Range/Step	Darg. Unit
Attorney III	1	22A	PX

Time Status	Staff Months	Location	Election District
PPT	12	JBA - Fairbanks	16

Type of Expenditure		Amount
1	2	3
Salary	28,128	
Benefits	7,576	
Premium Pay		
Other		
Total Personal Services		35,704
Travel		1,800
Contractual		3,600
Commodities		4,200
Equipment		1,500
Other		
Total Cost		46,804

Funding Source for Total Cost		
Federal Receipts	1002	
G. F. Match	1003	
General Fund	1004	46,804
I-A Receipts	1006	
CIP Receipts	1061	
Other		

Justification

This permanent part-time position at Fairbanks is required to handle the influx of new cases that will result when marijuana violations, or any use of marijuana, which is not now a violation, become misdemeanor offenses. Prosecutors expect that at least a few hundred offenses will occur each year as a result of the enactment of this bill. This position will be responsible for prosecuting those new cases that are brought in the Fourth Judicial District. Because these new cases will be classed as misdemeanor offenses, allocation of the position to the Attorney III level is appropriate.

Request For New Position

Agency Department of Law

BRU Prosecution

Component Fourth Judicial District

Revised Date

FY 88

STATE OF ALASKA 1987 LEGISLATIVE SESSION
FISCAL NOTE

REQUEST:

Bill Version : SB32
Publish Date :

Revision Date:
Title : "An Act relating to marijuana..."

Agency Affected : Dept. of Administration
BRU : Public Defender Agency

Sponsor : Sen. Fischer, Sen Faiks
Requestor : Judiciary

Components : Third Judicial District
Fourth Judicial District

EXPENDITURES/REVENUES: (Thousands of Dollars)

OPERATING	FY 87	FY 88	FY 89	FY 90	FY 91	FY 92
PERSONAL SERVICES		140.9	146.5	152.3	158.4	164.7
TRAVEL		-0-				
CONTRACTUAL		27.5	10.4	10.8	11.2	11.6
SUPPLIES		2.0	2.1	2.2	2.3	2.4
EQUIPMENT		3.0				
LAND & STRUCTURES						
GRANTS, CLAIMS						
MISCELLANEOUS						
TOTAL OPERATING	-0-	173.4	159.0	165.3	171.9	178.7
CAPITAL						
REVENUE						

FUNDING: (Thousands of Dollars)

GENERAL FUND	-0-	173.4	159.0	165.3	171.9	178.7
FEDERAL FUNDS						
OTHER						
TOTAL	-0-	173.4	159.0	165.3	171.9	178.7

POSITIONS:

FULL-TIME	-0-	2.0	2.0	2.0	2.0	2.0
PART-TIME						
TEMPORARY						

ANALYSIS : (Attach a separate page if necessary)

See attached analysis

Prepared by : Dana Fabe, Public Defender
Division : Public Defender Agency
Phone : 279-7541
Date : Feb. 20, 1987

Approved by Commissioner : Harvey Pesken
Agency :
Date : 3/6/87

Distribution (by preparer) :
Legislative Finance
Legislative Sponsor
Requestor
Office of Management and Budget
Impacted Agency(ies)
Senate Secretary

Public Defender Agency

CONTINUATION of FISCAL NOTE ANALYSIS

For Bill/Resolution No. SB32

This bill would re-institute the prosecution of offenses relating to the possession of marijuana in any amount or location and would result in a significant number of new cases for the Department of Law, the Public Defender Agency and the Office of Public Advocate. The Department of Law is requesting 2.5 new attorney positions while the Public Defender Agency is requesting an Attorney III in Anchorage and an Attorney III in Fairbanks for a total of 173.4.

BUDGET ANALYSIS

100	Attorney III - Anchorage	66.1		
	Attorney III - Fairbanks	74.8		140.9
200	Travel			-0-
300	Contractual	Space, phone, etc.	10.0	
		Litigation, one time	17.5	27.5
400	Supplies	- Law Library, office, etc.		2.0
500	Equipment	- One time		3.0
			Total	173.4

Position Title	No. of Positions	Range/Step	Barg. Unit	Gov.	Approv.	Disapp.
Attorney III	1	22A	PX			

Time Status	Staff Months	RP Number	Location	Election District
PFT	12.0		Anchorage	92

Type of Expenditure		Amount
1	2	3
Salary	49,140	
Benefits	16,980	
Premium Pay		
Other		
Total Personal Services		66,120
Travel		-0-
Contractual		22,500
Commodities		1,000
Equipment		1,500
Other		
Total Cost		91,120

Receipt Code	Funding Source		
	Federal Receipts	1002	
	G. F. Match	1003	
	General Funds	1004	91,120
	I-A Receipts	1005	
	Program Receipts	1028	
	CIP Receipts	1061	
	Other		

For B&M Use Only
Key Number __ __ - __ __ - __ __ - __ __ - __ __

Justification

This bill would result in a significant increase in criminal prosecutions as it would apply to any amount of marijuana in any location. The Public Defender Agency is requesting an Attorney III for Anchorage plus an additional 17.5 (one time) in contractual to litigate the constitutionality of this bill.

Request For New Position

Agency Dept. of Administration
BRU Public Defender Agency
Component Third Judicial District

FY 87

Position Title	No. of Positions	Range/Step	Barg. Unit	Gov.	Approv.	Disapp.
Attorney III	1	22A	94			

Time Status	Staff Months	RP Number	Location	Election District	Leg.		
PFT	12.0		Fairbanks	94			

Type of Expenditure		Amount
1	2	3
Salary	56,244	
Benefits	18,551	
Premium Pay		
Other		
Total Personal Services		74,795
Travel		-0-
Contractual		5,000
Commodities		1,000
Equipment		1,500
Other		
Total Cost		82,295

Receipt Code	Funding Source		
	Federal Receipts	1002	
	G. F. Match	1003	
	General Funds	1004	82,295
	I-A Receipts	1005	
	Program Receipts	1028	
	CIP Receipts	1061	
	Other		

For B&M Use Only
Key Number __ __ - __ __ - __ - __ - __ __ - __ __

Justification

This bill would result in a significant increase in criminal prosecutions as it would apply to any amount of marijuana in any location. The Public Defender Agency is requesting an Attorney III for Fairbanks to respond to the anticipated increased caseload.

Request For New Position

Agency Dept. of Administration
BRU Public Defender Agency
Component Fourth Judicial District

FY 87

STATE OF ALASKA 1987 LEGISLATIVE SESSION
FISCAL NOTE

Bill Version: CSSB 32 (HESS)
REQUEST — Publish Date:
Revision Date:
Agency Affected: Public Safety
Title: "An Act relating to the re-criminalization of marijuana.."
BRU: Alaska State Troopers
Sponsor: Sen. Fischer
Components: Detachments & CIB
Requestor: Senate Judiciary
Narcotics

EXPENDITURES/REVENUES: (Thousands of Dollars)

OPERATING	FY 87	FY 88	FY 89	FY 90	FY 91	FY 92
PERSONAL SERVICES						
TRAVEL						
CONTRACTUAL						
SUPPLIES						
EQUIPMENT						
LAND & STRUCTURES						
GRANTS, CLAIMS						
MISCELLANEOUS						
TOTAL OPERATING		0	0	0	0	0
CAPITAL						
REVENUE						

FUNDING:: (Thousands of Dollars)

GENERAL FUNDS		0	0	0	0	0
FEDERAL FUNDS						
OTHER						
TOTAL						

POSITIONS:

FULL-TIME		0	0	0	0	0
PART-TIME						
TEMPORARY						

ANALYSIS: (Attach a separate page if necessary)

No fiscal impact is anticipated.

JNR 4/8/87

Prepared by: Francis C. Allan — Phone: 269-5691
Division: Alaska State Troopers — Date: 4/8/87

Approved by Commissioner: William R. Nix — Date: 4/8/87
Agency: Public Safety

Distribution (by preparer):
- Legislative Finance
- Legislative Sponsor
- Requestor
- Office of Management and Budget
- Impacted Agency(ies)
- Senate Secretary

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STATE OF ALASKA 1987 LEGISLATIVE SESSION
FISCAL NOTE

Bill Version: SB 32
REQUEST: Publish Date:

Revision Date: Agency Affected: Alaska Court System
Title: An act relating to marijuana BRU: Trial Courts

Sponsor: Fischer Components:
Requestor: Senate Judiciary

EXPENDITURES/REVENUES: (Thousands of Dollars)

OPERATING	FY 87	FY 88	FY 89	FY 90	FY 91	FY 92
Personal Services		143.6	143.6	143.6	143.6	143.6
Travel						
Contractual						
Supplies						
Equipment		11.5				
Land & Structures						
Grants & Claims						
TOTAL OPERATING	0.0	155.1	143.6	143.6	143.6	143.6
CAPITAL						
REVENUE						

FUNDING: (Thousands of Dollars)

General Funds	0.0	155.1	143.6	143.6	143.6	143.6
Federal Funds						
Other						
TOTAL	0.0	155.1	143.6	143.6	143.6	143.6

POSITIONS:

Full-time		4.0	4.0	4.0	4.0	4.0
Part-time		1.0	1.0	1.0	1.0	1.0
Temporary						

ANALYSIS: (Attach a separate page if necessary)

See attached fiscal analysis.

Prepared by: Karla Forsythe, General Counsel Phone: 264-0228
Division: Alaska Court System Date: 4-23-87

Approved by: Stephanie J. Cole, Deputy Director Date: 4-23-87
Agency: Alaska Court System

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ALASKA COURT SYSTEM
SB 32 - Fiscal Analysis

The Court System's fiscal note is based on the assumption that this bill will be enforced if enacted into law. The fiscal note submitted by the Department of Law reports that enforcement personnel anticipate several thousand new cases. This figure does not include prosecution resulting from municipal enforcement. Municipal police will generate a significant volume of cases for the courts, since they are responsible for enforcement in Alaska's urban communities and are more likely to arrest a large number of individuals than state troopers who focus on organized drug activity.

Using a conservative estimate of 2,000 cases annually, it appears that the increased caseload could be absorbed with existing judicial resources, but additional clerical support would be needed to process the high volume of paperwork attributable to these new criminal offenses which will be entering the criminal justice system.

ALASKA COURT SYSTEM
SB 32 - Fiscal Analysis

Personal Services:

	Salary	Benefits	Total
2 - Court Clerk II, Range 10B, Anchorage, PFT - 12 months	$45,672	$16,580	$62,252
1 - Court Clerk II, Range 10B, Fairbanks, PFT - 12 months	25,740	8,936	34,676
1 - Court Clerk II, Range 10B, Juneau, PFT - 12 months	22,836	8,290	31,126
1 - Court Clerk II, Range 10B, Ketchikan, PPT - 6 months	11,418	4,145	15,563
Total Personal Services			143,617

Equipment: (one-time cost)

Desk, chair, typewriter, and filing cabinet for each new position	11,540
Total First-Year Cost	$155,157

FYI Senator Fischer
Sandy Spargo

Compiled by: U.S. Dept. of Justice
Executive Office for US. Attorneys
Washington D.C. 20530
11/85

STATE MARIJUANA LAWS

STATE (Territory)	PERSONAL USE POSSESSION		POSSESSION		SALE, DISTRIBUTION, DELIVERY	
	Max. Imprisonment	Max. Fine	Max. Imprisonment	Max. Fine	Max Imprisonment	Max. Fine
ALABAMA	1 yr (for personal use)	$1,000	min. 2-15 yrs	$25,000	Min. 2-15 yrs	$25,000
ALASKA	Legal to possess up to 4 oz. if not in public		90 days (4 oz to 1/2 lb) (1 oz or more in public)	$1,000	5 yrs (more than 1 oz.	$50,000
	(less than 1 oz in public)	$100	1 yr (more than 1/2 lb)	$5,000		
ARIZONA	1 1/2 yrs	$150,000	1 1/2 yrs	$150,000	7 yrs	$150,000
ARKANSAS	1 yr	$1,000	1 yr	$1,000	min. 4-10 yrs (less than 10 lbs)	$25,000
					5-20 yrs (10 lbs - 100 lbs)	$50,000
					6-30 yrs (over 100 lbs)	$100,000
CALIFORNIA	(less than 28.5 grams)	$100	6 mos.	$500	4 yrs	$10,000
COLORADO	(less than 1 oz.)	$100	6 mos. - 2 yrs. (1-8 ozs.)	$5,000	2-4 yrs	
			1-2 yrs (over 8 ozs.)			
CONNECTICUT	1 yr	$1,000	1 yr	$1,000	7 yrs	$1,000

STATE (Territory)	PERSONAL USE POSSESSION		POSSESSION		SALE, DISTRIBUTION, DELIVERY	
	Max. Imprisonment	Max. Fine	Max. Imprisonment	Max. Fine	Max Imprisonment	Max. Fine
DELAWARE	2 yrs	$500	2 yrs.	$500	10 yrs min. 3-10 yrs (50-100 lbs)	min. $1,000 to $10,000 min. $50,000
DISTRICT OF COLUMBIA	1 yr	$1,000	1 yr	$1,000	1 yr	$10,000
FLORIDA	1 yr (20 grams or less)	$1,000	5 yrs	$5,000	5 yrs	$5,000
GEORGIA	1 yr (Court can CD) (1 oz or less)	$1,000	1-10 yrs		1-10 yrs (up to 100 lbs) min 5 yrs (100-2,000 lbs)	 $25,000
GUAM	3 mos.	$500	3 mos.	$500	5 yrs	$5,000
HAWAII	30 days (1 oz. or less)	$500	1 yr (1 oz. to 2.2 lbs) 5 yrs (over 2.2 lbs)	$1,000 $5,000	1 yr 5 yrs (over 2 ozs)	$1,000 $5,000
IDAHO	1 yr (3 ozs. or less)	$1,000	5 yrs (over 3 ozs.)	$10,000	5 yrs	$15,000

STATE (Territory)	PERSONAL USE POSSESSION		POSSESSION		SALE, DISTRIBUTION, DELIVERY	
	Max. Imprisonment	Max. Fine	Max. Imprisonment	Max. Fine	Max Imprisonment	Max. Fine
ILLINOIS	30 days (2.5 grams or less)	$500	6 mos (2.5–10 grams)	$500	6 mos (2.5 grams or less)	$500
			1 yr (10–30 grams)	$1,000	1 yr (2.5–10 grams)	$1,000
			1–3 yrs (30–500 grams)	$10,000	1–3 yrs (10–30 grams)	$10,000
			2–5 yrs (over 500 grams)	$10,000	2–5 yrs (30–500 grams)	$10,000
					3–7 yrs (over 500 grams)	$10,000
INDIANA	1 yr (up to 30 grams)	$5,000	2 yrs (over 30 grams)	$10,000	1 yr (up to 30 grams)	$5,000
					2 yrs (30 grams - 10 lbs)	$10,000
					5 yrs (10 lbs or more)	$10,000
IOWA	6 mos	$1,000	6 mos	$1,000	5 yrs	$1,000
KANSAS	1 yr	$2,500	1 yr	$2,500	3–20 yrs (sale)	$15,000

STATE (Territory)	PERSONAL USE POSSESSION		POSSESSION		SALE, DISTRIBUTION, DELIVERY	
	Max. Imprisonment	Max. Fine	Max. Imprisonment	Max. Fine	Max Imprisonment	Max. Fine
KENTUCKY	90 days (less than 8 ozs.)	$250	1 yr (over 8 ozs.)	$500	1 yr (less than 8 ozs.)	$500
					1-5 yrs (8 ozs. - 5 lbs)	$10,000
					5-10 yrs	$10,000
LOUISIANA	6 mos (up to 100 lbs)	$500	6 mos (up to 100 lbs)	$500	10 yrs	$15,000
			5-15 yrs (100-2,000 lbs)	$50,000		
			15-25 yrs (over 2,000 lbs)	$200,000		
MAINE	(usable amount)	$200	1 yr (1 1/2 ozs - 2 lbs presumed furnishing)	$1,000	1 yr (up to 2 lbs)	$1,000
			5 yrs (over 2 lbs presumed trafficking)	$2,500	5 yrs (2-1000 lbs)	$2,500
					10 yrs (over 1,000 lbs)	$10,000
MARYLAND	1 yr	$1,000	1 yr	$1,000	5 yrs	$15,000
					25 yrs (import 100 lbs or more)	$25,000

STATE (Territory)	PERSONAL USE POSSESSION		POSSESSION		SALE, DISTRIBUTION, DELIVERY	
	Max. Imprisonment	Max. Fine	Max. Imprisonment	Max. Fine	Max Imprisonment	Max. Fine
MASSACHUSETTS	6 mos	$500	6 mos	$500	2 yrs	$5,000
					2 1/2 - 15 yrs (50-100 lbs)	$10,000
					3-15 yrs (100-2,000 lbs)	$25,000
MICHIGAN	1 yr	$1,000	1 yr	$1,000	4 yrs	$2,000
MINNESOTA	(small amount)	$100 and drug education	3 yrs	$5,000	5 yrs	$30,000
MISSISSIPPI	(1 oz or less)	min $100 max $250	3 yrs (1 oz to 1 kilo)	$3,000	3 yrs (1 oz or less)	$3,000
			20 yrs (1 kilo or more)	$1,000,000	20 yrs (1 oz to 1 kilo)	$30,000
					30 yrs (over 1 kilo)	$1,000,000
MISSOURI	1 yr (35 grams or less)	$1,000	5 yrs (over 35 grams)	$1,000	5 yrs to Life	

STATE (Territory)	PERSONAL USE POSSESSION		POSSESSION		SALE, DISTRIBUTION, DELIVERY	
	Max. Imprisonment	Max. Fine	Max. Imprisonment	Max. Fine	Max Imprisonment	Max. Fine
MONTANA	6 mos (60 grams or less	min $100 max $500	5 yrs (over 60 grams)	$50,000	min 1 yr to life	$50,000
NEBRASKA	(1 oz or less)	$100	7 days (1 oz to 1 lb)	$500	5 yrs	$10,000
			5 yrs (over 1 lb)	$10,000		
NEVADA	1-6 yrs	$5,000	1-6 yrs	$5,000	1-20 yrs	$20,000
					min 3 - 20 yrs (100-2,000 lbs)	$25,000
					min 5-20 yrs (2,000-19,000 lbs)	$50,000
NEW HAMPSHIRE	1 yr (less than 1 lb)	$1,000	7 yrs (1 lb or more)	$2,000	15 yrs	$2,000
NEW JERSEY	6 mos (less than 25 grams)	$500 - Risk losing driver's license	5 yrs	$15,000	5 yrs	$15,000
NEW MEXICO	15 days (1 oz or less)	$50 min $100 max	1 yr (1-8 ozs)	$100 min $1,000 max	18 mos (less than 100 lbs)	$5,000
			18 mos (8 ozs or more	$5,000	3 yrs (over 100 lbs)	$5,000

STATE (Territory)	PERSONAL USE POSSESSION		POSSESSION		SALE, DISTRIBUTION, DELIVERY	
	Max. Imprisonment	Max. Fine	Max. Imprisonment	Max. Fine	Max Imprisonment	Max. Fine
NEW YORK	(less than 25 grams)	$100	3 mos (25 grams - 2 ozs)	$500	1 yr (25 grams or less)	$1,000*
			1 yr (2-8 ozs)	$1,000	4 yrs (25 grams - 4 ozs)	$5,000*
			4 yrs (8-16 ozs)	$5,000	7 yrs (4-16 ozs)	$5,000*
			7 yrs (16 ozs - 10 lbs)	$5,000	15 yrs (over 16 ozs)	$5,000*
			15 yrs (over 10 lbs)	$5,000	* Fine can be double the peuniary gain from crime.	
NORTH CAROLINA	(1 oz or less)	$100	5 yrs (1 oz - 50 lbs)	discre-tion of Judge	5 yrs	set by Judge
			min 5 yrs (50-100 lbs)	$5,000 min. Max up to Judge		
			min 7 yrs (100-2,000 lbs)	$25,000 minimum		
			min 14 yrs (2,000-10,000 lbs)	$50,000 minimum		

STATE (Territory)	PERSONAL USE POSSESSION		POSSESSION		SALE, DISTRIBUTION, DELIVERY	
	Max. Imprisonment	Max. Fine	Max. Imprisonment	Max. Fine	Max Imprisonment	Max. Fine
NORTH DAKOTA	30 days (less than 1/2 oz)	$500	1 yr (1/2 - 1 oz)	$1,000	10 yrs	$10,000
			5 yrs (over 1 oz)	$5,000	20 yrs (100 lbs or more	$10,000
OHIO	(under 100 grams)	$100	30 days	$250	5 yrs (less than 200 grams)	$2,500
			5 yrs (200-600 grams)	$2,500	10 yrs (200-600 grams)	$5,000
			10 yrs (over 600 grams)	$5,000	15 yrs (over 600 grams)	$7,500
OKLAHOMA	1 yr	$1,000	1 yrs	$1,000	min 2-10 yrs	$5,000
OREGON	(1 oz or less)	$100	10 yrs	$100,000	10 yrs (sale)	$100,000
PENNSYLVANIA	30 days (30 grams or less)	$500	1 yr	$5,000	5 yrs	$15,000
					10 yrs (over 1,000 lbs)	$100,000
PUERTO RICO	3 yrs	$5,000	3 yrs	$5,000	12 yrs	$20,000
RHODE ISLAND	1 yr	$500	1 yr	$500	30 yrs	$50,000

STATE (Territory)	PERSONAL USE POSSESSION		POSSESSION		SALE, DISTRIBUTION, DELIVERY	
	Max. Imprisonment	Max. Fine	Max. Imprisonment	Max. Fine	Max Imprisonment	Max. Fine
SOUTH CAROLINA	30 days (oz or less)	$100 min $200 max	6 mos	$1,000	5 yrs	$5,000
			10 yrs (10-100 lbs)	$10,000		
			mandatory 25 yrs (100-2,000 lbs)	$25,000		
			mandatory 25 yrs (2,000-10,000 lbs)	$50,000		
SOUTH DAKOTA	30 days (1 oz or less)	$100	1 yr (1 oz - 1/2 lb)	$1,000	min 15 days to 1 year (sale 1 oz or less)	$1,000
			2 yrs (1/2 - 1 lb)	$2,000	2 yrs (1 oz - 1/2 lb)	$2,000
			5 yrs (1-10 lbs)	$5,000	5 yrs (1/2 - 1 lb)	$5,000
			10 yrs (over 10 lbs)	$10,000	10 yrs (over 1 lb)	$10,000
TENNESSEE	11 mos 29 days	$1,000	11 mos 29 days	$1,000	min 1-5 yrs (1/2 oz - 10 lbs	$3,000
					min 4-10 yrs (10-70 lbs)	$10,000
					min 10 yrs to Life (over 70 lbs)	$200,000

STATE (Territory)	PERSONAL USE POSSESSION		POSSESSION		SALE, DISTRIBUTION, DELIVERY	
	Max. Imprisonment	Max. Fine	Max. Imprisonment	Max. Fine	Max Imprisonment	Max. Fine
TEXAS	180 days (2 ozs or less)	$1,000	1 yr (4 ozs or less)	$2,000	1 yr (sale of 1/4 oz or less)	$2,000
			2-10 yrs (4 oz - 5 lbs)	$5,000	2-10 yrs (1/4 - 4 ozs)	$5,000
			2-20 yrs (5-50 lbs) (Presumed trafficking over 50 lbs)	$10,000	2-20 yrs (4 ozs - 5 lbs)	$10,000
					Life or 5-99 yrs (5-50 lbs)	$20,000
					5 yrs - Life (50-200 lbs)	$50,000
					10 yrs - Life (200-2,000 lbs)	$100,000
					15 yrs - Life (over 2,000 lbs)	$250,000
UTAH	6 mos	$299	6 mos	$299	5 yrs	$5,000
VERMONT	6 mos	$500	6 mos	$500	5 yrs (2 ozs or more)	$10,000

STATE (Territory)	PERSONAL USE POSSESSION		POSSESSION		SALE, DISTRIBUTION, DELIVERY	
	Max. Imprisonment	Max. Fine	Max. Imprisonment	Max. Fine	Max Imprisonment	Max. Fine
VIRGIN ISLANDS	1 yr	$5,000	1 yr	$5,000	5 yrs	$15,000
					mandatory 3 yrs (50-100 lbs)	$25,000
					mandatory 5 yrs (200-1,000 lbs)	$50,000
					mandatory 15 yrs (over 1,000 lbs)	$200,000
VIRGINIA	30 days	$500	30 days	$500	1 yr (1/2 oz or less)	$1,000
					1-10 yrs (1/2 oz - 5 lbs)	$1,000
					min 5-30 yrs (over 5 lbs)	
WASHINGTON	90 days (40 grams or less)	$1,000	5 yrs	$10,000	5 yrs	$10,000
WEST VIRGINIA	min 90 days max 6 mos	$1,000	min 90 days max 6 mos	$1,000	min 1 yr max 5 yrs	$15,000
WISCONSIN	5 yrs	$15,000	5 yrs	$15,000	5 yrs	$15,000
WYOMING	6 mos	$1,000	6 mos	$1,000	10 yrs	$10,000

Alaska State Legislature

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Senate Committee on Health, Education and Social Services

For Immediate Release

JUNEAU - First Lady Nancy Reagan will testify on drug abuse and its effects on America at a joint meeting of the Senate Health, Education and Social Services (HESS) and Senate Judiciary Committees, Thursday, April 9, 1987, at 1:30 PM Alaska Daylight Time, in the Senate Finance Room.

Mrs. Nancy Murkowski, wife of the Alaska's U.S. Senator Frank Murkowski, will join the First Lady in testimony televised live from Washington, D.C. Mrs. Murkowski will introduce Mrs. Reagan and address questions from the Committee at the conclusion of her presentation.

Mrs. Reagan and Mrs. Murkowski are making their presentation at the invitation of Senator Paul Fischer (R-Soldotna), Chairman of the Senate HESS Committee and Sponsor of SB 32, a bill to recriminalize marijuana.

- more -

Senator Jay Kerttula, Chairman of Senate Judiciary, has been extremely supportive in arranging for this unique occasion.

"I am very pleased that the First Lady, who has made such extraordinary efforts to address this critical national problem, can find the additional time to personally give her comments to Alaskans," said Senator Fischer. "Nancy Reagan's testimony will be a vital asset toward the passage of this bill. I appreciate the First Lady's campaign to "Just Say No." I would hope that all Alaskans will support the efforts of these two fine ladies and join the rest of the Nation in just saying "No" to drug use and abuse."

Although this is a "listen only" teleconference, Senator Fischer would like to "urge all Alaskans to access this important message. Our young people represent the future of Alaska and I would hope they would be allowed to take advantage of this important and timely message."

Senator Fischer has arranged for the First Lady's testimony to the Senate to be broadcast live statewide through the legislative teleconferencing system. The presentation will then be re-broadcast at 3:30 PM later in the day via the Rural Alaska Television Network (RATNET).

It is anticipated that Mrs. Reagan's presentation will begin at approximately 1:40 PM and last about 15 minutes with the whole hearing estimated to last one half hour.

The broadcast is the result of cooperative efforts of the offices of Senator Frank Murkowski in Washington D. C.; Alascom; KTOO-TV, a public television station in Juneau; and the Governor's Press Office. Senator Fischer would like to personally thank all who have joined him in making this presentation possible to Alaskans.

- end -

Reprinted by:

Committees of Correspondence, Inc., 57 Conant St. Room 113, Danvers, MA 01923

Roy Zimmerman
Attorney General
Pennsylvania

ATTORNEY GENERAL'S POLICY ON DRUG ABUSE MESSAGES TO YOUTH

*Drug prevention is the responsibility of everyone. Each of us should be intolerant of drug abuse and take a strong stand to oppose it. There is a need to be outspoken and inflexible when it comes to illegal drugs.

*Drug abuse is wrong and unacceptable. Each individual has a responsibility to society to keep our state strong and free from drug abuse.

*Individuals who abuse drugs should be helped to become drug free and treatment should be encouraged, but they should not be excused from personal responsibility for illegal actions.

*Drug prevention and education go hand in hand with strict drug law enforcement. The message must be clear and consistent - drugs have a destructive impact on society as well as the individual, and the law is a direct expression of society's intolerance towards drugs. Drug education should inform young people of the drug laws and legal consequences of drug use.

*Marijuana use/possession should be strongly opposed and remain a criminal offense. Recent research has revealed increasing evidence of marijuana's destructive effects on the brain, immune system, lungs and reproductive system of humans. Marijuana is the single best predictor of other future illegal drug use.

*There is no such thing as responsible use of illegal drugs. Admittedly, there are "occasional abusers" or "irregular abusers" who risk criminal prosecution and further addiction and destruction.

*There is no such thing as responsible use of alcohol for anyone under the legal drinking age. Such use is illegal and is never responsible. Alcohol is a drug and its use among minors and abuse among adults should be confronted and never excused.

*Certain terms are misleading, detrimental and should be avoided. These include:

"Experimental Use" - drug users do not experiment with drugs as a scientist experiments with substances in a laboratory, drug users risk their very lives and futures with no control over drug purity, type, or drug effects. Such use might better be described as "gambling with drugs."

"Social Use" - drugs are anti-social and destroy families and friendships.

"Recreational Use" - using drugs is not an acceptable form of recreation - it is a chemical version of Russian Roulette.

"Mood Altering" - drugs affect brain chemistry in order to operate and are "mind altering," not just mood altering.

"Soft drug(s)" - no illegal drug is "soft" on the human body or condition; each drug has its own destructive impact on individuals and society.

"Victimless Crime" - drug abuse victimizes everyone - users and their loved ones, taxpayers, drug-related crime victims and employers. Drug proceeds often feed organized crime and international terrorists.

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A.P.B. SPECIAL REPORT

TO LOCAL POLICE FROM ATTORNEY GENERAL ROY ZIMMERMAN

Office of Attorney General, Strawberry Square, Harrisburg, PA 17120 November 25, 1986

SPEAKING OF DRUGS:
MAKING SURE KIDS GET THE RIGHT MESSAGE



The purpose of this bulletin is to provide you, Pennsylvania's law-enforcement officers, with our newly promulgated Attorney General's Drug Abuse Policy on Drug Abuse Messages to Youth.

All of us in law-enforcement have seen, and welcomed, society's increasingly serious response to the drug abuse issue. Today's concern is a far cry from the permissive atmosphere that existed 21 years ago when I first became a district attorney.

Yet we continue to see mixed and misleading messages regarding drug use being presented to Pennsylvania's young people -- messages ranging from the portrayal of marijuana as a "soft" drug to the suggestion that drugs can have a "recreational use."

These messages are not only confusing to our children, they are detrimental and often contradictory to law enforcement interests. Often they are communicated unintentionally by well-meaning individuals.

The policy statement which follows is intended to help put an end to such unintentional endorsements of drug use. I am pleased to inform you that it has already won the support of two leading national parent organizations, PRIDE (the National Parents' Resource Institute) and the Committees of Correspondence, and has also been endorsed by the state drug and alcohol coalition, Pennsylvanians Aware.

I encourage each police department in Pennsylvania to adopt this policy, either formally or informally, as a guideline for statements issued by the department regarding drug use. In addition, I am urging the media and other groups involved in the drug-abuse issue, both public and private, to support the law enforcement community's effort to provide a clear, no-nonsense, no toleration message regarding drug use.

Continued on other side.

(2)

BEN MIRMAN, M.D., F.A.A.P.
EDWARD JACOBS, M.D., INC., F.A.A.P.
KATHLEEN M. HYKIN, M.D.
PEDIATRICS

August 22, 1986

Dear Ms. Cantor,

I am writing you to loudly disagree with your statement that "marijuana is not a particularly dangerous drug and is in fact one of the safest of commonly used drugs", which appeared in your column in the L.A. Times on Sunday, August 17, 1986.

Although your comments regarding alcohol, tobacco, caffeine and sleeping pills were very appropriate, it is <u>not true</u> that marijuana is safe. Marijuana is a crude plant containing over 400 identified chemicals of which more than 60 are psychoactive to some degree. The scientific community has studied only one, delta-9-Tetrahydrocannabinol (THC), in any depth, and knows almost nothing about the effects of all of the others or their metabolites. This represents chemical Russian roulette, and makes no sense in an age when we are so concerned about clean air, clean water and physical fitness.

We do know, however, that THC has anaverage half-life of approximately 4 to 5 days, which is by far the longest of any commonly used illegal drug. (One half-life is the length of time it takes the body to eliminate ½ or 50% of the amount of drug that is present.) Thus, it takes several weeks to totally eliminate THC from your body. Conversely, if one uses marijuana only once or twice per week, he or she not only never eliminates all the THC from their body but in fact, accumulates THC in the tissues.

Over the past several years, an increasing body of knowledge is accumulating regarding the broad range of very harmful effects of marijuana, especially on the central nervous system, respiratory tract and endocrine-reproductive system.

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In addition to the fact that marijuana causes the central nervous system effects of a decrease in short term memory, attention span, sequencing ability, concentration, coordination, visual-perceptual task performances, driving skills, and learning skills, recurrent use frequently results in personality changes, alienation from the family, deteriorating school performance and a loss of motivation.

The respiratory tract effects occur because marijuana is approximately 15 to 20 times "harsher" than ordinary tobacco cigarettes. We are all aware of the dangers associated with cigarette smoking, both actively and second hand smoking, and the rough equation is one marijuana joint equals approximately 3/4 to 1 package of regular cigarettes. Also there are approximately 50% more cancer causing (carcinogenic) hydrocarbons in a marijuana joint than in a cigarette. Plus one must take into account the significantly different inhalation smoking techniques. We do know that recurrent users have a significantly increased incidence of upper and lower respiratory infections, such as sore throats, cough, sinusitis, bronchitis, pneumonia, etc. and there is absolutely no reason to believe that the long range effects with regards to chronic lung disease and lung cancer will be any different for the marijuana user than it is for the regular tobacco smoker.

The endocrine (hormone) and reproductive system isanother part of the body which is at significant risk from marijuana. One must remember that during this crucial period of physiologic and psychodevelopmental change known as puberty and adolescence, anything that interferes with the delicate balance can have potentially far reaching effects. We know that recurrent marijuana use affects both male and female hormone levels, resulting in a significant decrease in the in the male hormone testosterone, and the balance of female hormones. In females, menstrual irregularities often result. In addition, THC crosses the placenta and gets into the fetus of the marijuana using pregnant woman and may affect the brain and body development of the unborn baby. In fact, the "fetal marijuana syndrome" is a reality just as is the "fetal alcohol syndrome" and one must remember that a woman is born with all the eggs (ova) she will ever have and if anything damages one of them such as marijuana or other drugs, it may remain damaged.

If that egg becomes fertilized, whether it is during the drug using years or several years later, the potential for a baby with significant problems is very real.

Furthermore, chemical dependency treatment personnel now well recognize the existence of marijuana dependency as well as the post drug impairment syndrome which can be caused by marijuana use.

When you couple all of this information with the fact that the potency of marijuana has increased 10 to 20 times in the past several years from less than .5% THC in the 60's and early 70's to 4-6% for "street grade" and 8-12% for the more potent sensimilla variety, I believe it becomes abundantly clear that marijuana is one of the <u>most</u> <u>dangerous</u> drugs available to young people.

I would appreciate it if you would use this information to correct the impression of safety given in your column so that young people and their parents will not be victims of the myths and misinformation which has plagued us in the past.

Sincerely,

Edward A. Jacobs M.D.

Associate Clinical Professor
of Pediatrics
USC School of Medicine and
Chairman, Substance Abuse
Committee California, Chapter 2
American Academy of Pediatrics

Good Resource Books & Booklets

Marijuana references:

1) Not My Kid: a Parents Guide to Kids & Drugs Beth Polson & Miller Newton Ph.D.
2) Parents Peers and Pot: Health Communications, Inc. also U.S. Dept H & S.S.
3) Parents, Peers and Pot: An Update
4) Kids & Drugs a Handbook for Parents and Professionals by Joyce M Tobias R.N. pg 37-39
5) Pot Safari by Peggy Mann 1985 (review of latest biological research)
6) Timeline is Too Old - Peggy Mann
7) Marijuana and Youth: Clinical Observations on Motivation, Learning U.S. Dept Health & Social Services (ADAMHA)
8) What Works Schools Without Drugs, Wm Bennett, U.S. Dept. of Ed. 1986
9) Report on Adverse Health & Behavioral Consequences of Cannabis Use. - by the Addiction Research Foundation of Toronto
10) Marijuana and Health, Institute of Medicine, Nat'l Academy Press
11) "Does Drug & Alcohol Use Lead to Failure to Graduate from High School?" Journal of Drug Education Vol 15(4) 1985

12.) "Marijuana in the School: Clinical Observations and Needs" Marijuana & Youth N. Acad 1982

13.) Marijuana & Alcohol. S. Cohen & P. Lessa Am. Council on Marijuana N. Y.

14.) Treating the Marijuana-Dependent Person R. de Silva & R. L. DuPont, Am Council on M. J.

15.) R. Heath, Marijuana & the Brain. Am Council on M. J.

16.) Pediatrician's View of Marijuana I. Lantner & R. Barth Am. Council on M. J.

17.) Marijuana & Driving, V. Moskowitz R. Peterson, Am Council on M. J.

18.) Marijuana Today: A Compilation of Medical Findings for the Layman. Myers Institute

19.) Marijuana and Reproduction C. Smith & R. Asch Am Council on M. J.

20.) Marijuana Smoking and Its Effects on the Lungs. A. Tashkin & S. Cohen Am. Council on M. J.

21.) The Marijuana Controversy: Adjunctive Research Perspective & Therapeutic Claims C. E. Turner Am Council on M. J.

22.) Marijuana Time for a Closer Look. Curtis L. Janeczek

Finally, in the 1976 elections, there was a political footnote: None of the Democrats who supported the reform bill was defeated.

That spring, as the battle raged on in California, strange things were happening in Alaska.

The Alaska saga actually began in 1972, with two young lawyers sitting around one evening smoking marijuana and grumbling about the marijuana laws. The two lawyers in Alaska were about thirty years old, and their names were Robert Wagstaff and Irwin Ravin. Wagstaff was a native of Kansas City who had done his undergraduate work at Dartmouth. It was there, in 1961, that he first smoked. Marijuana was not readily available in those days, but Wagstaff was a jazz fan, and some black jazz musicians introduced him to the weed. He returned to the University of Kansas law school, then moved to Fairbanks, Alaska, where he became an assistant district attorney. It was in Fairbanks that he met Ravin, a native of Newark, New Jersey, and a graduate of Rutgers. Later they moved to Anchorage and practiced law together.

They also smoked marijuana, and as they talked that night in 1972, they agreed the legal and political climate in Alaska was such that a good test case, with the right client, could overturn the marijuana laws. But who would be that client?

That question was left unresolved. Then, a couple of nights later, fate intervened in the person of a Fairbanks policeman who stopped Ravin because a taillight was out on his car. It was a routine traffic violation. All Ravin had to do was sign the citation and go on his way. But Ravin decided the time had come to take a stand. Knowing he had a couple of joints in his pocket, he refused to sign the citation. That left the arresting officer no choice but to take him to the station. There he was routinely searched, the two joints were found, and the case of *Ravin* v. *Alaska* came to be.

Wagstaff and another lawyer, R. C. Middleton, filed a motion to dismiss the charges before trial, arguing that the state law prohibiting possession of marijuana was unconstitutional because it violated the right of privacy guaranteed by both the U.S. and the Alaska constitutions. In a sense, the issue was not so much legal as political. Reformers in other states had made the same right-of-privacy arguments and had always been turned down. But Alaska was not like

other states. It was a frontier. People went there for privacy, for freedom; for Alaskans the right of privacy came near to being sacred. That, at least, is how Wagstaff hoped the courts would see things, and he was aware that the Alaska supreme court was the youngest and most liberal in the nation.

Lengthy hearings were held in district court on the constitutional question. Wagstaff was a member of the national board of the ACLU and he had legal and financial help from it. He also had help from NORML, who paid the expenses for Drs. Thomas Ungerleider, Joel Fort, and Lester Grinspoon to go to Alaska to testify. The district court denied Wagstaff's motion to dismiss, and he appealed the constitutional question to the Alaska supreme court. By the spring of 1975 the court was near a decision, and Wagstaff was increasingly optimistic that it would be a favorable one.

Meanwhile, things were happening in the state legislature. State Senator Terry Miller, a clean-cut Republican in his early thirties, had introduced a decriminalization bill similar to Oregon's. Stroup never went to Alaska, but he kept in touch with the situation there through Wagstaff, who had agreed to be NORML's state representative. As legislative hearings drew near, an unexpected conflict arose between Stroup and Wagstaff. Wagstaff was convinced there was a very good chance that the supreme court would make smoking legal in Alaska. For that reason he was very skeptical about the decriminalization bill. It provided for $100 fines for private possession and $1000 fines for public smoking or possessing while driving. As far as Stroup was concerned, it was a good bill, but Wagstaff feared that if the bill passed, it would take the pressure off the supreme court to rule in favor of Ravin. Thus, Alaska might settle for a system of fines when it could have had full legalization of private possession. He therefore announced to Stroup that he intended to go testify *against* the bill.

Stroup couldn't believe it. Wagstaff was the kind of smart, able lawyer he dreamed of finding to be a NORML state coordinator—and now he said he was going to testify against decriminalization. Stroup thought it made him and NORML look like idiots. A transcontinental shouting match ensued.

"Bob," Stroup insisted, "we can't have NORML opposing a decriminalization bill. It may not be a perfect bill, but we've only been able to pass one in America so far."

Wagstaff was not moved, and he did in fact testify against the bill. It

didn't matter. On May 16 the Alaska bill passed, and the state's new Republican governor, Jay Hammond, keeping the promise he had earlier made, did not veto it. The bill became law without his signature.

That made Alaska the second state, after Oregon, to adopt decriminalization. Then, eleven days after the legislature acted, the state supreme court, in a stunning decision, ruled five to none that possession of marijuana by adults at home for personal use was constitutionally protected by the right-of-privacy provision in the state constitution.

In its fifty-four page opinion the court said there was "no firm evidence" that marijuana was harmful to the user or to society, and that "mere scientific doubts" could not justify government intrusion into the privacy of the home. The court added, "It appears that the use of marijuana, as it is presently used in the United States today, does not constitute a public health problem. . . . It appears that effects of marijuana on the individual are not serious enough to justify widespread concern, at least as compared with the far more dangerous effects of alcohol, barbiturates and amphetamines."

The ruling stuck down the legislature's new system of fines for marijuana use. Private cultivation of marijuana was not mentioned by the court, but later the state attorney general ruled that the right of privacy included cultivation. It was as legal to grow marijuana in Alaska as it was to grow tomatoes. Only sale remained illegal.

On June 16 Maine became the third state, after Oregon and Alaska, to decriminalize marijuana use. The main reason marijuana-law reform passed easily in Maine was that it was part of a new state criminal-code revision that had been recommended by a high-level commission after several years of study. The commission concluded that far too much time and money were being spent on victimless crimes, such as marijuana use and prostitution, and the legislature accepted the view.

In Maine, as in several other states, it was not until after decriminalization passed that its opponents, particularly law-enforcement officials, began to speak out strongly against it. Pressure from police officials, who claimed the new law was causing increased smuggling activity in the state, led to new hearings the next year. A

NORML—IZER

98.6

NO MORE TERMITES

● Marijuana consumers have tunneled into the American mainstream —now is the time to bring the house down.

BY KEVIN ZEESE

Several years ago I had a conversation about termites with one of the leaders of the NORML National Legal Committee, Michael Stepanian. Mike suggested that marijuana consumers could learn from termites. We could quietly get into the mainstream of society and after doing so, topple the marijuana laws from within. He compared it to termites bringing down a house: no one knows they are there until the house falls down around them.

This seemed like an interesting analogy. Most marijuana consumers I know have legitimate jobs. As one friend described it, "We've fooled them, they don't know we use marijuana." This is possible because marijuana consumers are normal people. They do their jobs as well as anyone. Their employers can't tell they use marijuana because it does not affect work performance. Thus marijuana consumers can be productive citizens and, down the road, overthrow the marijuana laws from within.

Mass urine testing for marijuana makes it more difficult for marijuana consumers to get by. Even though an employer cannot tell if someone is a marijuana consumer, a urine test will show positive for weeks, perhaps even months, after last ingestion of marijuana.

Don't think that mass urine testing is too unAmerican to be accepted by our society. Sure, random searches of large numbers of people based on no suspicion is unAmerican, but look at some the other unAmerican things going on. In the name of marijuana prohibition they poison the forests with herbicides, send national guard troops onto private property, search backyards with helicopters, and arrest 49 of us every hour. Mass urine testing is just one more invasive unAmerican weapon in the marijuana war.

The use of urine tests is the key tool to make individual consumers the targets of the marijuana war. Remember what the President's Commission on Organized Crime said this March: we have an "obligation" to "recognize that those among us—friends, relatives, colleagues, and other 'respectable' people"—are "the driving force behind...the assault on this country." They made us the primary enemy of the marijuana war and urged the recriminalization of marijuana possession offenses, mass urine testing and police state tactics to target us in the war.

Already millions of citizens are being forced to submit to urine tests; thousands are being fired or blacklisted from work on the basis of urine tests for marijuana. Sometime in the near future when you are applying for a job or seeking a promotion, you will be forced to provide a sample of your bodily fluids and incriminate yourself.

This inevitablity makes it necessary for us to recognize that we are faced with the choice our forefathers faced: either we join together or we will hang separately.

Now is time for all good termites to evolve into human beings.

It is time to come out of the closet, to let your friends and families know that the war on marijuana is a war declared on you—a normal, productive, U.S. citizen.

By standing up we can claim certain inalienable rights that human beings have and termites don't. These rights were described by our founding fathers as the rights to "life, liberty and the pursuit of happiness." This phrase well describes the rights of marijuana consumers. The prohibition of marijuana denies us the right to the pursuit of happiness. The threat of arrest denies us liberty. And the threat of being blacklisted by a urine test denies us life. We have sat back for too long. It is time to stand up and claim rights that cannot be taken away by any government.

The act of standing up and admitting to your friends, families and colleagues that you are a marijuana consumer is a critical first step to ending the marijuana war. By doing so we educate all of society. We let them know that the stereotype of marijuana consumers as lazy, drug-abusing adolescents is wrong, that in reality we are productive normal citizens. We need to put a face on the enemies of the marijuana war.

Recently the **Phil Donohue Show** examined urine testing for drugs. The show demonstrated how a human face can change minds. At the beginning of the show the general consensus of the audience seemed to favor drug testing. People claimed, if you're not guilty you have nothing to hide and if you are, you're getting what you deserve.

However, after the audience heard the personal accounts of people who had been victimized by urine testing their perspectives changed. They saw the humiliation and degradation of these fellow citizens. When they heard one women say, "If it is a choice between taking another urine test or being unemployed, I choose to be unemployed," the audience applauded wildly.

Americans do not favor seeing normal citizens victimized. In the '70s when we were able to show the public that normal people were going to jail for marijuana possession, possession offenses were decriminalized or no longer enforced. Now with mass urine testing we have the opportunity to let the public see that healthy, productive citizens are being victimized by the marijuana war. This time, if we all stand up, we can end marijuana prohibition.

You have nothing to lose. You will be tested some day. You may as well take advantage of the safety in numbers: stand up now and don't hang alone. ●

High Times Magazine

STEVE COWPER

STATE OF ALASKA
OFFICE OF THE GOVERNOR
JUNEAU

January 27, 1987

Ms. Betty J. Wilson
Alaskans for Drug-Free Youth
Box 8515
Ketchikan, AK 99901

Dear Ms. Wilson:

Thank you for your recent letter concerning the recriminalization of marijuana and forwarding a copy of your organization's Marijuana Resolution.

While my administration presently has no plans to introduce legislation recriminalizing the public possession of marijuana, I would sign such a bill if it does not violate the Privacy Amendment of the Alaska Constitution.

As that amendment is currently interpreted, a person has a right to possess and use small amounts of marijuana in the home. Public possession and use, however, are an entirely different matter. Currently small civil fines are the only penalties available to law enforcement officials for such public use. I would support making public possession and use a misdemeanor.

I appreciate your sharing your thoughts on this matter. Thanks again for letting me know your concerns.

Sincerely,

Steve Cowper
Governor

Municipality of Anchorage

P.O. BOX 196650
ANCHORAGE, ALASKA 99519-6650
(907) 786-8510

TONY KNOWLES
MAYOR

OFFICE OF PUBLIC SAFETY
(4501 S. Bragaw)

January 26, 1987

Ms. Betty J. Wilson
Alaskans for Drug Free Youth
Box 8515
Ketchikan, Alaska 99901

Dear Ms. Wilson:

Mayor Knowles has asked me to thank you for your letter of support of December 10, 1986, regarding recriminalization of marijuana.

We are much concerned about the proliferation of drugs in our State, particularly as it infiltrates our school systems. We are currently developing some initiatives against drugs and recriminalization is a small part of our plans. We feel the current law sends the wrong message to our young people. We expect the State Legislature will act on this issue during the current session.

Thank you again for your letter and best of luck in your efforts in Southeast.

Sincerely,

John F. Franklin
Commissioner of Public Safety

cc: Mayor Knowles

KETCHIKAN GATEWAY BOROUGH
SCHOOL DISTRICT

Darroll Hargraves
SUPERINTENDENT

Resolution No. 210
Ketchikan Gateway Borough School District

A REQUEST FOR CHANGING THE
STATE STATUTES TO MAKE THE POSSESSION AND USE OF
MARIJUANA ILLEGAL

WHEREAS, the State of Alaska allows legal private possession and use of marijuana,

WHEREAS, Alaska's present statutes regarding possession and use of marijuana appear to be in conflict with the laws of The United States, and

WHEREAS, the problem of drug and alcohol abuse in our schools and our society appears to be on the raise, and

WHEREAS, the President of the United States initiated a national crusade to counter the current drug problem, and

WHEREAS, many students find easy access to illegal drugs, particularly marijuana, and

WHEREAS, Alaska statutes currently present a mixed message by currently allowing the use and possession of marijuana in the home, and

WHEREAS, current research and medical opinion concerning marijuana indicates that marijuana is harmful and presents a serious health problem, and

WHEREAS, the utilization of marijuana possession in Alaska sends the message to outside suppliers that Alaska is an open state which condones the "personal use" of marijuana, and

WHEREAS, a show of community resolve against the legal possession and use of marijuana sends a message to the state legislature and the governor's office,

POUCH Z • KETCHIKAN, ALASKA 99901-5026 • (907) 225-2118

NOW, THEREFORE BE IT RESOLVED by the Ketchikan Gateway Borough School District that:

1. The School District encourages and supports the reinactment of statutes which will recriminalize the possession of marijuana.

2. The School District makes this position one of public record so that all in the community, in other school districts, and across the state will understand our position that the present statutes in Alaska governing marijuana are not in the best interest of its' citizens.

3. The School District requests our legislators, locally and across the state, to give the recriminalization of marijuana immediate attention during the 1st session of the 15th legislature so that effective July 1, 1987 the possession and use of marijuana will be illegal and carry consequences.

PASSED, APPROVED, AND ADOPTED BY THE BOARD OF EDUCATION OF THE KETCHIKAN GATEWAY BOROUGH SCHOOL DISTRICT OF KETCHIKAN, ALASKA THIS _____ DAY OF _____, 1987.

_____
President of the Board

_____
Clerk-Treasurer of the Board

An Analysis of Marijuana Policy

Committee on Substance Abuse and Habitual Behavior
Commission on Behavioral and Social Sciences and Education
National Research Council

National Academy Press
Washington, D.C. 1982

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NOTICE: The project that is the subject of this report was approved by the Governing Board of the National Research Council, whose members are drawn from the councils of the National Academy of Sciences, the National Academy of Engineering, and the Institute of Medicine. The members of the committee responsible for the report were chosen for their special competences and with regard for appropriate balance.

This report has been reviewed by a group other than the authors according to procedures approved by a Report Review Committee consisting of members of the National Academy of Sciences, the National Academy of Engineering, and the Institute of Medicine.

The National Research Council was established by the National Academy of Sciences in 1916 to associate the broad community of science and technology with the Academy's purposes of furthering knowledge and of advising the federal government. The Council operates in accordance with general policies determined by the Academy under the authority of its congressional charter of 1863, which establishes the Academy as a private, nonprofit, self-governing membership corporation. The Council has become the principal operating agency of both the National Academy of Sciences and the National Academy of Engineering in the conduct of their services to the government, the public, and the scientific and engineering communities. It is administered jointly by both Academies and the Institute of Medicine. The National Academy of Engineering and the Institute of Medicine were established in 1964 and 1970, respectively, under the charter of the National Academy of Sciences.

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NATIONAL RESEARCH COUNCIL

2101 CONSTITUTION AVENUE WASHINGTON, D C 20418

OF THE CHAIRMAN

June 21, 1982

Dr. William Pollin, Director
National Institute on Drug Abuse
Parklawn Building
Room 10-05
5600 Fishers Lane
Rockville, Maryland 20857

Dear Dr. Pollin:

I transmit, herewith, a report of the National Research Council's Committee on Substance Abuse and Habitual Behavior: "An Analysis of Marijuana Policy" prepared at the request of the National Institute on Drug Abuse.

The Committee on Substance Abuse and Habitual Behavior, composed of 18 experts in the several relevant disciplines, has weighed carefully the available data regarding the costs, risks, and benefits of the major policy alternatives regarding the control of marijuana use and supply. The Committee is clear in pointing to the deficiencies of this body of evidence and cautions about the hazards of formulating policy recommendations based solely or in part thereon. In this regard, I call your attention to the following statement by Louis Lasagna and Gardner Lindzey contained in the Preface to the report:

> The Committee wishes to make clear what it regards as the limits of this report for the selection of policy alternatives. Scientific judgment can estimate the prevalence of different kinds of use, risks to health, economic costs, and the like under current policies and try to project such estimates for new policies. It can come to some conclusions based on those estimates. But selection of an alternative is always a value-governed choice, which can ultimately be made only by the political process.

This caveat notwithstanding, the Committee has derived from its examination of the scientific data a conclusion about the major policy choices facing the nation with respect to

marijuana: complete prohibition, prohibition of supply only, and regulatory approaches. Specifically, the Committee concurs with the judgment of the National Commission on Marijuana and Drug Abuse, rendered in 1971, that a policy of prohibition of supply only is preferable to a policy of complete prohibition of supply and use.

What must be understood by the public, the media, and all who read the Committee's report is that its decision to endorse a policy change was not fashioned from scientific information--old or new--alone. Rather it was the analysis of a combination of factors which affect policy decisions, including the cost and efficacy of enforcement practices. Values were necessarily involved in balancing these factors and there are those within the membership and governing bodies of the Academies and the National Research Council who might not have come to the same policy conclusions, after reviewing the same data.

My own view is that the data available to the Committee were insufficient to justify on scientific or analytical grounds changes in current policies dealing with the use of marijuana. In this respect I am concerned that the Committee may have gone beyond its charge in stating a judgment so value-laden, that it should have been left to the political process.

I have one further concern that cannot go unaddressed. I fear that this report, coming as it does from a well-known and well-respected scientific organization, will be misunderstood by the media and the public to imply that new scientific data are suddenly available that justify changes in public attitudes on the use of marijuana. This would be unfortunate at a time when daily use trends by high school students are down significantly. As the Committee's discussion of marijuana's behavioral and health-related effects clearly demonstrates, there is no new scientific information exonerating marijuana. In fact, the review by our Institute of Medicine, published a few months ago, reevaluated existing scientific evidence and concluded, as have others, that marijuana is a harmful drug whose use justifies serious national concern.

I wish to remind you that this is a committee report; the only position that can be inferred with respect to the National Research Council on the issue of marijuana policy is that the National Research Council is satisfied that the Committee was competent to examine the issue and diligent in carrying out its task. Despite my personal disagreement, I believe that the Committee has performed a useful service by illuminating many of the complex issues surrounding this highly controversial subject.

Yours sincerely,

Frank Press

Frank Press
Chairman

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PREFACE

In 1978 the Committee on Substance Abuse and Habitual Behavior began a study of marijuana policy at the request and with the support of the National Institute on Drug Abuse. Sharp increases in marijuana use along with suggestions for reform of existing marijuana laws from scientists and policy makers prompted a renewed look at those laws. In addition, the National Commission on Marijuana and Drug Abuse, in its 1973 final report, Drug Use in America: Problem in Perspective, had recommended that a follow-up commission be appointed to review possible changes in the situation four years later. That recommendation was not implemented, so the Committee took as a framework for its task the assessment that the Commission recommended, especially the assessment of new evidence regarding the effects of recent changes in state marijuana policies.

The Committee conducted its study with awareness of the intensity of past controversies about marijuana use in U.S. society. In the four years since the Committee began its work, there has been an increase in visible concern among many parents about marijuana use among youth, its potential risks to the health of children, and the possibility that heavy use by some young people may seriously threaten their education. Parents who have experienced problems with their own children, or observed those of others, have organized to make marijuana policies a major item on current political agendas. In comparison with the situation at the inception of this study, there is today greater rancor in public discussion, press reports, legislative hearings, and policy-oriented technical meetings related to marijuana use.

This is the context in which the Committee completed its review of the evidence and arguments of earlier studies and weighed the significance of subsequent evidence for the major policy alternatives. Every policy has potentially good and potentially bad effects, and policy choices involve difficult comparisons of such effects. It is important to recognize that to allow the inertia developed by existing policies to prevent change is itself a choice.

The Committee is aware that analyzing a topic that is the subject of heated social debate has its hazards. Many of those participating in the marijuana debate have already selected what they take to be the admissible terms of the discussion and look with disfavor on anyone's insistence on a wider set of considerations. For example, some would settle the issue on physiological grounds alone: whether cannabis products, in the dose ranges customarily used by most people, cause tissue damage. Defenders of marijuana use may seize on the ambiguity or absence of evidence for such damage and ignore any other effects on education or safety; those opposed to marijuana use may emphasize the possibility of chronic disease that is suggested by some laboratory findings and ignore the social, political, and economic costs of fighting a well-established custom.

This report does not review and analyze every conceivable policy nuance or option. It addresses the major choices--both because these families of alternative policies subsume many variants and because the choice among these major options must be discussed before specific, perhaps new, policy instruments can be designed.

The Committee wishes to make clear what it regards as the limits of this report for the selection of policy alteratives. Scientific judgment can estimate the prevalence of different kinds of use, risks to health, economic costs, and the like under current policies and can try to project such estimates for new policies. It can come to some conclusions based on those estimates. But selection of an alternative is always a value-governed choice, which can ultimately be made only by the political process. The role of scientific evidence in this process is not inconsiderable, even though, at times, the strongest evidence may be pushed aside and the wildest speculation prevail. But the weight of the evidence is only one factor in the process of policy formation; ultimately, that process involves value choices.

In completing its report, the Committee has benefited from many people in formulating, revising, and updating the analyses and data. A very early version of this report was discussed at the Committee's annual conference in 1979, and subsequent versions benefited from comments by staff of the National Institute on Drug Abuse and of the National Research Council. The final draft received close and constructive attention by members of the National Research Council's Commission on Behavioral and Social Sciences and Education, the Institute of Medicine, and the Report Review Committee of the National Academy of Sciences.

We have also maintained a close liaison with the staff and members of the Institute of Medicine's Committee to Study the Health-Related Effects of Cannabis and Its Derivatives, on which three members of our Committee also served, and whose recently published report, Marijuana and Health, significantly contributed to our work.

Two former Committee members, Troy Duster and Michael Agar, assisted in the early preparation of the report. At later stages we were very ably assisted by the staff of the Commission on Behavioral and Social Sciences and Education, in particular David Goslin, executive director, and Eugenia Grohman, associate director for reports. Without their help, it is doubtful that we could have completed this task. Finally, we are indebted to the staff and members of the Committee, for their diligence, patience, and commitment to a difficult assignment.

Louis Lasagna, Chair
Gardner Lindzey, Chair, 1977-1980
Committee on Substance Abuse and
Habitual Behavior

An Analysis of Marijuana Policy

INTRODUCTION

Since the early 1960s the use of marijuana as an intoxicant by a growing proportion of the American population has been an issue of major national concern. Despite repeated warnings of possible adverse health consequences and persistent efforts by law enforcement agencies to restrict the supply and use of marijuana, available data indicate that experimentation with or regular use of the drug is no longer restricted to a small minority of Americans. In 1979, for example, 68 percent of young adults between the ages of 18 and 25 reported having tried marijuana; 35.4 percent reported having used marijuana in the last month. Among adults over age 26, the proportion having ever used marijuana has more than doubled since 1971, from 9.2 percent to 19.6 percent (Fishburne et al., 1980; see Table 1, below).

Although "the marijuana problem" may be viewed as of recent origin, marijuana is not a new drug. The cannabis plant has been cultivated and used both for its intoxicating properties and for its fiber (hemp) throughout the world for more than 10,000 years (Abel, 1980). At various times and places attempts have been made to restrict its use as an intoxicant; at other times and places its virtues have been extolled for medical purposes, and it has played a significant role in religious ritual. Because cannabis is easily grown--indeed, it is one of the hardiest of all plant species--its resin has been used for centuries along with tobacco, fermented distillates of grains and fruits (alcohol), and opium derivatives as one means of relieving stresses associated with daily life.

Despite its long history, the use of cannabis as an intoxicant was relatively unknown in the United States until the latter part of the nineteenth century, and even then its use as a drug was restricted to a tiny fraction of the population, primarily immigrants from Mexico. The first efforts to restrict its use in this country did not occur until 1911, when Congress, which at that time was considering proposals for federal antinarcotics legislation, listened to arguments that cannabis should be included in the list of illegal drugs. That effort failed, but during the next two decades a number of state legislatures moved to prohibit the possession of marijuana unless prescribed by a physician. It was not until 1937, when the Marijuana Tax Law was enacted, that the federal government became involved in the attempt to control its use. Even this law recognized the industrial uses of hemp and also exempted the seeds of the plant, which were then being sold as bird feed. In 1956, Congress included marijuana in the Narcotics Act of that year and, in 1961, the United Nations adopted the Single Convention on Narcotic Drugs, the terms of which state that each participating country could "adopt such measures as may be necessary to prevent misuse of, and illicit traffic in, the leaves of the cannabis plant." Congress approved participation in the convention in 1967 and three years later passed the Comprehensive Drug Abuse Prevention and Control Act, which provides the basis for current federal prohibitions regarding marijuana use.

Despite this history it was not until the 1960s that most Americans became aware of marijuana. The political and cultural protests of that period focused public attention on young people, their life-styles, and their use of drugs, including marijuana. That period created the context in which public policies regarding marijuana use have been debated since the early 1970s. As Abel (1980) points out, for the first time marijuana use was not restricted to minority groups and fringe elements of society: many of the new users were native-born, middle-class, white college students. Without doubt, the political and cultural context in which marijuana emerged as an issue of national concern has strongly influenced the subsequent policy debate about its use.

The policy debate about marijuana use has also brought into sharp focus two conflicting but deeply held beliefs of large and overlapping segments of the American population. To many, the use of drugs of any kind solely for

the purpose of producing states of intoxication is abhorrent, entirely apart from any presumed health effects. At the same time, many people strongly defend the right of individuals to privately indulge their desires, so long as others are not adversely affected. Adding to the complexity of the issues are continuing uncertainties about the health and developmental consequences of marijuana use, concern over the growing number of adolescent users, the social consequences of prosecuting otherwise law-abiding citizens for possession and use of marijuana, the relationship between the distribution of marijuana and that of other illegal drugs, the costs of enforcement of current laws, and the economic implications of the persistence of very large illegal markets.

The next section of this report presents a brief summary of existing evidence regarding the health consequences of marijuana use, drawing heavily on the recently completed study by the Institute of Medicine. The third section summarizes existing federal and state laws relating to the supply and use of marijuana. The fourth section of the report reviews the conclusions of the report of the National Commission on Marijuana and Drug Abuse (1972). The next two sections deal, respectively, with policies regarding the use and the supply of marijuana. The two final sections present a summary of the committee's conclusions regarding major policy options and recommendations for research needed to more adequately assess those options.

THE DANGERS OF MARIJUANA

Marijuana is not a harmless drug. Although available evidence suggests that marijuana may be less likely than opiates, barbiturates, or alcohol to induce psychological and physical dependence in its users, it has the capacity to reduce the effective functioning of individuals under its influence, and prolonged or excessive use may cause serious harmful biological and social effects in many users.

The recent report, Marijuana and Health, of the Institute of Medicine (1982:5 [reproduced in the appendix]) concludes:

> The scientific evidence published to date indicates that marijuana has a broad range of psychological and biological effects, some of

> which, at least under certain conditions, are harmful to human health. Unfortunately, the available information does not tell us how serious this risk may be.

Overall, the report concludes (p. 5):

> [W]hat little we know for certain about the effects of marijuana on human health--and all that we have reason to suspect--justifies serious national concern.

The complete summary of the Institute of Medicine report appears as the appendix to this report.

Over the past 40 years, marijuana has been accused of causing an array of antisocial effects, including: in the 1930s, provoking crime and violence; in the early 1950s, leading to heroin addiction; and in the late 1960s, making people passive, lowering motivation and productivity, and destroying the American work ethic in young people. Although beliefs in these effects persist among many people, they have not been substantiated by scientific evidence.

Concerns about how marijuana affects citizenship, motivation, and job performance have become less salient in recent years as marijuana has moved more into the mainstream of society and has become less exclusively associated with radicals, hippies, or disadvantaged minorities. Though there is still widespread belief that heavy marijuana use may be incompatible with a responsible, productive life, evidence that marijuana has not adversely affected either the productivity or the sense of social responsibility of some groups of users (see, e.g., Hochman and Brill, 1973) has tempered earlier fears of a widespread "amotivational syndrome." Research that correlates marijuana use with undesirable behavior, such as alienation or inattention to school studies, has not established the direction of causality or ruled out spurious associations (see, e.g., Beachy et al., 1979). This issue, however, continues to be the subject of lively controversy and the Institute of Medicine report (1982:125) concludes that "it appears likely that both self-selection and authentic drug effects contribute to the 'motivational' problems seen in some chronic marijuana users."

Recently, a body of literature has accumulated that reports on links between marijuana use and such health

impairments as lung disease, chromosome damage, reduced reproductive function, and brain dysfunction (summarized in Institute of Medicine, 1982, and National Institute on Drug Abuse, 1980). In some areas--for example, effects on the nervous system and behavior and on the cardiovascular and respiratory systems--there is clear evidence that marijuana produces acute short-term effects (Institute of Medicine, 1982:2,3):

> With a severity directly related to dose, marijuana impairs motor coordination and affects tracking ability and sensory and perceptual functions important for safe driving and the operation of other machines. . . . [It also] increases the work of the heart, usually by raising the heart rate and, in some persons, by raising blood pressure.

There is as yet no such clear evidence on the possible long-term effects in these areas, or of other potential health consequences of marijuana use; further research is needed. In addition, most studies on human populations have been laboratory studies of young, healthy adult males. Differential effects of marijuana use on the elderly, on pregnant women, on groups that are psychiatrically vulnerable or at risk for disease or dysfunction, and particularly on adolescents have not been studied systematically.

In our view, the most troublesome aspects of marijuana use are its potential effects on the development of adolescents. Parents as well as a number of clinicians and researchers are concerned that the social and intellectual development of teenagers may be harmed by chronic marijuana use. There is good evidence that intoxication may seriously impair such important skills as comprehension and retention of newly presented educational materials (Institute of Medicine, 1982). Rapidly growing tissues have been shown to be particularly vulnerable to some, although by no means all, toxic agents, and there is at least a possibility that toxic effects may be subtle and not clearly manifest until adulthood. Scientifically, these are difficult relationships to identify, and the research to date is still insufficient to strongly support any relationship.

Perhaps more significant than any lasting biological effect is the effect of the drug in different patterns of use on emotional development, on the formation of habits, and on the acquisition of coping skills for

stress situations. Indeed, although the many issues raised by the use of intoxicants to escape stressful challenge have not been systematically studied, the evident attractiveness of marijuana to many adolescents, and its possible dose-related interference with the study and hard work needed for intellectual development in the crucial high school years, make this a special matter for concern. This is particularly so in light of the fact that, unlike alcohol, marijuana is used by many adolescents during school hours. Finally, reports of the effects of marijuana use on automobile driving skills are worrisome.

This Committee has reviewed the scientific literature surveys of marijuana effects on health and behavior, including the major recent study conducted by the Institute of Medicine (1982) and those by the National Institute on Drug Abuse (1979; 1980), Tashkin et al. (1978), Nahas (1977), and Fried (1977). We agree with the conclusion of the Institute of Medicine report that it is likely that long-term heavy marijuana use will be shown to result in measurable damage to health, just as long-term chronic tobacco and alcohol use have proven to cause such damage. It is evident that the full impact of marijuana use on human health will not be clear without careful epidemiological studies involving substantial populations of users--a matter of some decades--even though it is predictable that this drug--like all others--will cause harm in some of its users, particularly in its heaviest users, and among these, in its heaviest adolescent users. At this time, however, our judgment as to behavioral and health-related hazards is that the research has not established a danger both large and grave enough to override all other factors affecting a policy decision.

OVERVIEW OF CURRENT MARIJUANA POLICIES

Current federal and state marijuana laws are in part governed by international treaty. The major federal law relevant to marijuana is the Comprehensive Drug Abuse Prevention and Control Act of 1970, ~~which repealed all~~ prior federal legislation and reduced federal penalties for possession and sale. Although marijuana possession and sale are still prohibited, possession has been reduced from a felony to a misdemeanor offense; the maximum penalty for a first offense is $5,000 ~~and one year's~~

imprisonment. The Act also provides for conditional discharge, by which first offenders found guilty of simple possession or casual transfer (which is treated as simple possession) may be placed on probation for up to one year (Congressional Digest, 1979).

The Uniform Controlled Substance Act of 1970, drafted by the National Conference of Commissioners on Uniform State Laws, was designed to make state laws more compatible with the new federal law. Like the federal act, the Uniform Act reclassified marijuana as a hallucinogen rather than a narcotic and reduced the penalty for possession from the felony to the misdemeanor level; a majority of the states have adopted the Uniform Act. Eleven states have withdrawn the criminal sanction from possession for personal use. In these states, arrest has been replaced with a traffic-ticket type of citation, and a small fine is the sole allowable penalty. About 30 states include some provision for conditional discharge of first offenders, and about a dozen of them provide for all records of the offense to be expunged. The Alaska Supreme Court ruled in 1975 that possession for personal use by adults at home was protected by the constitutional right to privacy and hence was not subject to any penalty (Rosenthal, 1979).

State penalties for second-offense possession and for selling marijuana are extremely variable. (See National Organization for the Reform of Marijuana Laws and Center for Study of Non-Medical Drug Use, 1979, for summary tables of state marijuana laws.) Sale is almost always a felony, with maximum sentences ranging from two years to life, although casual transfer, or "accommodation," is sometimes exempt from felony treatment. All but 15 jurisdictions punish cultivation as heavily as they do sale; the Uniform Act includes the two in the same classification (manufacture), with the same penalty provisions.

Federal prohibition of small-scale possession is virtually unenforced. At the March 1977 House of Representatives hearings on decriminalization, the chief of the criminal division of the Department of Justice testified that the federal government no longer effectively prosecutes the use of marijuana, "nor do we, under any conceivable way, in the Federal Government have the resources to do so" (Select Committee on Narcotics Abuse and Control, 1977:13). In terms of its effects from a law enforcement point of view, the present official federal policy of complete prohibition does not differ in

fact from a policy of prohibition of supply only. Complete prohibition is the federal law, but partial prohibition is the practice. However, the law, even though partly unenforced, has probably had a restraining influence on the willingness of states to adopt policies of less than complete prohibition. The states traditionally have followed the federal lead in drug abuse legislation, although they are not legally required to do so (see the testimony of Jay Miller, American Civil Liberties Union, to the Select Committee on Narcotics Abuse and Control, 1977). In summary, in most states and according to federal law, U.S. marijuana policy is one of complete prohibition--that is, prohibition of both supply and use.

Major alternatives to complete prohibition include prohibition of supply only--called partial prohibition--and regulation.* Prohibition of supply only means having no penalty (or only civil penalties) for use, possession, or, sometimes, "casual transfer" of small quantities of marijuana, while having criminal penalties for manufacture, importation, or commercial sale of marijuana. Regulation means not only eliminating penalties for use but also allowing controlled production and distribution.

Within each of the three broad policy options--complete prohibition, prohibition of supply only, and regulation--numerous subsidiary policy choices exist. For example, a policy of complete prohibition necessitates decisions about the resources to be devoted to enforcement, the appropriate penalties to be imposed for violations, and whether marijuana should be made available for any medical uses. Under a policy of prohibition of supply only, decisions must still be made about penalties and permitted medical uses. In addition, one must also determine how to distinguish between users

*In this discussion, we use the terms "complete prohibition," and "prohibition of supply and use" interchangeably. We also use the terms "partial prohibition," "prohibition of supply only," and "decriminalization" as equivalent. We generally prefer the terms "partial prohibition," or "prohibition of supply only" since many people seem to regard decriminalization as the equivalent of legalization or regulation--which it most certainly is not. (The policy of partial prohibition has also been called the vice model.) Finally, we use "regulation" and "legalization" as equivalent terms.

and suppliers; whether cultivation should be permitted; how stronger preparations of the cannabis plant, such as hashish, should be treated; whether to criminalize small-scale casual transfers, made with or without payment; and what should be done about certain specific behaviors, such as the public use of marijuana and the operation of motor vehicles under the influence of the drug. Under a policy of regulation, some of the issues to be decided are the type of control system (e.g., state monopoly or licensed sale), the rules as to potency and quality, and appropriate penalties for violation of the system's rules.

The variety of choices within each of the broad policy options suggests that none can be characterized in a monolithic way. Some regulatory systems could be so stringent as to have results similar to prohibitory laws: e.g., a regulatory system that raised the price drastically above what the illegal market charges. Similarly, lack of enforcement could strongly reduce the impact of a prohibitory option. As we have already noted, this latter effect has already occurred in some jurisdictions in which the law provides for complete prohibition but users are not in fact prosecuted.

A REVIEW OF THE REPORT OF THE NATIONAL COMMISSION ON MARIJUANA AND DRUG ABUSE

An attempt to describe a full array of policy options together with associated benefits and detriments of each of them was made by the National Commission on Marijuana and Drug Abuse in its 1972 report, Marijuana: A Signal of Misunderstanding. With respect to the major policy choices, the Commission did a thorough job. The members and staff recognized the limited knowledge base for their deliberations and subsequently recommended that a second commission be appointed to review the situation four years later. Such a follow-up commission was never appointed. It seems appropriate, then, that this Committee reappraise the Commission's work in light of subsequent research findings, especially those relating to recent changes in marijuana policies.

The Commission examined the spectrum of social policies available to control marijuana use and the benefits and detriments of implementing each policy. The legal alternatives presented included those identified above: complete prohibition; prohibition of supply only; and

regulatory approaches. The Commission emphasized that choosing among the three approaches requires consideration of the social milieu, cultural values, and practicalities of implementation. The Commission considered such social conditions particularly important in examining marijuana controls because both use of the drug and the laws prohibiting supply and use had symbolic importance, representing a clash of values between a dominant culture that opposed marijuana use and a large minority that either used marijuana or condoned its use. The probable effects of the various policies considered by the Commission include changes in use patterns, enforcement costs, and influence on related social concerns such as the marketing of other illicit drugs and general respect for law.

The Commission commented on all three broad policy options. It suggested first that total prohibition has resulted in costly enforcement, alienation of the young, discrimination through selective enforcement, some deterrence of supply (especially to middle-aged and middle-class potential users), but minimal deterrence of use by those with access to the drug. Second, the Commission stated its belief that prohibition of supply only would support the official policy of discouraging use, but at the same time would recognize the practical difficulties of attempting to eliminate use. The report listed a number of choices that might be made under a system of partial prohibition and described some of the practical problems they might entail (e.g., the need to distinguish between casual and commercial distributors). Finally, the Commission described regulation as a policy that only mildly disapproved of occasional use and that concentrated on controlling excessive use, but was mostly designed to lower the costs of prohibiting the drug. The Commission argued that marijuana consumption would increase considerably if complete prohibition were replaced by regulation. In addition, the Commission considered a major drawback of any regulatory system to be that its elimination of the main symbol of society's disapproval--criminal sanctions--would cause resentment among the nonuser majority of the population. Marijuana was described as being symbolic of countercultural lifestyles: "the drug's symbolism creates a risk of strong political reaction to any liberalization of the present laws by older members of the society" (National Commission on Marijuana and Drug Abuse, 1972, Appendix Volume II:1149).

On balance, the Commission concluded that, since the threat of punishment had not apparently deterred the millions of people who had already used marijuana, the replacement of complete by partial prohibition would not produce a significant increase in marijuana use. Consequently, the Commission recommended that individual marijuana users should not be subject to criminal prosecution for their private use or possession of small amounts of the drug, and that, on balance, the best policy was one of prohibition of supply only. In accordance with this view, the Commission recommended that federal and state laws should be amended to achieve partial prohibition. In the decade since the Commission report, a number of states have changed their laws in varying ways. These legal changes can be viewed as natural experiments, and one can use the data from them to reassess the Commission's conclusions regarding these policies.

THE USE OF MARIJUANA: COMPARING COMPLETE AND PARTIAL PROHIBITION

To compare the two types of marijuana control policies presently used in the United States--prohibition of supply and use and prohibition of supply only--we need to consider only the one particular in which they differ: the application of criminal sanctions against marijuana users. To compare the effects of the two policies, we can examine the effects of the prohibition of use and determine whether prohibition results in more costs than benefits or vice versa.

In recent years the prohibition of marijuana use has come under increasing criticism. Many students of the U.S. marijuana situation, including the National Commission on Marijuana and Drug Abuse, members of Congress, political analysts, and legal experts, have suggested that existing laws prohibiting marijuana use be repealed. These suggestions have been prompted by the failure of current policies to deter large numbers of users, the consequent criminalization of large numbers of young Americans, and the high social costs of such law enforcement. A number of professional associations and agencies have also gone on record in support of the removal of all criminal penalties for the private possession and use of marijuana as a means of reducing the economic costs of law enforcement and the social costs of arrest or imprisonment (criminalization) of young

people who are otherwise not criminally involved or labeled. The organizations and agencies that have expressed this view include the American Medical Association, the American Bar Association, the American Public Health Association, the Canadian Commission of Inquiry into the Non-Medical Use of Drugs, the National Council of Churches, the National Advisory Commission on Criminal Justice Standards and Goals, the National Commission on Marijuana and Drug Abuse, among others. Eleven states, with one-third of the nation's population, have adopted some version of partial prohibition or "decriminalization." (In Oregon, Alaska, Maine, Colorado, California, Ohio, Minnesota, Mississippi, New York, North Carolina, and Nebraska, citations and small fines have replaced arrests and incarceration for use-only marijuana-related offenses.)

At first glance, criminalizing the selling of marijuana might appear inconsistent with failing to punish its purchase. But in the drafting of laws, a line is often drawn between legal and illegal conduct so that the maximum reduction in the proscribed behavior can be gained at minimum social cost. Frequently it turns out that laws aimed solely at suppressing sales are more cost-effective in reducing both the possession and use of a substance than are laws that attempt to suppress possession directly. There are several reasons for this. First, there are fewer sellers than buyers; this permits a concentration of law enforcement efforts where they do the most good. Second, juries are likely to be more sympathetic to a "mere" user, who may be ill-advised, than to a dealer making a profit from the weaknesses of others. Offenses treated under the vice model (partial prohibition) range from gambling--the person who takes illegal bets is guilty of a crime while the person who places them is not--to the offense of selling new automobiles not equipped with seat belts--the seller, not the buyer, is guilty of an offense. Even Prohibition in 1919 never criminalized the possession or use of alcohol, only its manufacture and sale.

Effects of Partial Prohibition

Probably the most important fact about a policy of prohibition of supply only is that where it has been adopted it has apparently not led to appreciably higher levels of marijuana use than would have existed if use

were also prohibited. The National Commission on Marijuana and Drug Abuse's speculations about the lack of change in use patterns resulting from repeal of prohibitions on use have been confirmed by data since 1972. Reports from California, Oregon, and Maine indicate no appreciable increase in use following decriminalization of use, at least in the short term.

Oregon, the first state to repeal prohibition of use (in October 1973) has been studied in a series of Drug Abuse Council surveys (National Governors' Conference, 1977). Surveys in 1974 and 1975 showed no major increase following decriminalization. While the percentage of adults who were current users had increased by January 1977 (from 20 to 24 percent), use had increased similarly nationwide in the same period, suggesting that the causes for the adult increase in Oregon were the same as those for increases in the rest of the country rather than the result of changes in the law. Indeed, the percentage of adult ever-users in Oregon in 1976 (24 percent) was lower than the average percentage of adult ever-users in the western United States (28 percent) in 1975-1976, although higher than the national average (21.3 percent). (It should be noted that aggregate use rates in the western United States are heavily weighted by use rates in California, the largest western state, which had relatively high rates even prior to the state repeal of prohibition of use.) That the increase in use in Oregon from 1973 to 1976 was probably not due to the new law is suggested by other survey data. Only a small proportion of nonusers said fear of legal prosecution was a reason for nonuse in 1974, 1975, and 1976 (National Governors' Conference, 1977). On the question of the fear of health dangers, Drug Abuse Council survey data show that such fear decreased significantly over those years but has increased since 1976.

The state of Maine, which repealed criminal penalties for marijuana use in May 1976, surveyed the effects of legislation in July and August 1978 (State of Maine Department of Human Services, 1979). Its study concluded that the change from criminal to civil penalties has not caused a large increase in marijuana use; less than 1 percent of all adults and 3.1 percent of all high school students reported any increase in their use as a result of the new law; 3.5 percent of adult regular users and 7 percent of high school regular users reported any increase in their use directly attributable to the change in the law. There is also preliminary evidence, based on

a nationwide study of high school students between 1975 and 1979, that "any increase in marijuana use in the decriminalized states, taken as a group, was equal to or less than the increases being observed in the rest of the country where decriminalization was not taking place" (Johnston, 1980:5). It could be argued that because de facto repeal of prohibition of use has been taking place throughout the country, one should not expect to see larger increases in use in states that legally decriminalize than in others. Even if this is true, however, the important point is that the legal change to decriminalization does not, in itself, appear to lead to increases in use.

This lack of change is not particularly surprising. The statistical chance that any person would be apprehended for his or her use is, in fact, extremely low throughout the United States (though, as we note below, the large number of users is sufficient to generate a substantial volume of arrests in states that do prohibit use). As a result, it is hard to imagine that the deterrent effect of prohibition laws on any given user would be very great.

It has been suggested that repeal of government prohibitions might change attitudes related to health or morals, perhaps symbolizing that health officials certify marijuana use to be safe. The absence of large increases in marijuana use in repeal states, however, indicates that either the change in policy has not had such a symbolic effect, or that, if it has, its causal significance is not appreciable--though it must be acknowledged that changes of this type might take generations to occur.

Costs of Prohibition of Use

The costs of policies directed at the user are not negligible, although actual savings in law enforcement costs attributable to repeal of prohibition of use per se are difficult to estimate. The difficulty arises in part because marijuana arrests have decreased nationally in recent years, reflecting the overall tendency to relax enforcement of marijuana laws, and that change could lead to inaccurate estimates of the impact of repeal. Nevertheless, reduced law enforcement activities seem to have led to substantial savings in states that have repealed laws that prohibit use.

California made a careful study of the economic impact of its law repealing prohibition of use, which went into effect in January 1976 (State Office of Narcotics and Drug Abuse, 1977). The law reduced the penalty for personal possession of one ounce or less of marijuana from a possible felony to a citable misdemeanor, punishable as an infraction with a maximum fine of $100 without regard to prior possession offenses. Criminal custody, booking, and pretrial incarceration procedures were eliminated. Possession of more than one ounce was also made a misdemeanor, with a maximum fine of $500, six months in jail, or both. According to the study, these changes resulted in a 74 percent reduction in what the state had been spending yearly to enforce its marijuana laws. (Estimates of what the state had been spending ranged from $35 million to more than $100 million yearly; see National Governors' Conference, 1977.)

In addition to its economic benefits, repealing prohibition of use saves the social costs of criminalizing the marijuana user. In recent years, close to 400,000 people have been arrested each year for marijuana-related offenses despite the general nonenforcement of criminal sanctions for use (Federal Bureau of Investigation, 1980). Only a small fraction of the arrests are made under federal law, largely for importation of marijuana. About 85 percent of all marijuana-related arrests are for possession, usually of one ounce or less (see, e.g., State Office of Narcotics and Drug Abuse, 1977).

A study by the National Commission on Marijuana and Drug Abuse of a sample consisting of some 3,000 of the people arrested for marijuana-related offenses in 1970 indicated that the marijuana arrest was usually the arrestee's first experience with the criminal justice system, particularly among juveniles (National Commission on Marijuana and Drug Abuse, 1972). Yet, "it is standard practice for law enforcement agencies to report such offenses to prospective employers, licensing agencies, and other authorities as 'narcotic drug arrests'" (testimony of Jay Miller, American Civil Liberties Union, to the Select Committee on Narcotics Abuse and Control, 1977). Thus young users, who are often otherwise law-abiding people, are subject to an arrest record, or even a prison term, with implications extending into many aspects of their lives.

Alienation from the rule of law in democratic society may be the most serious cost of current marijuana laws. The National Commission on Marijuana and Drug Abuse was

concerned that young people who see no rational basis for the legal distinction between alcohol and marijuana may become cynical about America's political institutions and democratic process. The American Bar Association report (printed in Select Committee on Narcotics and Drug Abuse, 1977) concurs in the view that marijuana laws that criminalize the millions of Americans who have used marijuana engender disrespect for the law.

Public Attitudes Toward Partial Prohibition

Although the National Commission on Marijuana and Drug Abuse concluded that prohibition of supply only would be a better policy than prohibition of supply and use, it felt that a serious disadvantage of such a course would be the upset and moral outrage such a policy would engender. Hindsight now shows that the Commission was mistaken in predicting a strong uniform public reaction to the adoption of partial prohibition policies. Experience since 1973 has shown that repeal of criminal penalties for use of marijuana has not been accompanied by massive public protest in the states in which it occurred and, in fact, has had the approval of the majority of citizens in those states (National Governors' Conference, 1977).

Nationally, attitude trends are consistent with the experience of the repeal states. Roffman (1978) reports that public opinion surveys indicate a slowly increasing preference for a reduction in penalties for marijuana offenses; a 1975 national survey (National Institute on Drug Abuse, 1975-1976) found that 52 percent of American adults favored only a fine or probation for small marijuana offenses; and a 1977 Gallup poll showed that 28 percent of the public favored legalization, compared with 12 percent in 1969.

THE SUPPLY OF MARIJUANA: COMPARING PROHIBITED AND REGULATED MARKETS

Policy implementation does not occur in an ideal world. Prohibition of supply has not, in practice, meant that no one has had access to marijuana--though this may have been the intent of those who framed that law. Similarly, regulation of supply does not mean that everyone who uses marijuana will use it moderately, minimizing its harm. Prohibition of supply does make marijuana less

accessible than it might otherwise be to a large number of Americans, and thus it almost certainly reduces the total amount of the drug used and the number of users. Such reduction is the purpose of a partial prohibition policy and to some extent it is accomplished. Arguments for a regulated, legal supply of marijuana are largely based on the social costs and incomplete effectiveness of prohibition of supply and on the belief that regulating rather than prohibiting the supply would not lead to an unacceptably large increase in use.

Under a regulatory policy, the cultivation, importation, manufacture, distribution, retailing, and, of course, use of marijuana would no longer be illegal per se. Within this broad category, specific policy options range from a virtual withdrawal of the government from marijuana control (allowing the drug to be freely produced, advertised, and sold, very much as coffee is today--but protecting the consumer against harmful adulterants), to a carefully controlled system of licensing, to a government monopoly on retail sales, wholesale distribution, or manufacture of marijuana. Thus, controls might be placed on such factors as quality, potency, amount purchased, time and place of sales, age of buyers, etc. If marijuana were regulated as is alcohol, restrictions would derive from federal, state, or local statutes, with the majority of them not at the federal level. Regulations might also include legally fixed prices--as in state-controlled alcohol beverage retailing or as a consequence of the levying of excise taxes.

The specific form and content of any proposed regulatory system are very important for those faced with the decision as to whether and under what conditions to remove penalties for the distribution of marijuana, but such details are beyond the scope of this report.

The advantages of a policy of regulation include the disappearance of most illegal market activity, the savings in economic and social costs of law enforcement directed against illegal supply systems, better controls over the quality and safety of the product, and, possibly, increased credibility for warnings about risks. The major disadvantages are a consequence of increased marijuana use--increases in harm to physical health and to individual development and behavior.

Costs of Prohibition of Supply

The number of arrests for violations related to supply is much lower than for those related to use. But enforcement of prohibition of supply is far more costly per arrest. Long undercover investigations, the purchase of expensive hardware, and the major consumption of trial and correctional resources are largely attributable to the prohibition of supply.

The National Institute on Drug Abuse (1975) estimated that in 1974 costs for enforcement of marijuana laws totaled $600 million for state and local agencies. If we extrapolate from the California data (State Office of Narcotics and Drug Abuse, 1977), about three-fourths of the total is spent enforcing the law against marijuana supply. The total federal drug abuse law enforcement budget was more than $400 million in 1979, about half of which was the budget for the Drug Enforcement Administration. At the federal level, authorities do not break down their expenditures on enforcement between marijuana and other drugs; virtually all of the federal resources that are allocated to marijuana are spent in attempting to enforce the laws against supply.

The task of attempting to make the prohibition of supply effective is, of course, formidable. In 1969 Operation Intercept demonstrated the practical difficulty of sealing off the Mexican border. In the weeks the operation lasted, hundreds of thousands of vehicles and passengers were searched every day; ensuing traffic jams caused expenditures by U.S. tourists and commuters to Mexico to drop 50-70 percent below normal (Kaplan, 1971). The situation was intolerable and the program was halted. However, the federal government has continued efforts to improve border surveillance and to penetrate trafficking networks. The White House Strategy Council on Drug Abuse (1979) notes that more than 5.6 million pounds of marijuana was seized at the Mexican border over a 12-month period in 1977-1978; a large increase over the 1.5 million pounds seized during the previous 12 months, "but a fraction of marijuana entering the country." Recently, the Council has suggested strengthening border surveillance by cooperative efforts of the Drug Enforcement Administration, the Customs Service, the Coast Guard, and the Department of State and by the use of the detection capabilities of the armed forces as well.

In our view, the prospects for major success in these ventures are not great. Nor is there much likelihood

that some recently suggested measures against marijuana production outside the U.S. would make future prohibition of supply more effective. For example, the White House Strategy Council on Drug Abuse has supported crop eradication programs, provided that the proposed method of eradication is evaluated for possible health and environmental consequences and that a readily distinguishable marker is added to any chemical herbicides that are used, but the political obstacles to this course would be significant. Entirely apart from the views of producer nations, which are likely to be quite negative, the public is unlikely to support the use of chemicals of unknown toxicity on an import product, legal or not, that may be used by large numbers of Americans. And irrespective of the degree of success of controlling imports, the problem of domestic production under a policy of partial prohibition remains. Although the illegal domestic industry is thought to account for only about 15 percent of American marijuana consumption, marijuana grows easily in many parts of the United States. The National Commission on Marijuana and Drug Abuse cited a Department of Agriculture estimate that in 1972 there were 5 million acres containing wild marijuana in the United States and an undetermined but obviously growing number of acres under cultivation.

Law enforcement costs are by no means the only costs of prohibition of supply. There are large amounts of money being made in marijuana--which, like any illegal business, carries with it the likelihood of corruption of public officials and the loss of tax dollars. Violence is also a cost of attempting to prohibit marijuana supply; this problem is not confined to illegal marijuana production abroad. There has been violence in marijuana-growing regions in the United States. The extent of such violence is not known with any precision, but there have been popular press reports of kidnappings, assaults, burglaries, and homicides known to be connected with the marijuana business in northern California and elsewhere.

Another major cost of attempts to prohibit the supply of marijuana is related to the fact that many illegal sellers of marijuana also sell other illegal drugs, e.g., PCP, amphetamine, and barbiturates (Blum, 1971). It is likely, therefore, that prohibition of the supply of marijuana increases access to and use of other illegal drugs through the creation of an illegal marketing system for all drugs. Little is known about the structures and activities of illicit drug markets. It is clear,

TABLE 1 Lifetime Prevalence and Use in Past Month of Marijuana, 1971-1979, by Category of User (percentage)

Category of User	1971	1972	1974	1976	1977	1979
Youth: Ages 12-17						
Ever used	14.0	14.0	23.0	22.4	28.0	30.9
Used in past month	6.0	7.0	12.0	12.3	16.6	16.7
Young Adults: Ages 18-25						
Ever used	39.3	47.9	52.7	52.9	59.9	68.2
Used in past month	17.3	27.8	25.2	25.0	27.4	35.4
Older Adults: Ages 26+						
Ever used	9.2	7.4	9.9	12.9	15.3	19.6
Used in past month	1.3	2.5	2.0	3.5	3.3	6.0
(Number)	(3,186)	(3,265)	(4,022)	(3,576)	(4,594)	(7,224)

SOURCE: Fishburne et al. (1980).

however, that there are many small-scale marijuana dealers, that many sellers service only their friends and acquaintances, and that those who sell marijuana are thereby more likely to come into contact with users and sellers of more dangerous drugs, to use such drugs, and to make them available to their clientele (Blum, 1971). Moreover, there is reason to believe that marijuana sellers may become socialized into other illegal activities.

Costs of Regulating Supply

The wide availability and use of marijuana are not only major factors in the cost of attempts to prohibit the supply of the drug, they also have implications for the likely magnitude of increases in use that could be expected under a regulatory policy. Greater use of marijuana under a regulatory policy is regarded as the most significant cost of such a policy. In an analysis of this potential cost, however, it is important to note that under the present policy of prohibition, prevalence and frequency of marijuana use are substantial and have increased in recent years.*

A National Institute on Drug Abuse general household survey (Fishburne et al., 1980) shows that 35.4 percent of the 18-25-year-olds in the United States report having used marijuana in the month preceding the survey. Yearly surveys show a steady increase from 1971 to 1979 in the percentage of people who report having ever used marijuana as well as in the percentage of people who report being current users (see Table 1). These survey results (Fishburne et al., 1980) also indicate that between 1976 and 1977, the percentage of current users among 12-17-year-olds increased from 12.3 to 16.6 percent; this trend

*The data indicating rates of use are based on self-reports; as such, their reliability and validity may be questioned. Nevertheless, as Radosevich et al. (1979) indicate, studies of questions on drug use have consistently demonstrated reliable responses within the same instrument and over time. Furthermore, there are indications that most drug surveys do not have serious validity problems (see Whitehead and Smart and Abelson and Atkinson, both cited in Radosevich et al., 1979; Johnston et al., 1982).

TABLE 2 Trends in Prevalence of Marijuana Use by High School Seniors (percentage)

Prevalence	Class 1975	1976	1977	1978	1979	1980	1981
Ever used	47.3	52.8	56.4	59.2	60.4	60.3	59.5
Used in last 12 months	40.0	44.5	47.6	50.2	50.8	48.8	46.1
Used in last 30 days	27.1	32.2	35.4	37.1	36.5	33.7	31.6
Used daily in last 30 days[a]	6.0	8.2	9.1	10.7	10.3	9.1	7.0

[a]Daily use defined as using marijuana on 20 or more occasions in the last 30 days.

SOURCE: Johnston et al. (1982).

had leveled off by 1979 and has since shown a decline. In an annual survey of national samples of some 17,000 high school seniors, Johnston et al. (1982) found that 7.0 percent of the class of 1981 reported daily marijuana use, compared with 6.0 percent in 1975 and 10.7 percent in 1978, the peak year (see Table 2). There has been a similar trend in initial use at younger ages.

Although the present policy of prohibition of supply is not preventing the current levels of marijuana use, including use among the very young, it is probable that most strategies under a regulatory policy would result in an overall increase in use. Even more important than overall use rates, however, are likely changes in consumption patterns; such patterns are the most difficult changes to predict. The smallest increases in numbers of users can be expected to occur among those to whom marijuana is now most readily available--the young. Johnston et al. (1982) found that close to 90 percent of the high school seniors in their national sample survey report that marijuana is "fairly easy" or "very easy" for them to get. This percentage remained relatively stable over the seven years, 1975-1981. At the same time, the reported availability of most other illegal drugs (except cocaine) declined considerably. For example, while 46.2 percent of the 1975 high school seniors said that LSD would be "fairly easy" or "very easy" to get, only 32.2 percent of the class of 1978 gave those responses. It would appear, therefore, that the reports of easy availability are not due to a tendency of adolescents to report any illegal drug as easy to get, but reflect their actual access to the drug. It might also be noted that only 13.9 percent of the class of 1978 reported having no friends who smoke marijuana; thus it is reasonable to expect that at least 86 percent have a factual basis for estimating the availability of the drug.

Other survey data corroborate these findings. Radosevich et al. (1979) report that a 1975 national survey by the Drug Abuse Council found that at least 70 percent of the high school students in their sample reported marijuana "easy to get," and O'Donnell et al. (1976) found similar results. There are no contrary reports for recent years. In sum, one can be reasonably confident that, at least with respect to older adolescents, the prohibition against supply does not succeed in suppressing access to marijuana. (The effect on price is discussed below.)

Regulation could be expected to provide the greatest increase in availability to those to whom the drug is now least available, i.e., older adults who are not in contact with marijuana sellers or a drug-using subculture and who are most likely to avoid illegal "connections."

It has been argued that a serious cost of the adoption of a regulatory policy for marijuana is the likelihood that such a change might delude many people into believing that the drug is safe. As noted above, there is no indication that the elimination of penalties for marijuana use has caused the drug to be regarded as any less dangerous. Moreover, alcohol and tobacco are almost universally regarded as involving risks to health, and these drugs are already made available under regulatory systems.

To the extent that marijuana use causes harm, one is necessarily concerned about policy changes that will lead to increases in use. As we have noted, however, it is a fact that marijuana is already widely available despite the legal prohibition of supply and that, despite the best efforts of government under any foreseeable set of conditions, it will continue to be. Though a regulatory policy would increase the availability of the drug, estimates of the size of these increases, and associated increases in harm, must be weighed against estimates of the costs and weaknesses of continuing prohibitions of supply. In pragmatic terms, the issue is whether more harm would be done, overall, by retaining the partly effective, costly prohibition of supply or by moving to a system of legalized regulated sales--wherein presumably more people would use more marijuana, but some of the costs imposed by prohibition of supply would be removed.

Regulatory Systems: Some Concrete Aspects

To this point, a policy of regulation has been discussed rather abstractly in contrast with the more concrete discussion of prohibition policies. Experimentation with varying systems of regulation followed by adjustment and readjustment based on experience would be necessary before those most appropriate for particular circumstances could be developed. This can be a complex matter. For instance, U.S. alcohol policy, developed with the repeal of Prohibition, consists of an umbrella of national policy and a wide variety of supporting state and local regulation. The national policy umbrella includes

controls on importation, taxation, potency, packaging, labeling, advertising, use in federal jurisdictions (e.g., parks, military installations), and use in systems regulated by the federal government (e.g., air transportation); it also provides funds and guidelines for the treatment of casualties of excessive use. Under the umbrella policy, states and local jurisdictions regulate taxes, retail sales, hours of availability, age limits, and the like, where supply is legal, or prohibit sales entirely. Some states have monopoly systems for package sales, others use licensed private stores. Historically, under this system, the strictness of controls has reflected local sentiment about the consumption of alcohol. Although few "dry" jurisdictions exist today, various degrees of local "dryness" were quite widespread until very recently (National Research Council, 1981).

Controlling Use

A regulated system of marijuana sale might attempt to moderate use by inhibiting the frequency of use and the amounts used as well as by prescribing conditions of purchase and use. However, it is likely that under a regulatory system consumption would in great part be controlled by informal social norms--as it is today.

Manipulating the price of the drug is an obvious means of inhibiting use. It has been argued that most adults would be willing to pay a higher price for legal marijuana than they currently pay for illegal supplies in return for not having to seek out "connections" and being relieved of the feeling that they may be supporting organized crime. A high price would be comparatively more restrictive for young people--precisely those whom one would most want to discourage from use--since, though they seem affluent compared with young people in previous times, their budgets are in fact more constrained than those of adults. The possibility of illegal markets selling to young people remains, but today's kind of illegal market for marijuana would probably shrink greatly under a regulatory system in the same way that illegal alcohol distribution systems have become so scarce. Young users would be much more likely to gain access to marijuana by diversion from the legal market--as they do today for alcohol--or from homegrown plants than from a wholly illegal chain of distributors. Such a development would make marijuana selling a less profitable and status-producing occupation among the young.

It has been suggested that if legal limits were imposed on the potency of legally available marijuana, a substantial illegal market for high-potency forms of the drug, including hashish, would still exist. Since it is likely that there would continue to be some users who prefer high-potency forms of cannabis, this is a reasonable concern. But there is no compelling a priori reason to believe that a legal structure for retail marijuana sales, which includes limits on potency, would result in any increase in the availability and use of high-potency products.

Home Cultivation

Cultivation of marijuana by users is another issue that would have to be confronted in devising a regulatory system. Growing marijuana without payment of a tax might be treated as a revenue offense. Without criminal penalties or vigorous enforcement, however, deterrent effects would be minimal since marijuana can be grown indoors anywhere in the United States using artificial light--and at comparatively little expense. A recent British study of options for marijuana control (Logan, 1979) suggests that, from a law enforcement perspective, it is not feasible to attempt to control home cultivation. Whether users would take the trouble to grow their own marijuana would depend in part on the legal price. The relatively high prices that might be charged in order to discourage use and to increase revenues would also tend to encourage home cultivation. Whatever its disadvantages, however, the use of homegrown marijuana at least would not bring users into contact with those who illegally sell the drug. With respect to young people, moreover, marijuana under cultivation is much harder for children to hide from parents than is the purchased prepared drug, and cultivation by juveniles could remain illegal if age limits on use were imposed. Nonetheless, the treatment of home cultivation represents a major issue for the design of a regulatory system.

Public Education

Excessive use may be discouraged by policies aimed at public education and at the use of the media, including a ban on commercial advertising. Although information

on how to use drugs, on drug hazards, and on the attributes of drugs is passed along most effectively through informal channels (see, e.g., Hanneman, 1972), media and education programs can make such information far more readily available.

Research on the communication of messages to the public has identified source credibility as a major factor contributing to the persuasive power of a message (McGuire, 1969). It appears that the public is now extremely wary of some government information programs that attempt to influence health behaviors. The credibility of the federal government may be especially suspect when it issues health warnings about an illegal substance that it is clearly trying to prohibit. Rosenthal (1979) asserts that distrust of the government and the medical establishment has grown because of past exaggerations and distortions of the effects of some mind-altering drugs.

Informal Social Controls

In an assessment of possibilities for governmental controls under a regulatory system, the operation of informal norms for controlling substance use practices must be taken into account (Maloff et al., 1980). National experience with alcohol use, for example, provides evidence that there are informal rituals and sanctions that generally encourage moderation in the use of recreational drugs. Moreover, moderation is encouraged when a drug is introduced gradually, that is, to a growing population of users, like marijuana in the 1960s and early 1970s. One might expect that when a new drug is introduced into a society, governmental control would be particularly important since no informal controls for teaching people appropriate rules for use would have developed. If a potent drug is made widely available precipitously and very cheaply to a novice population, severe societal disruptions may occur: for example, the gin epidemics of early eighteenth-century England (see Clark, 1976). Because in the past two decades informal norms for controlling marijuana use have spread in the United States under conditions of greatly increased availability of marijuana, there is reason to believe that widespread uncontrolled use would not occur under regulation. Indeed, regulation might facilitate patterns of controlled use by diminishing the "forbidden fruit" aspect of the

drug and perhaps increasing the likelihood that an adolescent would be introduced to the drug through families and friends who practice moderate use, rather than through their heaviest-using, most drug-involved peers.

Relations Among States

As has historically been the case with respect to alcohol, state governments differ in their approaches to marijuana. So long as present federal law continues to prohibit cultivation and distribution of marijuana, states cannot adopt a regulatory system, although they are legally free to reduce or eliminate their own penalties for sale and are not compelled to enforce federal laws. If federal law were changed, however, the institution of a regulatory system in one state would have reverberations in other states. Residents of states that continued to prohibit marijuana could be expected to cross state lines to purchase the drug in a state with a regulated system, thus further compromising the ability of states to enforce prohibition of supply among its residents. Furthermore, states that attempted to curtail consumption by raising prices might find their populations turning to lower-cost marijuana from neighboring states with lower prices. This is a familiar situation. Large numbers of both cigarettes and guns are smuggled illegally into New York from other states. Moreover, New Yorkers may travel to New Jersey to gamble in a casino, or Virginians to the District of Columbia to buy cheaper liquor. It is difficult to see how state prohibitions could remain effective if the number of states with regulatory systems grew very large unless the changes occurred in only one region of the country. However, there may be advantages in permitting a state-by-state approach. Conditions governing the costs and benefits both of partial prohibition and of regulation vary among the states. In this area of uncertainty, we may learn from experiment. If one regulatory system proved successful, other states would be more likely to adopt similar systems; similarly, if it worked poorly in one state, other states would be less inclined to adopt a regulatory policy.

Effects on Foreign Relations

The 1961 Single Convention on Narcotic Drugs, which now obligates the U.S. government to prevent the importation of marijuana and to prohibit the adoption of a licensing system by any state, is a serious (although not an insurmountable) obstacle to the adoption of a federal regulatory policy and the development of state licensing. The treaty allows a signatory to terminate its adherence to the agreement at any time after two years from the date of the convention. Of course the general impact of any move to withdraw from the convention includes a broad foreign policy context, which is beyond the expertise of this Committee to judge.

CONCLUSIONS

For the last decade, concern with health hazards attributable to marijuana has been rising. The hearts, lungs, reproductive functions, and mental abilities of children have been reported to be threatened by marijuana, and such threats are not to be taken lightly. Heavy use by anyone or any use by growing children should be discouraged. Although conclusive evidence is lacking of major, long-term public health problems caused by marijuana, they are worrisome possibilities, and both the reports and the a priori likelihood of developmental damage to some young users makes marijuana use a cause for extreme concern.

At the same time, the effectiveness of the present federal policy of complete prohibition falls far short of its goal--preventing use. An estimated 55 million Americans have tried marijuana, federal enforcement of prohibition of use is virtually nonexistent, and 11 states have repealed criminal penalties for private possession of small amounts and for private use. It can no longer be argued that use would be much more widespread and the problematic effects greater today if the policy of complete prohibition did not exist: The existing evidence on policies of partial prohibition indicates that partial prohibition has been as effective in controlling consumption as complete prohibition and has entailed considerably smaller social, legal, and economic costs. On balance, therefore, we believe that a policy of partial prohibition is clearly preferable to a policy of complete prohibition of supply and use.

We believe, further, that current policies directed at controlling the supply of marijuana should be seriously reconsidered. The demonstrated ineffectiveness of control of use through prohibition of supply and the high costs of implementing such a policy make it very unlikely that any kind of partial prohibition policy will be effective in reducing marijuana use significantly below present levels. Moreover, it seems likely to us that removal of criminal sanctions will be given serious consideration by the federal government and by the states in the foreseeable future. Hence, a variety of alternative policies should be considered.

At this time, the form of specific alternatives to current policies and their probable effect on patterns of use cannot be determined with confidence. It is possible that, after careful study, all alternatives will turn out to have so many disadvantages that none could command public consensus. To maximize the likelihood of sound policy for the long run, however, further research should be conducted on the biological, behavioral, developmental, and social consequences of marijuana use, on the structure and operation of drug markets, and on the relations of various conditions of availability to patterns of use.

RECOMMENDATIONS FOR RESEARCH

Health and Behavior

The persistent concern about the health-related effects of marijuana requires both an immediate and a continuing response. First, as the report of the Institute of Medicine (1982:5) recommends, there should be "a greatly intensified and more comprehensive program of research into the effects of marijuana on the health of the American people." An important goal of this research program should be the identification of subgroups at high risk for physiological and psychological damage in relation to patterns of use and doses of marijuana. The report presents a detailed agenda of needed research. Second, to the extent that potential health hazards are identified, policy research should address possible safeguards and precautions to protect the user.

If marijuana use can be scientifically shown to entail grave risks--to the brain, the cardiovascular and respiratory systems, or to reproductive functions, for

example--that are currently not known, it can be argued that, as was the case with cigarette smoking, knowledge of those effects will be more effective than criminal enforcement as a deterrent to use.

Drug Markets

Research on the price elasticity of demand in legal and illegal markets is a clear priority. The result of such research will be important in determining the likelihood of controlling heavy use through price mechanisms and in computing the amount of money--if any--that could be realized in taxation of marijuana.

Present knowledge of the structure and activities of drug markets and networks is insufficient to allow prediction of the effects of policy changes on them. Research in this area is difficult but the questions are important. If many dealers who sell cocaine, PCP, amphetamines, and barbiturates as well as marijuana would be put out of business if marijuana were available through legal channels, it might result in a curtailed market for a variety of other drugs. On the other hand, it is also possible that the market structure is so loosely organized, and dealers so transiently involved, that removing marijuana from the illegal markets would have little effect. To be sure, much research on some of these questions could not be conducted unless a regulatory system were in place in some state. Nonetheless, some research, particularly ethnographic and economic studies, should be undertaken now to discover the importance of marijuana profits to drug-dealing networks; the transiency, size, and nature of such networks; etc. It is essential for research in this area to be supported by appropriate government agencies.

Effects on Use

Although many questions remain to be answered before the most informed choices can be made between prohibiting and regulating supply, there are many things that cannot be known unless some jurisdiction tries a regulatory policy. Although adoption of a regulatory policy is likely to result in increased use, little is known about changes in patterns of use that are likely to result. If federal laws prohibiting supply are changed to allow

states to license marijuana sales, epidemiological research programs must be ready to monitor any changes in use and their consequences. To do so, research should be organized and operating well in advance of any such policy changes in order to determine rates of use before the change. Although the shift in the law from complete to partial prohibition in 11 states has apparently had little effect on consumption patterns there, we do not know the degree to which legally available marijuana would attract a larger market. The impact on use of educational campaigns, health warnings, and informal social controls under a regulatory system should be investigated.

In the absence of the opportunity for states to adopt regulatory policies, there can only be educated guesses about which age groups are likely to increase use or whether individuals who now use marijuana will use more, etc. Meanwhile, every bit of analysis to predict the answers to these questions, by surveying public attitudes, assessing past experiences with the spread of drug use in society (e.g., alcohol use following the repeal of Prohibition), and critically reviewing the experience of other societies in which marijuana is more readily available, will be valuable.

Marijuana regulation would permit systematic provision of comprehensive, clearly communicated health warnings on package inserts or covers, in public health education, by medical practitioners, and by public health interest groups as well as by the government. The extent to which such warnings would have more credibility for users than current health warnings, generated in an atmosphere of prohibition, is an important subject for research. Despite widespread pessimism about the failures of drug education campaigns, there are encouraging results in educational approaches based on the Stanford Heart Disease Prevention Program experience. With appropriate, research-based models and techniques, public health education may be an attractive means for limiting excessive use (see, e.g., Maccoby, 1979).

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APPENDIX: SUMMARY OF MARIJUANA AND HEALTH

The Institute of Medicine (IOM) of the National Academy of Sciences has conducted a 15-month study of the health-related effects of marijuana, at the request of the Secretary of Health and Human Services and the Director of the National Institutes of Health. The IOM appointed a 22-member committee to:

- analyze existing scientific evidence bearing on the possible hazards to the health and safety of users of marijuana;
- analyze data concerning the possible therapeutic value and health benefits of marijuana;
- assess federal research programs in marijuana;
- identify promising new research directions, and make sugggestions to improve the quality and usefulness of future research; and
- draw conclusions from this review that would accurately assess the limits of present knowledge and thereby provide a factual, scientific basis for the development of future government policy.

This assessment of knowledge of the health-related effects of marijuana is important and timely because marijuana is now the most widely used of all the illicit drugs available in the United States. In 1979, more than 50 million persons had tried it at least once. There has been a steep rise in its use during the past decade, particularly among adolescents and young adults, although there has been a leveling-off in its overall use among high school seniors in the past 2 or 3 years and a small decline in the percentage of seniors who use it frequently. Although substantially more high school students have used alcohol than have ever used marijuana, more high school seniors use marijuana on a daily or near-daily basis (9 percent) than alcohol (6 percent). Much of the heavy use of marijuana, unlike alcohol, takes place in school, where effects on behavior, cognition, and psychomotor performance can be particularly disturbing. Unlike alcohol, which is rapidly metabolized and eliminated from the body, the psychoactive components of marijuana persist in the body for a long time. Similar to alcohol, continued use of marijuana may cause tolerance and dependence. For all these reasons, it is imperative that we have reliable and detailed information about the effects of marijuana use on health, both in the long and short term.

What, then, did we learn from our review of the published scientific literature? Numerous acute effects have been described in animals, in isolated cells and tissues, and in studies of human volunteers; clinical and epidemiological observations also have been reported. This information is briefly summarized in the following paragraphs.

EFFECTS ON THE NERVOUS SYSTEM AND ON BEHAVIOR

We can say with confidence that marijuana produces acute effects on the brain, including chemical and electrophysiological changes. Its most clearly established acute effects are on mental functions and behavior. With a severity directly related to dose, marijuana impairs motor coordination and affects tracking ability and sensory and perceptual functions important for safe driving and the operation of other machines; it also impairs short-term memory and slow learning. Other acute effects include feelings of euphoria and other mood changes, but there also are disturbing mental phenomena, such as brief periods of anxiety, confusion, or psychosis.

There is not yet any conclusive evidence as to whether prolonged use of marijuana causes permanent changes in the nervous system or sustained impairment of brain function and behavior in human beings. In a few unconfirmed studies in experimental animals, impairment of learning and changes in electrical brain-wave recordings have been observed several months after the cessation of chronic administration of marijuana. In the judgment of the committee, widely cited studies purporting to demonstrate that marijuana affects the gross and microscopic structure of the human or monkey brain are not convincing; much more work is needed to settle this important point.

Chronic relatively heavy use of marijuana is associated with behavioral dysfunction and mental disorders in human beings, but available evidence does not establish if marijuana use under these circumstances is a cause or a result of the mental condition. There are similar problems in interpreting the evidence linking the use of marijuana to subsequent use of other illicit drugs, such as heroin or cocaine. Association does not prove a causal relation, and the use of marijuana may merely be symptomatic of an underlying

disposition to use psychoactive drugs rather than a "stepping stone" to involvement with more dangerous substances. It is also difficult to sort out the relationship between use of marijuana and the complex symptoms known as the amotivational syndrome. Self-selection and effects of the drug are probably both contributing to the motivational problems seen in some chronic users of marijuana.

Thus, the long-term effects of marijuana on the human brain and on human behavior remain to be defined. Although we have no convincing evidence thus far of any effects persisting in human beings after cessation of drug use, there may well be subtle but important physical and psychological consequences that have not been recognized.

EFFECTS ON THE CARDIOVASCULAR AND RESPIRATORY SYSTEMS

There is good evidence that the smoking of marijuana usually causes acute changes in the heart and circulation that are characteristic of stress, but there is no evidence to indicate that a permanently deleterious effect on the normal cardiovascular system occurs. There is good evidence to show that marijuana increases the work of the heart, usually by raising heart rate and, in some persons, by raising blood pressure. This rise in workload poses a threat to patients with hypertension, cerebrovascular disease, and coronary atherosclerosis.

Acute exposure to marijuana smoke generally elicits broncho-dilation; chronic heavy smoking of marijuana causes inflammation and pre-neoplastic changes in the airways, similar to those produced by smoking of tobacco. Marijuana smoke is a complex mixture that not only has many chemical components (including carbon monoxide and "tar") and biological effects similar to those of tobacco smoke, but also some unique ingredients. This suggests the strong possibility that prolonged heavy smoking of marijuana, like tobacco, will lead to cancer of the respiratory tract and to serious impairment of lung function. Although there is evidence of impaired lung function in chronic smokers, no direct confirmation of the likelihood of cancer has yet been provided, possibly because marijuana has been widely smoked in this country for only about 20 years, and data have not been collected systematically in other countries with a much longer history of heavy marijuana use.

EFFECTS ON THE REPRODUCTIVE SYSTEM AND ON CHROMOSOMES

Although studies in animals have shown that delta-9-THC (the major psychoactive constituent of marijuana) lowers the concentration in blood serum of pituitary hormones (gonadotropins) that control reproductive functions, it is not known if there is a direct effect on reproductive tissues. Delta-9-THC appears to have a modest reversible suppressive effect on sperm production in men, but there is no proof that it has a deleterious effect on male fertility. Effects on human female hormonal function have been reported, but the evidence is not convincing. However, there is convincing evidence that marijuana interferes with ovulation in female monkeys. No satisfactory studies of the relation between use of marijuana and female fertility and child-bearing have been carried out. Although delta-9-THC is known to cross the placenta readily and to cause birth defects when administered in large doses to experimental animals, no adequate clinical studies have been carried out to determine if marijuana use can harm the human fetus. There is no conclusive evidence of teratogenicity in human offspring, but a slowly developing or low-level effect might be undetected by the studies done so far. The effects of marijuana on reproductive function and on the fetus are unclear; they may prove to be negligible, but further research to establish or rule out such effects would be of great importance.

Extracts from marijuana smoke particulates ("tar") have been found to produce dose-related mutations in bacteria; however, delta-9-THC, by itself, is not mutagenic. Marijuana and delta-9-THC do not appear to break chromosomes, but marijuana may affect chromosome segregation during cell division, resulting in an abnormal number of chromosomes in daughter cells. Although these results are of concern, their clinical significance is unknown.

THE IMMUNE SYSTEM

Similar limitations exist in our understanding of the effects of marijuana on other body systems. For example, some studies of the immune system demonstrate a mild, immunosuppressant effect on human beings, but other studies show no effect.

THERAPEUTIC POTENTIAL

The committee also has examined the evidence on the therapeutic effects of marijuana in a variety of medical disorders. Preliminary studies suggest that marijuana and its derivatives or analogues might be useful in the treatment of the raised intraocular pressure of glaucoma, in the control of the severe nausea and vomiting caused by cancer chemotherapy, and in the treatment of asthma. There also is some preliminary evidence that a marijuana constituent (cannabidiol) might be helpful in the treatment of certain types of epileptic seizures, as well as for spastic disorders and other nervous system diseases. But, in these and all other conditions, much more work is needed. Because marijuana and delta-9-THC often produce troublesome psychotropic or cardiovascular side-effects that limit their therapeutic usefulness, particularly in older patients, the greatest therapeutic potential probably lies in the use of synthetic analogues of marijuana derivatives with higher ratios of therapeutic to undesirable effects.

THE NEED FOR MORE RESEARCH ON MARIJUANA

The explanation for all of these unanswered questions is insufficient research. We need to know much more about the metabolism of the various marijuana chemical compounds and their biologic effects. This will require many more studies in animals, with particular emphasis on subhuman primates. Basic pharmacologic information obtained in animal experiments will ultimately have to be tested in clinical studies on human beings.

Until 10 or 15 years ago, there was virtually no systematic, rigorously controlled research on the human health-related effects of marijuana and its major constituents. Even now, when standardized marijuana and pure synthetic cannabinoids are available for experimental studies, and good qualitative methods exist for the measurement of delta-9-THC and its metabolites in body fluids, well-designed studies on human beings are relatively few. There are difficulties in studying the clinical effects of marijuana in human beings, particularly the effects of long-term use. And yet, without such studies the debate about the safety or hazard of marijuana will remain unresolved. Prospective

hort studies, as well as retrospective case-control udies, would be useful in identifying long-term havioral and biological consequences of marijuana use.

The federal investment in research on the alth-related effects of marijuana has been small, both relation to the expenditure on other illicit drugs d in absolute terms. The committee considers the search particularly inadequate when viewed in light of e extent of marijuana use in this country, especially young people. We believe there should be a greater vestment in research on marijuana, and that vestigator-initiated research grants should be the imary vehicle of support.

The committee considers all of the areas of research marijuana that are supported by the National itute on Drug Abuse to be important, but we did not lge the appropriateness of the allocation of resources ng those areas, other than to conclude that there uld be increased emphasis on studies in human beings l other primates. Recommendations for future research presented at the end of Chapters 1-7 of this report.

CONCLUSIONS

scientific evidence published to date indicates that ijuana has a broad range of psychological and logical effects, some of which, at least under tain conditions, are harmful to human health. ortunately, the available information does not tell how serious this risk may be.

The major conclusion is that what little we know for tain about the effects of marijuana on human lth--and all that we have reason to pect--justifies serious national concern. Of no less cern is the extent of our ignorance about many of the basic and important questions about the drug. Our or recommendation is that there be a greatly nsified and more comprehensive program of research the effects of marijuana on the health of the rican people.

Back-up SB 32

EXECUTIVE SUMMARY

PATTERNS OF DRUG USE: SCHOOL SURVEY



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July 31, 1983

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I

EXECUTIVE SUMMARY:
Highlights of the Study

A. Introduction

This report presents the findings from a study conducted by the Center for Alcohol and Addiction Studies (CA) of the University of Alaska, Anchorage. The research, sponsored by the State Office of Alcoholism and Drug Abuse (SOADA), surveyed students in grades 7-12 in school districts in eight locations in the state: Anchorage, Barrow, Bethel, Kotzebue, Fairbanks, Juneau, Nome and Sitka. The project was designed to obtain information on the use or nonuse of a broad spectrum of chemical substances, ranging from legal socially-sanctioned drugs for those of legal age, such as alcohol and tobacco, to illegal and unsanctioned drugs taken for nonmedical purposes, such as marijuana, cocaine, hallucinogens and stimulants, among others.

In recent years American society has experienced an increase in the frequency and intensity of substance use and abuse, particularly among college and secondary school age youth. In particular, the nonmedical use of illicit mood-altering drugs by youth of elementary, junior and senior high school age has become a problem of major concern. Although legal and social sanctions exist to preclude nonmedical use of psychoactive drugs for recreational or social purposes, they continue to be taken, and youngsters who take them are placing themselves at risk for potential legal, social, and health problems.

Recent research (c.f., Richards, 1981) has shown that the prevalence of drug use is generally fairly low among elementary school youth, but that the prevalence increases dramatically among junior and senior high school students. The

use of drugs among school age youth began to emerge slowly in the early 1960's, and increased dramatically during the mid to late 1970's. Although the prevalence of drug use is believed to be moderating (Miller, 1983; Johnston, Bachman, & O'Malley, 1982), the overall level of drug use by youth remains a significant concern.

Interest in learning about the nature and extent of drug use by school age youth has prompted a number of national surveys sponsored by the National Institute of Drug Abuse (NIDA), as well as a myriad of research studies directed at investigating adolescent drug use (c.f., Richards, 1981). Alaska has been isolated from participation in these studies, thereby leaving a void with respect to reliable information on the use and nonuse of drugs by Alaska's school age youth. Without this information state and local agencies are hampered in their planning for drug related services, education, and prevention programs.

The present research is directed at achieving information concerning experiences with mood-altering drugs by school age youth. It is the specific aim of the study to identify current trends and patterns of use by these youthful Alaskan residents, and to also obtain knowledge about students' perceptions and consequences of using drugs. In order to achieve these objectives, surveys were conducted in eight school districts (listed above) in diverse locations within the state. The major topics to be addressed from the results of the survey in this report are the current prevalence of drug use among the students and an analysis of some of the characteristics of those who have had experiences with psychoactive drugs. Also reported are data on use by grade, age of first use, intensity of drug use, and perceptions about taking drugs. Emphasis is also given to addressing the non-using student, and to explore why they did not experiment with chemical substances.

The results to be presented have been summarized in a series of tables, charts and graphs; a discussion of results follows the presentation of the tables. In the following section a glossary has been provided to help define terms and to provide a key to the interpretation of the graphic figures. When appropriate, comparisons of the Alaskan data have been made with comparable school age youth included in some of the national survey research.

It is envisioned that the findings of the drug survey will be useful to schools in their efforts to develop education programs designed to address the issue of drug-taking behavior. Additionally, the study is designed to assist SOADA with respect to its planning and policy development, as well as to be of value to local and state governments and govermental agencies in their efforts to understand and deal with the health, social and legal consequences of drug-taking behavior by school age youth.

In summary, the five sets of results share several critical characteristics which contribute to the integration of findings, and which also contribute to their utility to estimate drug use among the general population of school age youth in Alaska:

- data collection from students in grades 7-12, which consistently includes those in age from 12 to 18;
- adequate and consistent sampling methodology;
- comparability of drugs investigated;
- comparability of question formats; and
- accessibility of detailed tabular data.

Each of the five data sets are found in Chapter III, the section on results. Chapter IV contains a discussion of the results, followed by conclusions and recommendations (Chapter V).

B. Glossary

This section is provided to acquaint the reader with precise definitions of the terms and concepts used in this report. Included in this glossary are definitions of substances and frequently used terms, as well as information on reading tables, and clarification of the statistical terms used in the report. Phrases are listed in alphabetical order.

Adults	This category includes persons age 26 years and older. For other age groups see: Youth and Young Adults.
Alcohol	Alcoholic beverages - beer, wine, and whiskey, such as gin, and other hard liquors.
Barbiturates	See depressants.
Cocaine (see stimulants)	A behavioral stimulant drug taken to induce a "rush" which involves a feeling of intense euphoria and a sense of well-being.
Confidence Level (Interval)	A range of values within which the true statistic or value may be found, or where there is a probability of locating the true population value.
Current Use	Has used within past month.
Depressants	Chemical substances which act to exert a nonselective general depressant action upon the central nervous system, and which are taken to induce a mild state of euphoria similar to alcohol intoxication. Sedatives are divided into four subgroups: intermediate/long acting barbiturates, nonbarbiturate/ nonbenzodiazepine sedatives, short acting barbiturates and Dalmane.
Drug	For purposes of the study, a drug is defined as any chemical substance that alters mood, perception, or consciousness.
Frequency	How often a drug was taken, e.g., once a week, weekly, etc.
Ever Used	Taking/trying a drug one or more times during one's lifetime.
Hallucinogens	Drugs classified as hallucinogens and/or psychedelics have the capacity to induce visual, auditory, and other hallucinatory experiences, and to separate the individual from reality. Such drugs as LSD, phencyclidine (PCP), mescaline, psyote, psilocybin, and DMT, among others, are included within general data on hallucinogens.
Heroin	A semisynthetic opiate produced by a chemical modification of morphine, taken to induce a subjective experience characterized by an extremely pleasant, euphoric state, feelings of warmth, well-being, peacefulness and contentment.

Inhalants	For the purpose of this report, substances currently being inhaled to alter subjective states are being defined as inhalants. Inhalants may be classified into three basic classes: commercial and related volatile solvents, aerosols, and anesthetics. The following substances have been defined as inhalants: 1) Gasoline or lighter fluids; 2) Spray paints; 3) Other aerosol sprays (PAM or deodorants); 4) Shoe shine, glue, or toluene; 5) Lacquer thinner, or other paint solvents; 6) Amyl nitrite, "poppers"; 7) Halothane, ether, or other anesthetics; 8) Nitrous oxide, whippets; 9) Locker room odorizer; 10) Other substances used as inhalants.
Lifetime Prevalence (Ever Used)	Percent who ever used; i.e., has used the drug one or more times in lifetime.
Marijuana	A mixture of the crushed leaves, flowers, and small branches obtained from the hemp plant, and taken to induce feelings of well-being, relaxation, tranquility, and a heightened state of awareness.
Nonuse	A "No" answer to any of the questions which inquire whether one had ever taken a chemical substance.
Opiates	Any natural or synthetic drug that acts in the same way as morphine to relieve pain, such as codeine, demerol and other such drugs.
Past Month, Past Year Use	See: Use in Past Month, Use in Past Year.
Percents/ Percentage	A given part or amount in every hundred, e.g., a 20% rate means 20 in every 100. Percents are shown to the nearest tenth for the data in this study.
Prevalence	The incident of drug taking, represented by the percent of respondents who tried a drug, such as 40% tried a drug 6 or more times.
Recency of Use	The categories of recency are: past 30 days, past year, and lifetime use.
Relative Percent	The amount or number of persons among those within a specific group, e.g., taking or not taking a specific drug, who have responded to questions which pertain only to use or non-use of the drug.
Rounding	The tables sometimes add to 99% or 101% when they should add to 100%. Similarly, tables shown to one decimal place sometimes add to 99.9% or 100.1% instead of 100%. These discrepancies are due to the rounding of percents.
Sedatives	See depressants.
Significance (level of)	The reliability of finding or the dependability one can place on an obtained statistic as an indicator of the true population

value. Significance always refers to probability, or how much an obtained value can be explained as a chance occurrence. The significance value used in this research is $p = .05$, which means that we anticipate that 95 times out of 100 chances we have obtained reliable statistics.

Stimulants — Any drug that increases behavioral activity is defined as a stimulant drug. Stimulants are divided into amphetamines, nonamphetamine anorectics, Ritalin, and Cylert. These drugs are generally taken to feel more alert, to achieve a "rush," or to enhance the effects of other drugs.

Tranquilizers — Psychoactive drugs which are used principally to reduce anxiety, stress or tension and to treat neurotic disorders. The tranquilizers concerned in this survey are Librium, Valium, Equanil and other such types.

Use in Past 30 Days — Reports given which indicate have taken a drug one or more times during the past 30-day period.

Use in Past Year — Respondent reports use one or more times during year prior to interview date.

Young Adults — This category includes persons age 18 to 25 years. For other age groups see: Youth and Older Adults.

Youth — This category includes persons who participated in Junior and Senior High School samples. Age of respondents will vary but will generally range from 12 to 18. For other groups see Adults and Young Adults.

Key to Graphs and Figures

MJ - Marijuana	ST - Stimulants
HL - Hallucinogens	DP - Depressants
CK - Cocaine	TQ - Tranquilizers
HR - Heroin	OP - Opiates
IH - Inhalants	TB - Tobacco
AL - Alcohol	

C. Major Findings

The major findings of the study are summarized in the tables, graphs and figures which follow, and in the summary statements listed below:

- Half the students sampled have reported experiences with one or more illicit mood-altering drugs. A substantial proportion of these experiences involved marijuana. The percentages of students who tried different illicit drugs is illustrated in Figure 1. After marijuana, the other drugs experienced reflect the following order of lifetime prevalence: stimulants, cocaine, inhalants, depressants, tranquilizers, hallucinogens and heroin.

- The level of lifetime experiences with psychoactive drugs among students is high. The extent to which drugs have been tried/taken among Alaska's students is illustrated vividly when the present findings are compared to results of a national survey of drug use among a sample of 12-17 year olds. Although the ages of the two samples are not exactly comparable, the national data nevertheless provides a "baseline" which helps to achieve a perspective on drug use by Alaska's youth. The comparison in Figure 2 shows clearly that Alaskan students are having more experiences with psychoactive drugs than their counterparts in the "lower 48."

- Although many students have tried drugs, the majority of such use has been chiefly experimental. Only a small percent of students have taken drugs with any consistency or regularity. Marijuana, however, is the exception, with about 4% of the sample using it once or more a day.

FIGURE 1

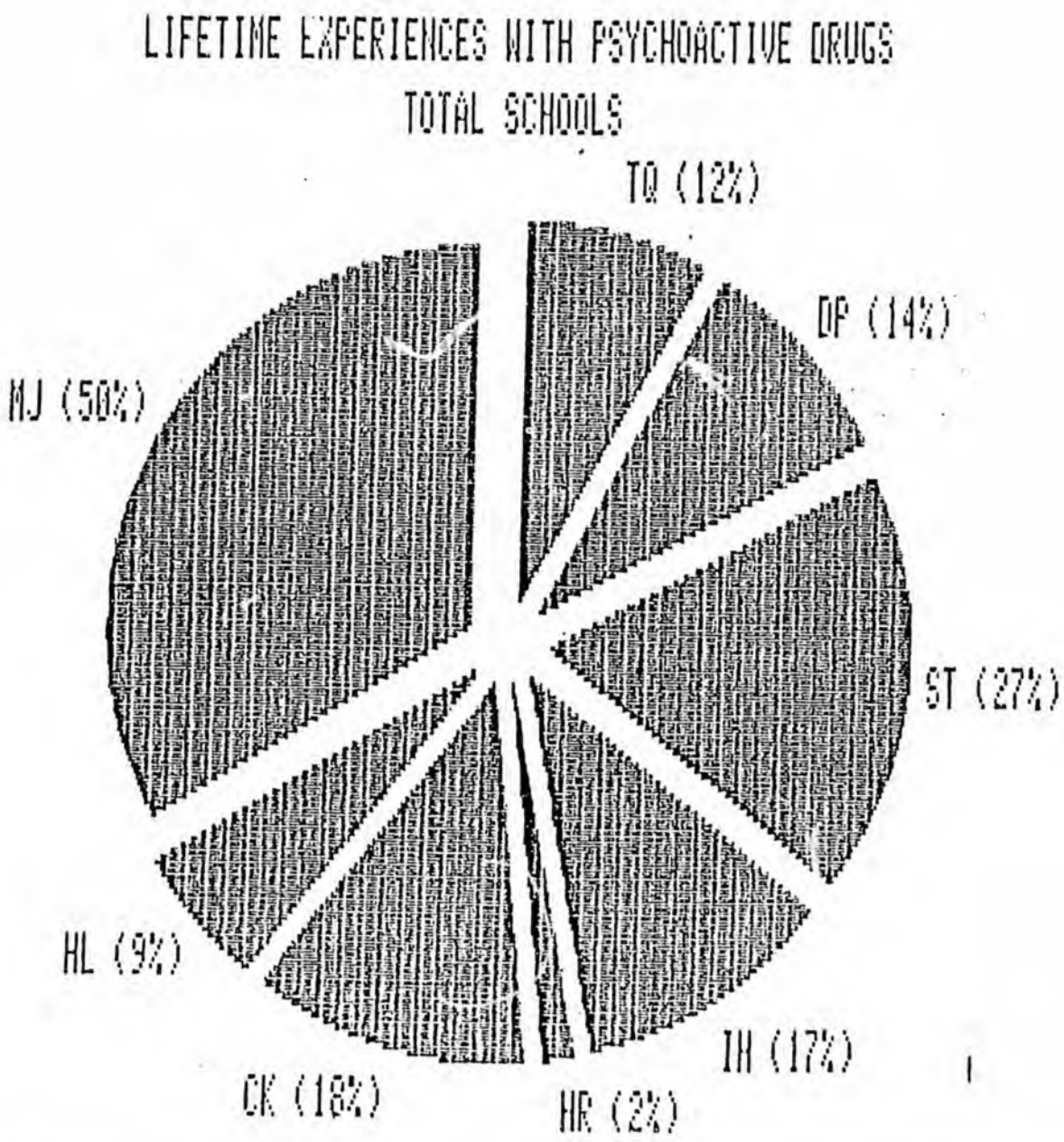
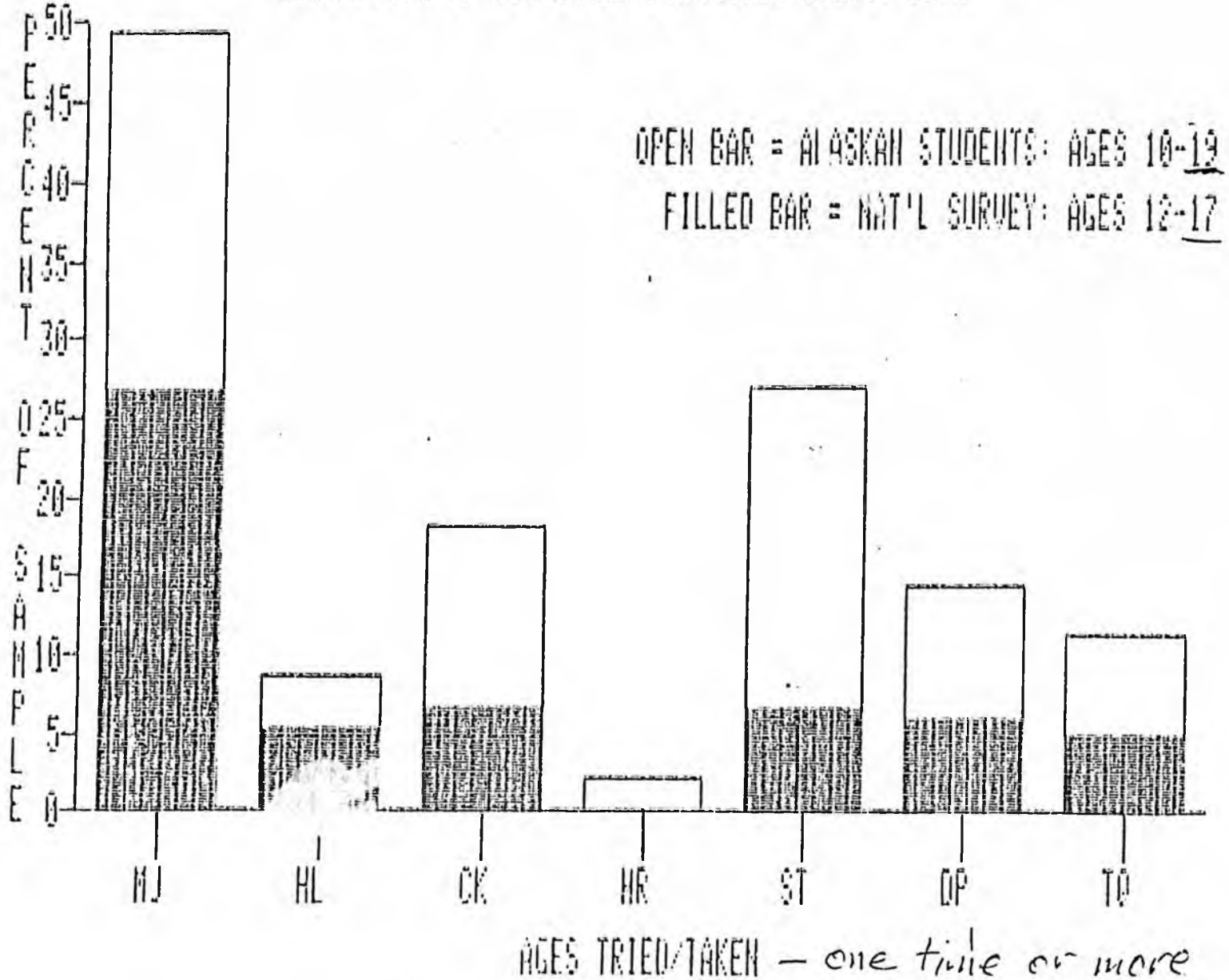

LIFETIME EXPERIENCES WITH PSYCHOACTIVE DRUGS
TOTAL SCHOOLS
TQ (12%)
DP (14%)
ST (27%)
IH (17%)
HR (2%)
CK (18%)
HL (9%)
MJ (50%)

FIGURE 2

COMPARISON OF ALASKA WITH NATIONAL SURVEY DATA



- Slightly higher proportions of males than females are involved in taking/trying drugs.

- Distinct relationships exist between age, grade, and drug-taking behavior. These relationships are represented by the following results:

(1) Age and First Trying Psychoactive Drugs

As age increases, the proportion of students who try/take drugs increases correspondingly, but this relationship appears to be non-linear. That is, as age increases, the number of students who try different drugs varies at different age levels, thereby presenting distinct patterns for trying each drug. Figure 3 illustrates this process for the three most widely tried/taken drugs - marijuana, stimulants and cocaine - for all but the Anchorage school sample (where the question of age of first trying each drug was not asked).

(2) Grade and Drug-Taking Behavior

A direct, almost linear, relationship exists between grade level and the taking of drugs. As grade level increases, the percent of students who have tried/taken drugs increases correspondingly. The nature of this relationship is illustrated in Figure 4, for the three most tried drugs - marijuana, stimulants and cocaine.

(3) Junior-Senior High School Comparisons

The extent of drug-taking behavior differs significantly between junior high school (grades 7-9) and senior high school (grades 10-12) students. Senior high school students experiment with taking drugs more frequently than junior high school students.

- Most students who do not try drugs report that it is because of concern that drugs would "hurt" their minds, and because of fear that drugs would also cause physical harm.

FIGURE 3

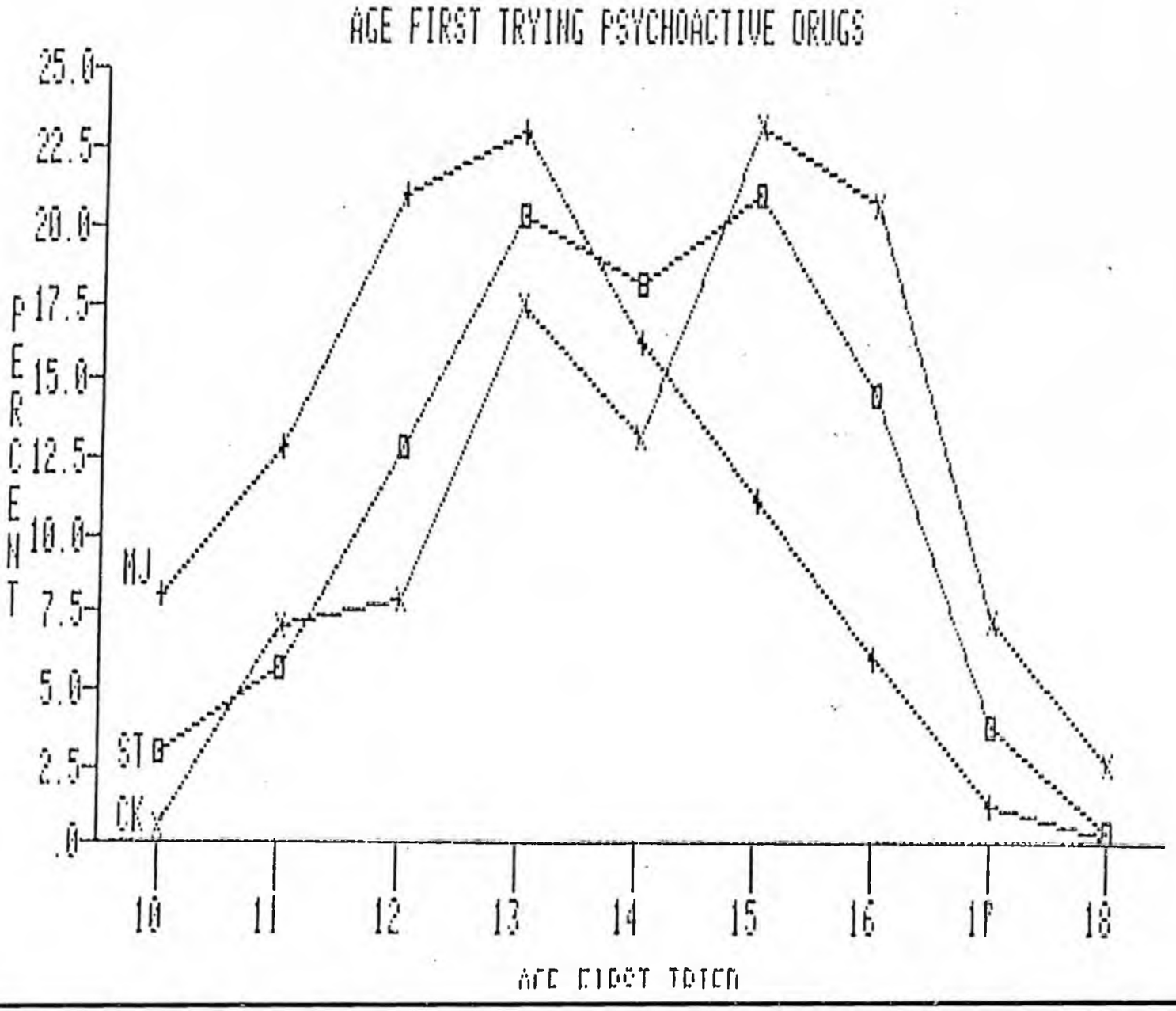
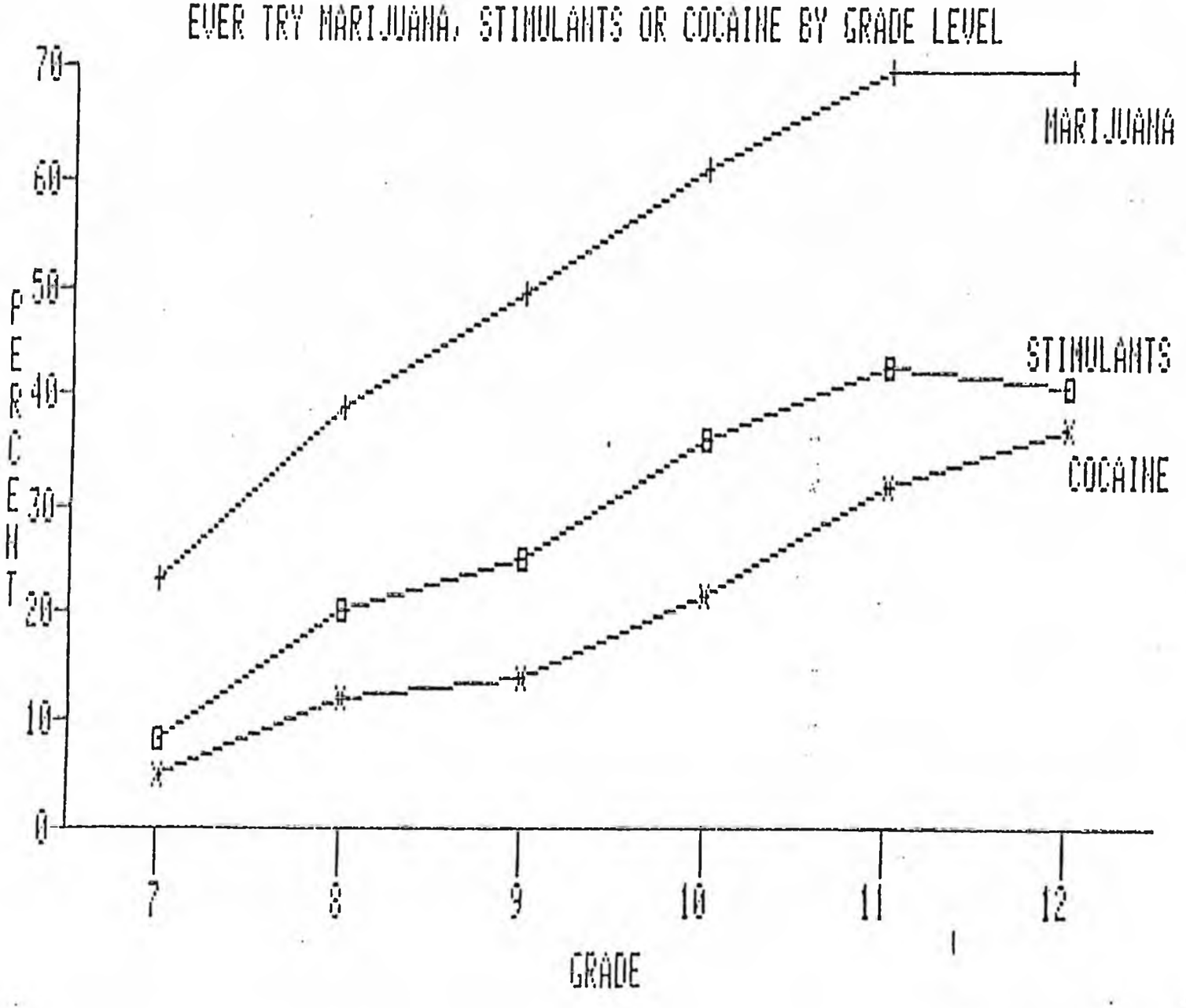

AGE FIRST TRYING PSYCHOACTIVE DRUGS
PERCENT
25.0
22.5
20.0
17.5
15.0
12.5
10.0
7.5
5.0
2.5
.0
MJ
ST
CK
10
11
12
13
14
15
16
17
18
AGE FIRST TRIED

FIGURE 4


EVER TRY MARIJUANA, STIMULANTS OR COCAINE BY GRADE LEVEL
70
60
50
40
30
20
10
0
PERCENT
MARIJUANA
STIMULANTS
COCAINE
7
8
9
10
11
12
GRADE

- Of those who have tried/taken drugs, the reasons for stopping are also mainly because of concern over psychological and physical harm.

- More students who have tried drugs express a need for drug education than those who did not try drugs.

- Corresponding to the relationship between grade level and drug-taking behavior, problems related to drug-use increase as grade level increases, but there is much variation within and between grade levels.

D. Abstraction of Summary and Conclusions

In reviewing the overall findings from the statewide study, it is readily apparent that the opportunities to try mood-altering drugs are very high, and that the rate of trying drugs is also correspondingly high. Athough it is not known whether it is the "real thing" as opposed to a "look-a-like" or a substitute chemical that students are taking/trying, the important fact is that students report that they are involved in drug-taking behavior. A question which arises is, Why is the opportunity to try drugs so very high?

The most apparent answer is that the drugs are available for them to try. It is clear the these youth are reflecting what is alleged about drug use in general in Alaska, especially in the larger communities - that it is high. The drugs that are available - albeit illegally - find their way down to adolescents and early teenagers in the school system. Also, a large percent of students are willing to try certain illicit drugs such as marijuana, cocaine and stimulants among those available.

Another questions is, Why do so many students experiment with drugs? There are several possible answers to this question. One is that many of the illicit drugs such as marijuana, stimulants and cocaine have become incorporated into

the "lifestyle" of so many people that adolescents themselves experiment with them as part of their own "normative" behavior. That is, the wide scale prevalence of drug use in general makes it a phenomenon which adolescents may pursue in order to know what drug experiences are like. It thus appears that adolescent drug use may be related to the attitudes and behavior found in the larger adult society. Research by Segal (1983), which has shown that experimentation with drugs and even moderate drug taking by a significant percentage of youth is divorced from any particular pattern of deviant behavior or severe emotional distress, tends to support the above conclusion.

The implications from the study are clear. Efforts need to be directed toward reducing the high rate of experimentation with drugs by a large number of students, as well as reducing the on-going usage by the small percentage of students who are involved in such behavior. The data suggest that intervention strategies should be emphasized within grades 8 and 9, or at least prior to age 14, since experiences with drugs tend to peak by 14 years of age.

III

RESULTS

Overview

This section provides the report of the results of the school surveys with respect to nonmedical drug-taking behavior by students in eight different locations within the state in grades 7 through 12. Also included is data on alcohol consumption and cigarette smoking.

Information compiled from surveying over 3,000 students, utilizing a comprehensive questionnaire, can be very extensive. There are a multitude of different ways of reporting results, some may have either special or unique significance, and some may be too general to be of value. It was therefore necessary to place some limitations on the reporting of the survey findings with the aim of presenting data which would be best utilized by the schools, by the State Office of Alcoholism and Drug Abuse (SOADA), by health planners, and by governmental bodies. Thus, the primary emphasis of this section, in keeping with the study's research objectives, is to present information which describes the extent, type, patterns, frequency, and distribution of nonmedical drug use among a large sample of Alaska's junior and senior high school students. Additionally, the results also describe age and grade differences with respect to drug-taking behavior, as well as data on some of the motivations for trying or not trying drugs, and on some consequences of drug-taking.

The data to be reported are presented in tabular and graphic form. They illustrate the prevalence and frequency of drug use for eight major drug categories (marijuana, inhalants, hallucinogens, cocaine, heroin, stimulants, sedatives, and tranquilizers) listed by frequency of occurrence, by gender, and by

selected school-related characteristics such as grade and comparison of junior and senior high school. A table and graph illustrating the relationship between age and first experience with drugs is also included.

Contingency tables have been utilized to help describe the results. This procedure is a way of showing the relationship between two or more classificatory variables. The display of the distribution of cases by their positions on two or more variables is the chief component of contingency table analysis and is a commonly accepted and popular procedure used by social scientists. The joint frequency distributions can be systematically analyzed by certain tests of significance (e.g., the Chi Square statistic) to determine whether or not the variables are statistically independent; these distributions can also be summarized by a number of measures of association, such as the contingency coefficient, which describes the degree to which the values of one variable predict or vary with those of another.

Contingency tables or cross-tabulation tables also allow for a determination of whether the differences which occur with respect to selected variables (e.g., specific sample characteristics such as selected demographic variables) are significantly different.

Finally, the surveys from the eight school districts have been grouped together to form five sets of results. This procedure was followed for two basic reasons: (a) to account for the procedural differences which necessitated using revised forms of the school survey in different school districts, and (b) to facilitate regional comparisons. The classification of results is as follows:

1. Total Sample (Tables T-1 - T-14)

This section links together all similar items which were used in Anchorage, Barrow, Bethel, Fairbanks, Juneau, Kotzebue, Nome and Sitka. It provides a

comprehensive summary of the responses of 3,609 students, giving an extensive overview of the nature and pattern of drug use by students in grades 7-12. The remaining four sets of tables represent subsets of the total results and, except for items not in the total sample, they essentially mirror the total findings, with some minor fluctuations.

2. Total Less Anchorage (Tabes A-1 - A-14)

This data set contains the aggregated results from all the communities less Anchorage. Thus, Barrow, Bethel, Fairbanks, Juneau, Kotzebue, Nome, and Sitka are represented. Since the Anchorage sample constitutes such a large percent of the total (44%), and since Anchorage is the state's largest school district it was decided to compare the aggregated data from all other locations with the Anchorage sample.

3. Anchorage, Barrow, Kotzebue, Nome, and Sitka (Tables A1-1 - A1-13)

The results were aggregated because they were obtained from a total school district or were obtained from a random survey of students representative of the district. These compiled results not only link the findings from different sections of the state, but they are also used to contrast with schools where nonrandom samples were obtained.

4. Bethel, Fairbanks, and Juneau (Tables A2-1 - A2-13)

This aggregation represents those school districts in which a nonrandom sample was obtained. These districts required parental permission and only students with such authorization were surveyed.

5. Barrow, Kotzebue, and Nome (Tables A3-1 - A3-13)

This aggregated unit links the three northern communities into a single data set, and also provides a means of maintaining the anonymity of each location.

In summary, the five sets of results share several critical characteristics which contribute to the integration of findings, and which also contribute to their utility to estimate drug use among the general population of school age youth in Alaska:

- Data collection from students in grades 7-12, which includes those in age from 12 to 18;
- Adequate and consistent sampling methodology;
- comparability of drugs investigated;
- comparability of question formats; and
- accessibility of detailed tabular data.

Each of the five data sets are found in the following pages. The next chapter contains a discussion of the results.

TABLE T-1

OPPORTUNITY TO TRY AND TRYING DRUGS
Lifetime Experiences

Total Schools
Students Grades 7-12
(N = 3609)

	1	2	3	4	5
Drug	Number of Students Having a Chance to Try a Drug	Percent of All Students Having a Chance to Try a Drug	Number of Students Reporting Having Tried a Drug	Percent of Students who Had a Chance to Try and Did Try a Drug	Percent of All Students Trying a Drug
Marijuana	2384	66.1	1784	74.8	49.5
Hallucinogens	653	18.1	314	48.1	8.7
Cocaine	1046	29.0	662	63.3	18.3
Heroin	261	7.2	78	29.9	2.2
Inhalants	968	26.8	595	61.5	16.5
Stimulants	1288	35.7	982	76.2	27.2
Depressants	725	20.1	516	71.2	14.3
Tranquilizers	573	15.9	416	72.6	11.5

FIGURE T-1

ALL SCHOOLS: OPPORTUNITY TO TRY AND TRYING DRUGS

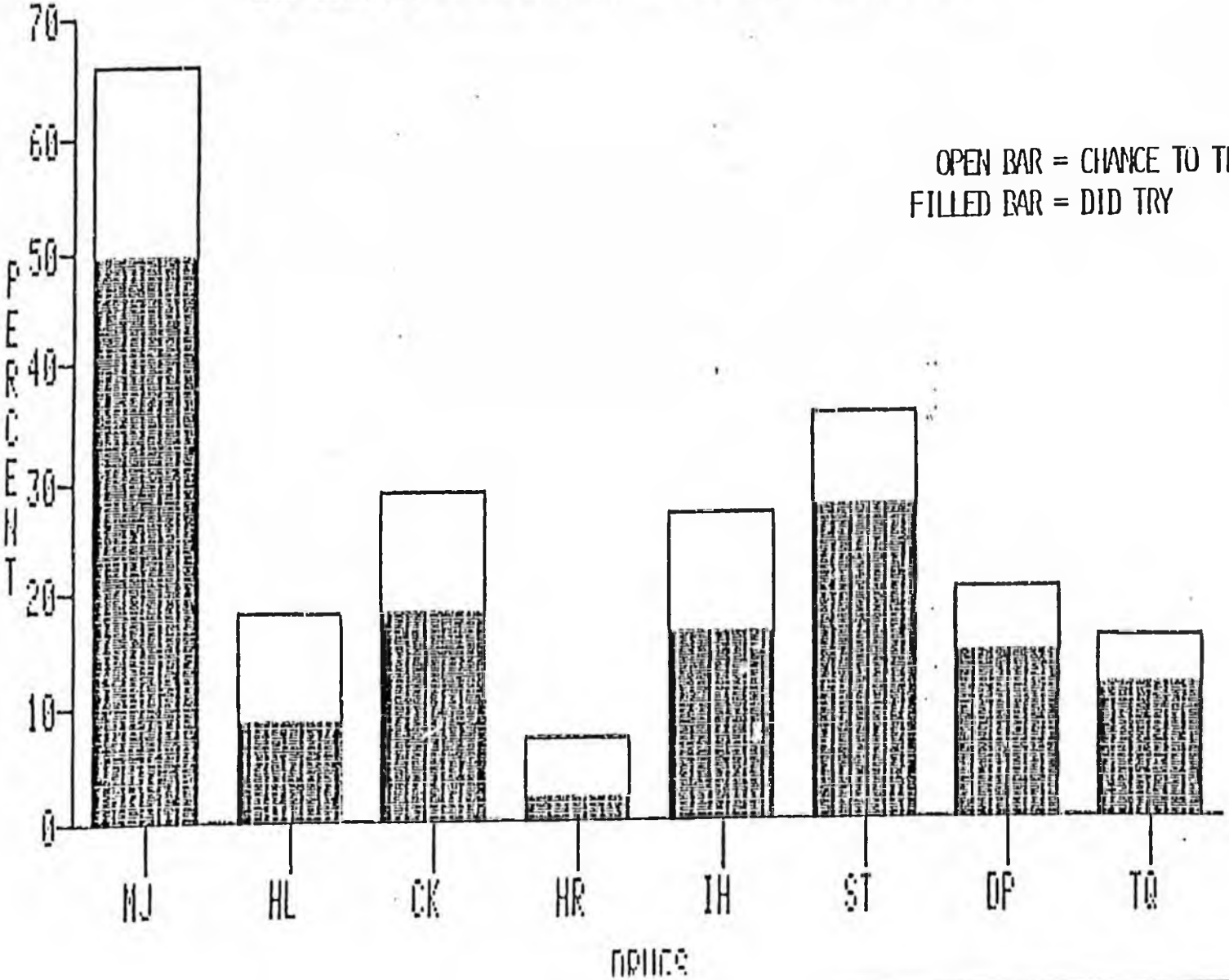


TABLE T-2

LIFETIME EXPERIENCES WITH PSYCHOACTIVE DRUGS

Total Schools
Students Grades 7-12
(N = 3609)

Drug	Number of Students Reporting Trying	Lower* Limit	Percent of Sample who Ever Tried	Upper* Limit	Percent of Sample who Tried Within Past Year
Marijuana	1784	47.2	49.5	51.6	42.6
Hallucinogens	314	7.5	8.7	10.0	7.1
Cocaine	662	18.3	18.3	16.6	15.6
Heroin	78	1.9	2.2	2.7	1.7
Inhalants	595	15.1	16.5	18.0	11.9
Stimulants	982	25.4	27.2	29.2	22.0
Depressants	516	12.5	14.3	16.2	11.8
Tranquilizers	416	10.2	11.5	11.6	11.4
Alcohol	2589	69.7	71.7	73.8	-
Tobacco	1986	3.3	55.0	57.2	56.9

*Confidence Limits

TABLE T-3

FREQUENCY OF DRUG-TAKING BEHAVIOR
Past Year Experiences

Percent of Students Who Have Tried/Taken a Drug

Total Schools
Students Grades 7-12
(N = 3609)

Drug	Percent of Sample Responding	Not Taken	Frequency*						Total Once or More
			Once a Month or Less	2-3 Times a Month	Once A Week	2-5 Times a Week	Daily	More Than Once a Day	
Marijuana	88.0	46.6	19.0	7.1	4.0	6.0	2.6	2.8	41.5
Hallucinogens	82.0	75.5	4.9	0.7	0.2	0.2	0.2	0.0	6.4
Cocaine	83.0	67.7	11.0	2.5	0.6	0.7	0.3	0.4	15.5
Heroin	81.9	79.4	1.7	0.2	0.1	0.1	0.1	0.3	2.5
Inhalants	82.6	72.2	7.4	1.4	0.5	0.4	0.4	0.4	10.5
Stimulants	83.1	62.1	112.2	4.0	1.7	1.3	0.8	0.9	20.9
Depressants	82.2	70.9	7.3	2.1	0.6	0.6	0.2	0.5	11.3
Tranquilizers	81.7	72.3	6.5	1.4	0.6	0.3	0.2	0.4	9.4

*Because of missing responses, those who report having tried a drug in the past year will not always correspond to the percent who reported ever trying a drug.

TABLE 1-4

LIFETIME EXPERIENCES WITH PSYCHOACTIVE DRUGS BY GENDER

Females and Males Who Reported Ever Having Tried a Drug*

Total Schools
Students Grades 7-12
(N = 3609)

	Males (N=1770)			Females (N=1732)		
	1	2	3	1	2	3
Drugs	Number Having Tried	Percent of Males who Tried a Drug	Percent of All Students who Tried Drug	Number Having Tried	Percent of Females who Tried a Drug	Percent of All Students who Tried Drug
Marijuana	904	51.1	51.9	837	48.3	48.1
Hallucinogens	185	10.5	60.5	121	87.0	39.5
Cocaine	351	19.8	54.4	294	17.0	45.6
Heroin	57	3.2	73.1	21	1.2	26.9
Inhalants	317	17.9	54.7	262	15.1	45.3
Stimulants	466	26.3	46.8	489	28.2	49.1
Depressants	272	15.4	53.5	236	13.6	46.5
Tranquilizers	219	12.4	53.8	188	10.9	46.2

*107 students did not report gender.

TABLE T-5

LIFETIME EXPERIENCES WITH PSYCHOACTIVE DRUGS
Junior-Senior High School Comparisons

Total Schools
Students Grades 7-12
(N = 3609)*

	Junior High School** Grades 7-9 (N=1950)				Senior High School** Grades 10-12 (N=1567)			
		1	2	3		1	2	3
Drugs	F***	Percent of Jr. H. S. Students who Ever Tried (N=479)	Percent of All Students who Have Tried each Drug	Percent of Total Sample (N=798)	F***	Percent of Sr. H. S. Students who Ever Tried (N=291)	Percent of All Students who Have Tried each Drug	Percent of Total Sample (N=798)
Marijuana	716	36.7	40.9	19.8	1033	65.9	59.1	28.6
Hallucinogens	105	5.4	34.1	2.9	203	13.0	65.9	5.6
Cocaine	199	10.2	30.7	5.5	450	28.7	69.3	12.5
Heroin	32	1.6	41.0	0.9	46	2.9	59.0	1.3
Inhalants	290	14.8	50.0	8.0	290	18.5	50.0	8.0
Stimulants	343	17.6	35.7	9.5	618	39.4	64.3	17.1
Depressants	207	10.6	40.5	5.7	304	19.4	59.5	8.4
Tranquilizers	151	7.7	37.1	4.2	256	16.3	62.9	7.1

*89 students did not report grade level.
**The differences in frequencies and percentages between junior and senior high students are statistically significant for each drug ($p < .01$).
***F=Frequency or number of students reported having tried each drug.

FIGURE T-5

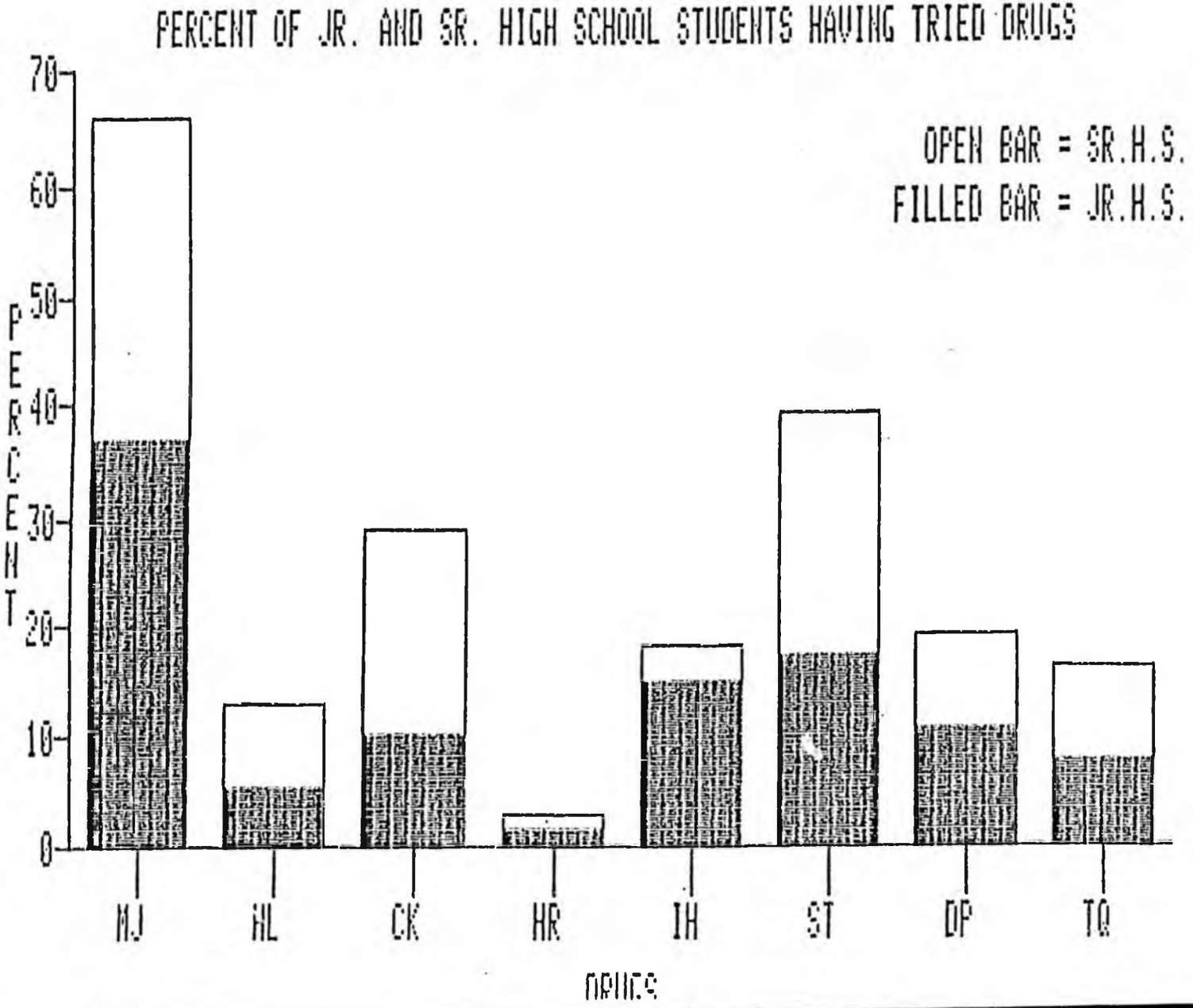

PERCENT OF JR. AND SR. HIGH SCHOOL STUDENTS HAVING TRIED DRUGS
OPEN BAR = SR.H.S.
FILLED BAR = JR.H.S.
PERCENT
70
60
50
40
30
20
10
0
MJ
HL
CK
HR
IH
ST
DP
TQ
DRUGS

TABLE T-6A

FREQUENCY OF TAKING DRUGS:
Past Year Experiences

Total Schools
Junior H. S.*
(N = 1953)

Drug	Percent of Jr. H. S. Students Responding	Not Tried	Percent of Jr. H. S. Students who Have Tried Up to 3 Times a Month	Percent of Jr. H. S. Students who Have Taken Once a Week or More
Marijuana	86.4	63.6	24.5	11.9
Hallucinogens	80.9	94.8	4.5	0.7
Cocaine	81.9	88.0	10.6	1.4
Heroin	80.8	97.3	2.0	0.4
Inhalants	82.0	86.9	11.0	2.1
Stimulants	82.0	82.9	13.6	3.5
Depressants	81.4	89.3	8.9	1.8
Tranquilizers	80.5	91.7	6.9	1.4

*304 students did not report grade level.

TABLE T-6B

FREQUENCY OF TAKING DRUGS:
Past Year Experiences

Total Schools
Senior H. S.*
(N = 1567)

Drug	Percent of Sr. H. S. Students Responding	Not Tried	Percent of Sr. H. S. Students who Have Tried Up to 3 Times a Month	Percent of Sr. H. S. Students who Have Taken Once a Week or More
Marijuana	90.8	39.9	35.9	24.2
Hallucinogens	84.1	88.7	9.9	1.4
Cocaine	85.3	73.4	23.1	3.5
Heroin	83.9	96.6	2.3	1.1
Inhalants	84.1	88.2	9.9	1.8
Stimulants	85.3	64.7	26.8	8.5
Depressants	84.1	82.3	14.8	2.9
Tranquilizers	83.9	84.6	12.7	2.7

*304 students did not report grade level.

TABLE T-7

DRUG-TAKING BEHAVIOR BY GRADE

Percent Within Each Grade Who Reported
Trying/Taking a Drug

Total Schools
Students Grades 7-12
(N = 3609)

	Grade*					
	7	8	9	10	11	12
Drug	(N=665)	(N=685)	(N=603)	(N=658)	(N=564)	(N=345)
Marijuana	23.3	38.7	49.1	60.6	69.9	69.6
Hallucinogens	2.9	5.5	8.0	10.9	13.8	15.4
Cocaine	4.8	12.1	13.9	21.9	31.6	37.1
Heroin	0.9	1.8	2.3	2.6	4.4	1.2
Inhalants	12.0	18.0	14.4	18.8	18.8	17.4
Stimulants	8.1	20.0	25.2	36.0	42.6	40.9
Depressants	6.2	12.4	13.4	18.7	21.1	18.0
Tranquilizers	3.8	9.6	10.0	15.7	18.3	14.5

*304 students did not report grade levels.

FIGURE T-7

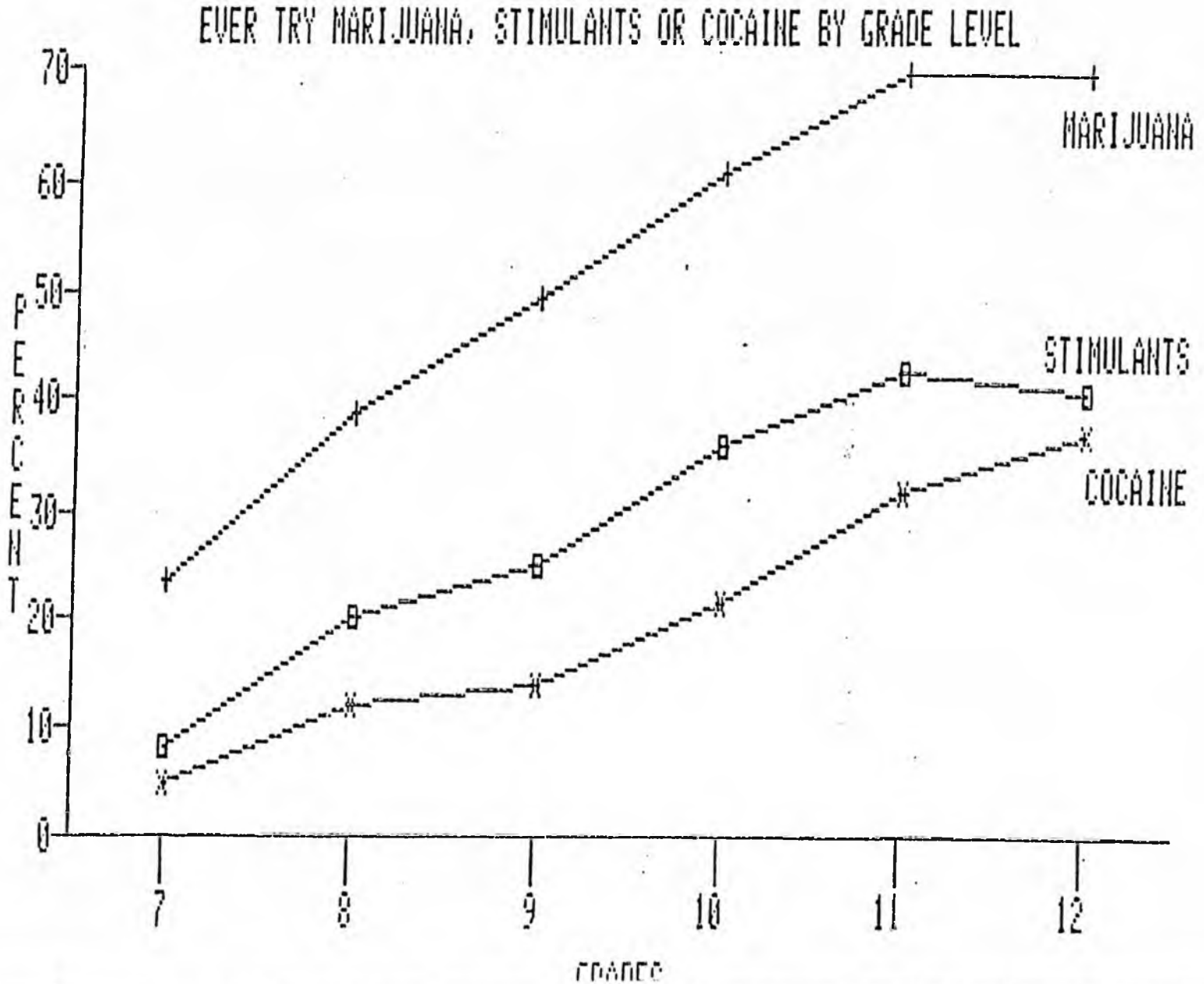

EVER TRY MARIJUANA, STIMULANTS OR COCAINE BY GRADE LEVEL
70
60
50
40
30
20
10
0
PERCENT
MARIJUANA
STIMULANTS
COCAINE
7
8
9
10
11
12
GRADES

TABLE T-8

REASONS FOR NOT TRYING OR HAVING STOPPED
EXPERIMENTING WITH PSYCHOACTIVE DRUGS

Total Schools
Students Grades 7-12
(N = 3609)

Reasons Given:	Total Number of Students Responding	For Not Trying Drugs: Percent of Respondents Not Trying for each Reason	For Having Stopped Experimenting with Drugs: Percent of Respondents who Tried and Stopped for each Reason
1. May hurt my body.	2779	18.3	41.9
2. May hurt my mind.	2780	15.8	44.6
3. May cause addiction.	2744	20.6	40.0
4. Friends disapprove.	1675	37.4	17.9

TABLE T-9

DRUG EDUCATION AND TRYING DRUGS

Percent of Students Responding

Total Schools
Students Grades 7-12
(N = 3609)

Drug	Percent of Students Responding	Have Had Drug Education and Have Tried	Have Had Drug Education and Have Not Tried	Have Not Had Drug Education and Have Tried	Have Not Had Drug Education and Have Not Tried
Marijuana	72.2	28.6	18.3	34.2	18.9
Hallucinogens	45.2	7.9	38.0	9.9	44.2
Cocaine	50.5	13.5	31.8	20.1	34.6
Heroin	37.7	2.1	42.5	3.0	52.4
Inhalants	47.7	15.4	31.5	16.2	36.9
Stimulants	54.5	20.5	26.0	25.1	28.4
Depressants	42.9	13.0	32.0	17.2	37.8
Tranquilizers	40.2	10.8	33.9	16.0	39.3

TABLE T-10

STUDENTS' PERCEPTIONS OF DRUG-TAKING BEHAVIOR

Total Schools
Students Grades 7-12
(N = 3080)

Students who:	Percent of Students who* Expressed a need for drug education	Expressed no need for drug education	Total
Have Tried Drugs	43.2	12.8	56.0
Have Not Tried Drugs	37.1	6.9	44.0
Total	80.3	19.7	100.0

*The differences between classifications are not statistically significant: $X^2 = 14.1$, d.f. = 1, $p < .001$.

TABLE T-11

PERCENT OF STUDENTS RESPONDING "TRUE" TO VARIOUS STATEMENTS

Total Schools
By Grade Levels
(N = 3609)

Statement	Grades*						
	7	8	9	10	11	12	Total
1. I have missed school because of drug use.	2.1	5.8	8.2	11.7	14.8	17.3	9.2
2. I have had problems in school because of drug use.	4.3	5.6	8.5	11.1	11.4	12.9	8.6
3. I have had problems outside of school because of drug use.	6.3	10.0	11.6	16.0	15.8	15.0	12.1

*Each statistic represents the proportion of students within each grade who answered "yes" to each question. The total represents the percent of all students responding "yes" to each question.

TABLE T-12

COMPARISONS OF LIFETIME EXPERIENCES WITH PSYCHOACTIVE DRUGS

Surveys: Percent Who Ever Tried Each Drug

Total Schools
Students Grades 7-12

Drug	Total Sample (N=3609)	Anchorage Sitka Nome Barrow Kotzebue (N=2811)	Total Sample Less Anchorage (N=2021)	Bethel Juneau Fairbanks (N=798)	Barrow Kotzebue Nome (N=600)	Anchorage (N=1588)	1982* National Survey of 12-17 Yr. Olds (N=1581)
Marijuana	49.5	50.7	50.8	44.9	58.8	51.4	26.7
Hallucinogens	8.7	8.7	9.4	8.6	9.2	9.4	5.2
Cocaine	18.3	18.5	17.0	17.8	18.0	23.5	6.5
Heroin	2.2	2.1	1.8	2.3	2.2	3.2	<.1
Inhalants	16.5	15.5	17.3	20.1	15.0	18.4	-
Stimulants	27.2	26.9	28.6	28.2	25.8	29.6	6.7
Depressants	14.3	14.6	12.5	13.2	10.5	19.9	5.8
Tranquilizers	11.5	12.0	8.9	9.9	6.3	17.9	4.9
Alcohol	71.7	44.8	65.8	66.2	62.0	82.1	65.2
Tobacco	55.0	34.0	50.9	47.5	54.7	64.9	49.5

*Miller, 1983.

FIGURE T-12

COMPARISON OF ALASKA AND NATIONAL SURVEY DATA
LIFETIME EXPERIENCES WITH PSYCHOACTIVE DRUGS

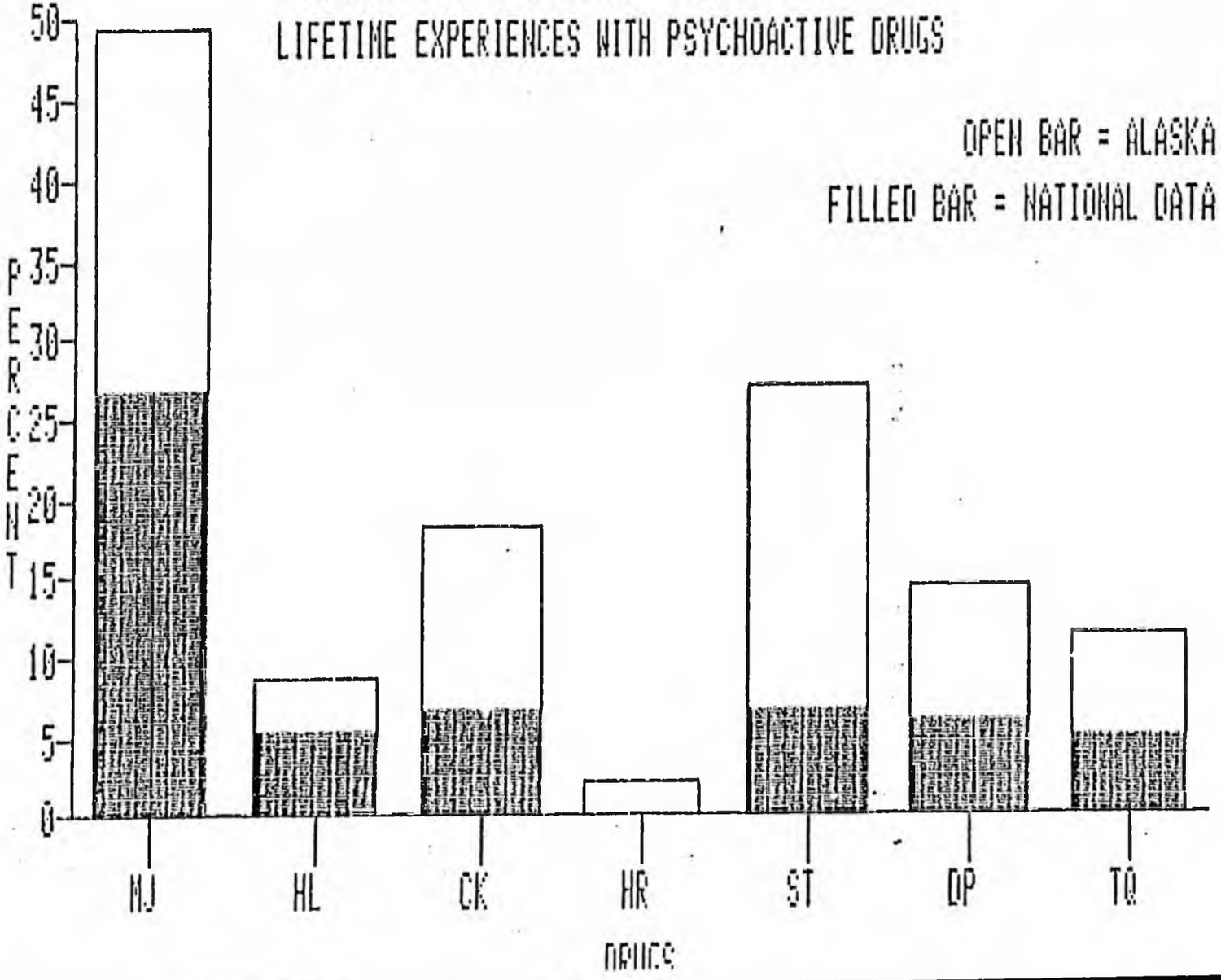


TABLE T-13

COMPARISONS OF LIFETIME EXPERIENCES WITH PSYCHOACTIVE DRUGS
ALASKAN SENIORS AND NATIONAL STUDENT SURVEY

High School Seniors Who Ever Tried Each Drug

Total Schools
Students Grades 7-12

Drug	Total Sample (N=345)	Anchorage Sitka Nome Barrow Kotzebue (N=277)	Total Sample Less Anchorage (N=215)	Bethel Juneau Fairbanks (N=68)	Barrow Kotzebue Nome (N=73)	Anchorage (N=123)	1982* National Survey of 12-17 Yr. Olds (N=17500)
Marijuana	69.6	77.2	77.2	72.1	78.9	60.2	58.7
Hallucinogens	15.4	17.7	17.7	14.7	9.4	12.2	12.5
Cocaine	37.1	40.0	40.0	42.6	39.7	34.1	16.0
Heroin	1.2	1.4	1.4	0.0	4.1	0.8	1.2
Inhalants	17.4	19.5	19.5	17.6	17.8	14.6	18.0
Stimulants	40.9	48.8	48.8	42.6	49.3	29.3	27.9
Depressants	18.0	17.7	17.7	17.6	13.7	19.5	15.2
Tranquilizers	14.5	12.6	12.6	11.8	8.2	18.7	14.0

*Johnston, Bachman, & O'Malley, 1982.

V

CONCLUSIONS AND RECOMMENDATIONS

The major objective of this project was to assess the extent, type of patterns, frequency and distribution of drug-taking behavior among school age youth in grades 7-12 in eight locations of the state: Anchorage, Barrow, Bethel, Fairbanks, Juneau, Kotzebue, Nome and Sitka. The results of this undertaking found generally high rates of lifetime experiences with mood-altering drugs among students surveyed. This high level of drug-taking behavior contrasts dramatically with reports from surveys conducted in the "lower 48," which indicate that "American young people are continuing to moderate their use of illicit drugs..." (Johnston et al., 1982, p. 9). Reports from two recent national surveys (Johnston et al., 1982; Miller, 1983) indicate that there have been declines in use of marijuana and in other drugs and a leveling off of cocaine use by youth. Although there is no previous survey data of Alaskan youth to compare trends, a comparison of current findings of Alaskan youth with their counterparts in the "lower 48" shows considerably higher levels of drug use, except for heroin, which is just slightly higher.

One factor which may contribute to the extensive differences found between the National Survey of 12-17 year olds and Alaskan youth may be related to differences in methodology. The National Survey conducted face-to-face interviews while our procedure involved anonymous responses to questionnaires. It may be that when youth are selected from a general population and interviewed, the reports of prevalence of drug use may be more guarded than when responding anonymously to a survey.

Prior to elaborating on these findings it should be restated that it is not known whether the students who report having tried a drug actually took the drug, that is, whether it is the "real thing" as opposed to a "look-a-like" or a substitute chemical. The important fact, however, is that students apparently believe that they took the reported drug. Also, students, whether taking real or substitute drugs, were involved in drug-taking behavior.

What is evident in the results is that when there is an opportunity to try a drug, particularly marijuana, large percentages of those students having the chance will try it. The question which arises is, Why is the opportunity to try drugs so very high among junior and senior high school students?

A factor which seemingly contributes to the high prevalence rates reported in our study is that drugs are generally available in the state, a phenomena which is supported by anecdotal evidence. The drugs which are available - albeit illegally - find their way down to adolescents and early teenagers who are willing to try them. Additionally, it also appears that these youngsters can afford to buy the available drugs.

Thus, with apparent opportunities to try, students are trying/taking drugs, and the number of students reporting such experiences is high. The pattern of drug use generally follows the pattern described for the "lower 48." Marijuana is the most frequently tried/taken drug, followed by experiences with stimulants and cocaine. While experiences with the other drugs vary, a consistency exists in that heroin is the least tried. In all, the findings indicate that at least half of all students are likely to try marijuana and/or some other drug by the time of high school graduation. More than 75% of students will have also have tried/consumed alcohol prior to their graduation from high school. Most of the "hard" drug use, however, will be experimental.

The important question is, Why do so many students experiment with and/or

take drugs? There are several possible answers to this question. One is that many of the illicit drugs such as marijuana, stimulants and cocaine, have become incorporated into the "lifestyle" of so many people that adolescents themselves experiment with them as part of their own "normative" behavior. That is, the wide scale prevalence of drug use in general makes it a phenomenon which adolescents may pursue in order to know what drug experiences are like. It appears that adolescent drug use may, to a large extent, be related to the attitudes and behaviors found in the larger adult society. Simply put, the "kids" do what the adults are doing!

Related to this "imitation" phenomena is what may be called a "curiosity" motive for trying drugs. This motive is discussed in greater detail in the Anchorage School District Report (see Appendix 2), in which an analysis of students' motives for trying/taking drugs was completed. Briefly, a common reason for many youngsters to try mood-altering drugs is curiosity -- just to see what it is like. Many students try a drug once, or several times, with no intention to continue use in the future. However, this motive may not be totally applicable to use of alcohol, cigarettes, marijuana and, to a lesser extent, stimulants and cocaine.

Another reason for the trying/taking of drugs, interrelated with the "curiosity" motive, is a willingness to seek new and different experiences. This motive was found to prevail within the Anchorage School sample and has been reported in other research (Segal, 1982; 1983, in press). Drugs do provide a new and different experience; some students seem to find it rewarding or gratifying whereas others do not find it pleasurable.

Some youngsters may use mood-altering drugs to gain the ability to cope with personal problems and/or stress. Drugs may not only temporarily help one to

escape from personal discomfort, but they also help to delay having to deal with conflict or stress. This motive for taking drugs has been found consistently in research investigating both adolescent and adult drug-taking behavior (Jessor & Jessor, 1977; Segal, Huba, & Singer, 1980). It is unlikely that the high level of drug use found in this study is attributable to this motive, but it is possible that a small percentage of students, particularly those who take a variety of drugs with some degree of frequency, may be using drugs to "feel better" as well as to feel "high."

An important finding in this study is that age, opportunity to try and first experiences with mood-altering drugs are signficantly interrelated and also vary greatly for each dr g. As experiences with some drugs, such .ljuana, begin to taper off, first experiences with other drugs, such as coca. tend to increase. The relationship between age and first experiences with drugs is revealing itself to be curvilinear, that is, a relationship which can change direction at any given age level for any given drug. The most frequent ages for trying drugs are 13 and 15, which are related to beginning junior and senior high school. It may be, as advocated within some recent research literature (Huba, Winegard and Bentler, 1979; Segal, 1983; Segal, Huba and Singer, 1980; Segal, Cromer, Hobfoll and Wasserman, 1982) that drug-taking behavior by adolescents is mainly experimental and is in large part "normative" and unrelated to any pattern of deviance or serious emotional distress.

Another interesting finding which characterizes the Alaskan findings (as discussed more fully in the Anchorage School District Report) is that peer pressure or influences do not appear to be as significant a factor as is reported in other studies (Jessor & Jessor, 1977; Kandell, Kessler, & Margulies,

1978). Why this is the case is not totally clear; it may be that drug-taking behavior has become so acceptable among all youth that the traditional schism between "users" and "nonusers" no longer exists, thereby making it unnecessary for those who take drugs to seek mutual support from others who take drugs. Additionally, the generally widespread use of drugs may offset any special status attributable to those who take drugs, thus reducing the peer influences to try or not try drugs.

In summary, it is evident that drug-taking behavior is attributable to many interrelated factors, some exerting greater influences than others at different points during one's secondary school career. Further research is needed to focus more specifically on students' perceptions of why they take drugs and the particular expectations that they have of what drugs will do for them.

The results of the present study have a number of implications concerning drug education/prevention programs. One important consideration is that the students perceive a need for such programs, particularly the ones who have had experiences with psychoactive drugs. This finding suggests that the students may be inferring that if other students are "educated," or if they themselves learned more about "drugs," the risks of taking drugs may be reduced. It is presumed that presentation of information regarding the "dangers" and risks of taking drugs, especially in light of the findings that most students fear the harmful psychological and physical effects of taking drugs, can help to lessen the curiosity to experience the anticipated sensations which drugs can engender. The issue becomes one of how to develop and implement an effective drug education/prevention program. This question is one which educators and researchers have been struggling with for over a decade. While the evidence supports the continued need for educational efforts (Wepner, 1979), it is apparent that such programs generally tend to restrain young persons who were

not inclined to try drugs in the first place. The major problem is how to identify those who are at greater risk of trying drugs. A variety of drug education/prevention programs have been implemented over the country, each to a large extent providing a uniform curriculum across age and grade level.

An important implication concerning drug education from the foregoing analysis of age/grade trends is that different prevention goals should be devised for different points in the incidence and prevalence curves. The most logical starting point is that age in the curve at which positive acceleration begins in the prevalence curve. Prior to this point prevention efforts should focus on delaying or preventing the onset of nonmedical taking of mood-altering drugs, and/or extrafamiliar alcohol consumption. After this point intensive prevention efforts should concentrate on the reduction of prevalence, giving special emphasis to multiple substance use, frequency of drinking, regular use of marijuana, and on reducing the trying/taking of stimulants and cocaine. Emphasis should also be given to other types of mood-altering drugs, capitalizing on the apparent self-moderating factors that appear to already be "at work" with students to avoid taking drugs perceived as particularly harmful. What is needed is the involvement of a rational program of drug education/prevention - a program derived from an informational base which provides data on the prevalence and developmental trends of drug-taking behavior and on some of the psychosocial aspects related to use and nonuse of mood-altering drugs. This data base can serve as a conceptual basis for prevention strategies designed to prevent and reduce drug-taking behavior by school age youth.

Another important implication of the findings concerns the issue of availability of mood-altering drugs. It should be noted that if a reduction of experimentation with and continued use of drugs is to be achieved, the availabi-

lity of drugs needs to be reduced. There is, however, no easy solution to achieving such a reduction.

The recent history of attempts to address drug use in the United States has tended to deal with the problem through strong legislation aimed at reducing "drugs on the street" by increasing penalties for possession and use of drugs. Such an approach has led to a preoccupation with and elaboration of penalties associated with drug use which has not generally resulted in an overall reduction of "drug problems." Rather than focusing only on the elimination of drugs by legislation, efforts also have to be directed toward focusing on people and the circumstances which contribute to their use of drugs. It has been shown that the "legal" approach to drug misuse puts an unfair and sometimes overwhelming burden on the justice system, leading to the unrealistic expectation that this system will eliminate the problem.

Legal measures can only be effective if society perceives them to be reasonable and realistic. The experience of decades of having to confront drug use in this country makes it clear that without a comprehensive approach the likelihood of reducing drug use is low. This comprehensive approach, requires the joining together of legal, social, education and legislative bodies to pool resources, experiences and knowledge to develop an integrated, comprehensive and relevant approach to address problems of drug use in the community, as well as focusing on the drug-taking behavior of school age youth.

The accomplishment of the above goal requires that a price be paid. This price lies in the implications for policy decisions made by local and state governmental bodies regarding drug use. With respect to youth, in order to prevent the taking of drugs prior to the age at which most of the experimentation with and continued use of drugs occurs, and in order to reduce the incidence and prevalence thereafter, governmental bodies will have to appropriate program

funds. The level of funds will have to be sufficient to allow systematic research and comprehensive program development to be initiated, implemented, and evaluated over a period of time. Legislators and other governmental officials will also need to realize that the efforts of prevention programs are difficult to assess, especially since the effects may not be immediate. Efforts directed at fourth graders, for example, may not be realized until students reach junior high school, where exposure to drugs becomes more widespread and where influences to try drugs exert themselves. Additionally, the importance of drug education/prevention efforts directed at those students in the peak years of drug experimentation may not be fully realized until they reach young adulthood. What is important is the understanding that an investment in a rational educational/prevention program subject to ongoing evaluation, while costly at the point of initial undertaking, can save costs associated with health, social and legal consequences. Only through the acceptance and commitment to alter the attitudes and behaviors of the next generation can a reversal in the trend to take drugs be achieved.

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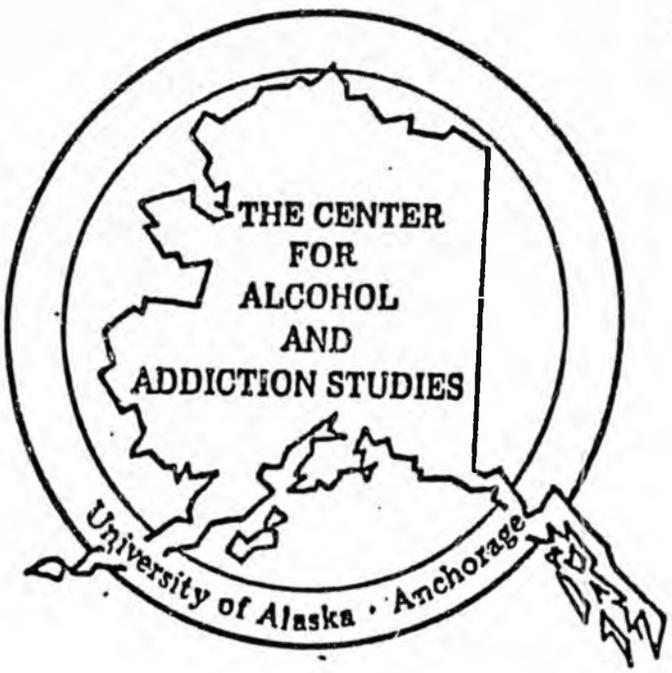
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Attachment I

Confidential

Adolescent Drug-Taking Behavior Followup Study

Juneau: Grade 7 thru 12



Bernard Segal, Ph.D.
The Center for Alcohol and Addiction Studies
University of Alaska Anchorage
October, 1987

Funded by a grant from the State Office of Alcoholism and Drugs Abuse,
Department of Health and Social Services

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Preface

Adolescent Drug-Taking Behavior Followup Study (Preliminary Findings)

During 1981 and 1982 an extensive statewide study, sponsored by the State Office of Alcoholism and Drug abuse (SOADA), was undertaken by the Center for Alcohol and Addiction Studies (CAAS) to estimate the prevalence of drug-taking behavior among Alaskan youth. A comprehensive report of the findings was released in 1983 (Segal et al., 1983). That research involved eight widely separated urban and rural school districts representative of the different regions of Alaska, except for the Aleutian chain. The locations were Anchorage, Juneau, Bethel, Fairbanks, Juneau, Kotzebue, Nome, and Sitka. These sites were selected in order to obtain a representative sample of the state's junior and senior high school students. This research also served to establish baseline information about drug-taking behavior among Alaskan youth so that comparisons could be made with subsequent studies.

The present research, also under the auspices of a grant from SOADA, is a follow-up study of the initial study undertaken during 1981-1982. The overall aims of the current study are: (1) to assess the nature and extent of current drug-taking behavior among Alaskan youth, (2) to compare the current findings with the initial study of drug-taking behavior, (3) to examine psychosocial characteristics associated with use and nonuse of chemical substances, and (4) to explore some of the implications that the findings have for prevention of substance abuse. Some of the specific objectives are:

(1) To obtain demographic and socialization information about adolescents in grades 7 - 12 relative to use or nonuse of chemical substances.

(2) To obtain information on the prevalence of specific chemical substances, including alcohol and tobacco.

(3) To obtain data relating to the patterns of drug-taking behavior, including alcoholic beverages and tobacco products.

(4) To obtain data relating to actual or perceived peer group use of specific drugs, including alcohol and tobacco.

(5) To obtain information on the consequences of drug-taking behavior

(6) To obtain information about which factors serve to contribute to or mitigate against drug-taking behavior.

The preliminary results of the study pertaining to Juneau students is presented as a confidential report to the Juneau Borough School District. The findings will not be made public in any manner by CAAS, and will not be presented in any way that will allow Juneau to be identified in published documents. If the school district chooses to make the findings public, only then will the information be in the public domain.

This document presents a summary of the major findings, specifically focusing on substance use, alcohol, and tobacco. Comparisons will be made with previous findings and with findings from other Alaska communities. A complete report of the findings will be released by SOADA upon the study's completion. Additional findings pertaining to Juneau will be forwarded after further analysis of the data is completed.

I would like to express my appreciation to the Juneau Borough Schools for enabling me to include Juneau in this follow-up study.

Bernard Segal, Ph.D.
Principal Researcher and,
Director, Center for Alcohol and Addiction Studies

Introduction

The apparent ongoing use of mind-altering substances in the United States, particularly by youth, has continued to challenge the efforts of educators, health professionals, law enforcement agencies, and governmental authorities, to deal with the problem. Despite significant efforts at prevention of drug abuse, it is patently clear that some youth will try drugs, and that a few will continue to use them to the point where they become substance abusers. From large surveys conducted in the United States, we have seen that there was an upward trend in the use of illicit drugs that began during the 1970s, which reached its peak in the 1980s. There is still considerable concern that while the use of many illicit psychoactive substances is beginning to decline, others such as cocaine are just beginning to stabilize, or even show modest increases in use.

This study provides an opportunity to review what is happening within Alaska with respect to the use of illicit psychoactive substances and about drinking and use of tobacco products among the state's adolescent population. It is envisioned that these findings will be useful to both the state and school districts in their efforts to address the continuing problem of drug use among adolescents.

It is important to note that the findings reported herein are based on self-report questionnaires. Although the research literature continues to indicate that such data are valid, a note of caution should be introduced. The findings can only reflect what the adolescent respondents say they <u>think they have taken</u>, and not what was actually used. It is well known that counterfeit and lookalike drugs exist, and that youngsters may have taken such substances thinking that they were the "real thing." In this instance what is important is that drug-taking behavior occurred, and that it was reported as having had occurred. Furthermore, it is always possible that some adolescents who may have tried a chemical substance may not have reported such use, or that some students may have either over- or under-reported their use. Each questionnaire was reviewed for consistency of responses to attempt to obtain reliable and valid data.

<u>Confidentiality and Anonymity</u>

The purpose of this research was to gain an understanding of drug-taking behavior among Alaskan Adolescents, and not to identify those who use or have tried a drug. Considerable effort was undertaken to obtain the most reliable and valid responses from the students choosing to participate in the study by ensuring their anonymity and confidentiality. The student's names were not asked for in any phase of the research, nor were any identifying measures used except to identify the community in which surveying was undertaken. The only

identifying information on the questionnaire was age, gender, grade, and ethnicity, none of which could be used to identify any single student.

Method

Questionnaire

The questionnaire used in the 1987 study was similar to the one used in the previous study, but with a different format. The questionnaire was designed to be self-administered and restricted to an administration time of one class period (about 50 minutes). The types of data items outlined below were collected through the questionnaire shown in Appendix A.

(1) Demographic

This section included question that inquired about: gender, ethnic background, age, participation in drug education programs, grades obtained, and length of time lived in community.

(2) Drug Usage

Information on drug usage included an extensive set of question on nonprescriptive or social/recreational use of marijuana , cocaine, crack, stimulants, hallucinogens, depressants, heroin, inhalants, and tranquilizers, with specific reference to recency and frequency of use, problems from use, age of first use, and level of peer use.

(3) Alcohol

This section includes information about the quantity and frequency of consumption, and about some adverse consequences of drinking.

(4) Tobacco

Information on cigarette smoking and on use of smokeless tobacco products, including the quantity and frequency of use.

(5) Personality Items

The use or nonuse of drugs is in part influenced by personality characteristics. The incorporation of a measure of personality attributes facilitates an evaluation of what personality traits are related or unrelated to nonuse of drugs and to differing pattern of drug use.

The Sample

Sampling within the Juneau schools was undertaken by the School District itself, utilizing the method of stratified random sampling to obtain a representative sample of students in grades 7-12. Stratification was based on class and gender. A total of 418 completed questionnaires were obtained. A response rate cannot be provided because the total number of students asked to complete the questionnaire is not known. Additionally, since the total

number of students in grades 7-12 is not known, it is not possible to report what percentage of the total population of students in grades 7-12 is represented in the sample. A description of the samples follows.

Characteristics of the Juneau Student Sample

Gender	N	%
Males	199	47.6
Females	218	52.2
Unreported	1	.2
Total	146	

418 ?

Ethnicity	N	%
Alaska Native	41	10.0
White	317	75.8
Am. Indian	11	2.6
Asian-Pacific	21	5.0
Black	10	2.4
Hispanic	6	1.4
Other	6	1.4
Not reported	6	1.4

Grade	N	%
7	86	20.6
8	88	21.1
9	70	16.7
10	66	15.8
11	78	18.7
12	29	6.9
NR*	1	.2

*Not reported

Participation by School, Gender*, and Grade*

Grade	7	8	9	10	11	12	Total
School							
Drake							
Males	21	22					43
Females	22	27					49
Dryden							
Males	20	17					37
Females	23	21					44
J. Alternative							
Males		1	19	1			21
Females			15	0			15
Juneau-Douglas H.S.							
Males			11	37	37	13	98
Females			25	28	41	16	110
Total:	86	88	70	66	78	29	417
Males							199
Females							218

*One student did not report gender, and one did not indicate grade.

The extent to which this sample is representative of the school district's student population cannot be estimated because the actual class sizes and

representation by gender are unknown. What is evident, however, is that the sample is that seniors are underrepresented and, overall, more females than males are represented in the sample.

Results

Part I. Chemical Substances

Opportunity to Try and Trying Drugs

Trying mood-altering drugs does not occur without an opportunity to be exposed to such substances. After exposure, a choice is then made to try or not try a given drug. Table 1, which is represented graphically in Figure 1, presents the findings with respect to the number of students who indicated that they had an opportunity to try one or more of the different mood-altering substances listed in the questionnaire. A comparison with the 1982 findings is also presented.

Inspection of the findings indicate that some changes in students' opportunity to try, or exposure to, chemical substances has occurred since 1982. Most noticeable is the increase in opportunities to try inhalants (+18.9%), which is almost doubled since 1982. A large increase in opportunities to try tranquilizers (+11.0%) has also taken place. In contrast, opportunities to try cocaine decreased since 1982 (-4.5%). Although some other changes have also occurred, the nature of these shifts suggest that exposure to these substances has remained fairly constant. Overall, what these findings suggest is that adolescents may be trying to keep up with current drug trends or "fads." It is thus possible that an actual increase in the actual available of these substances has not occurred, but that the changes reported by the students reflects a shift in their pattern of use.

Lifetime Experience (Prevalence)

(1) Prevalence of Use: Trying One or More Drugs

Figure 2A shows how many respondents reported actually having tried one or more chemical substances. Presently, 58.4 percent of those surveyed, over half of the sample, reported having tried one or more of the chemical substances listed in the questionnaire during their lifetime. The number of students reported having tried one or more drugs in 1982 was 42.6 percent. The difference between the two statistics represents an increase of 15.8 percent (over a five year period). Table 2 shows the patterns of use reported by the students.

(2) Lifetime Prevalence: (Ever vs. Never Trying a Chemical Substance)

Table 2, accompanied by Figure 2B, indicates how many adolescents in the

Table 1
Opportunity to Try and Trying Drugs:
Comparison of 1982 and 1987 Findings
Juneau Schools
Grades 7-12

Drug	1987 (n=418) Percent of Sample Having a Chance to Try	1982 (n=298) Percent of Sample Having a chance to Try
Marijuana	69.4	68.7
Hallucinogens	25.1	26.5
Cocaine	30.1	34.6
Heroin	8.6	9.1
Inhalants	47.4	28.5
Stimulants	46.2	44.6
Depressants	22.7	18.1
Tranquilizers	24.2	13.4
Crack	1.4	--

Figure 1
Juneau Schools
Opportunity to Trg Chemical Substances
Comparison of 1987 and 1982 Findings
Grades 7-12

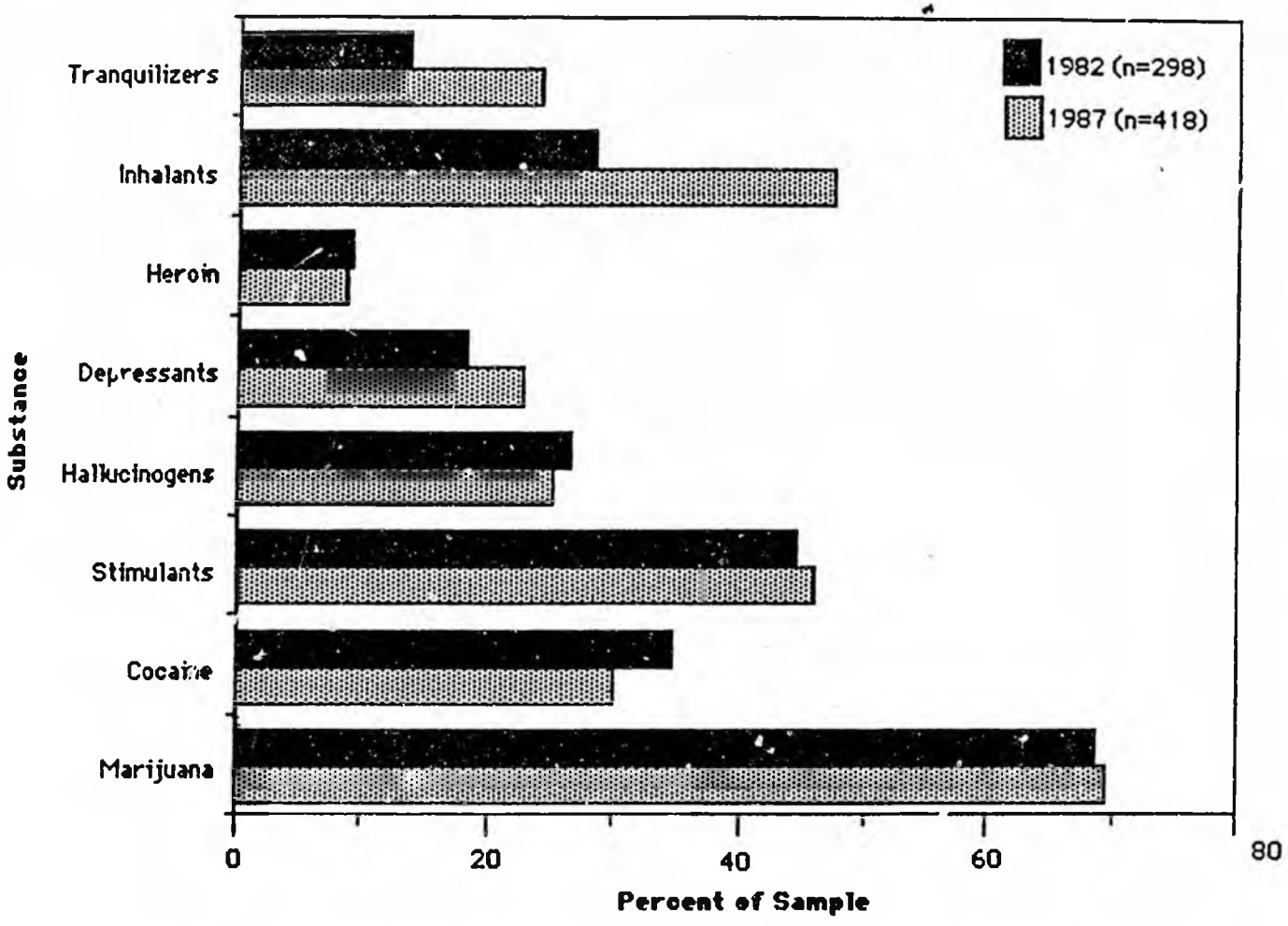


Figure 2A
Juneau Schools
Lifetime Experience with One or More Chemical Substances
Grades 7-12

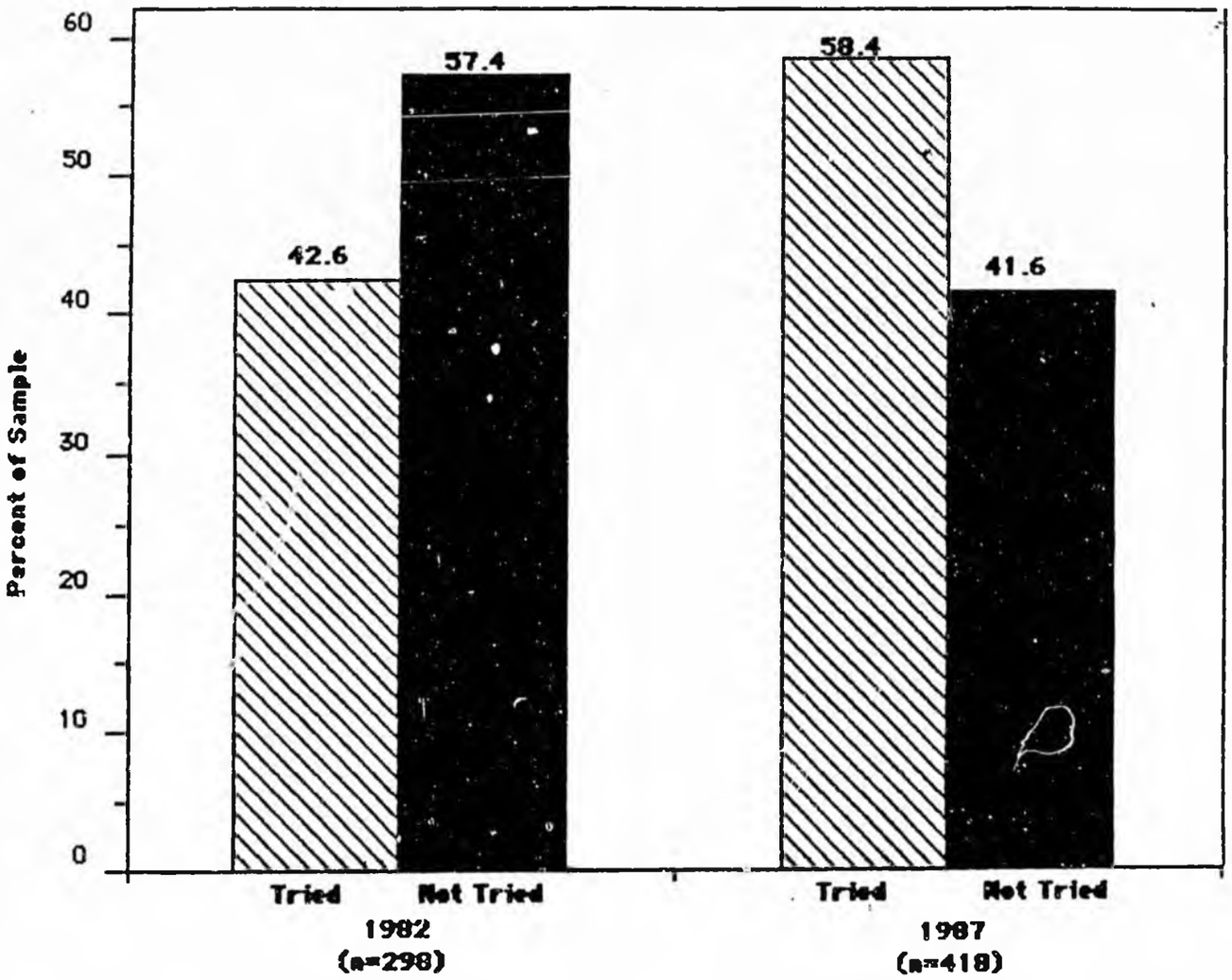


Figure 2B
Juneau Schools
Lifetime Experience with One or More Chemical Substances
Comparison of 1982 and 1987 Findings
Grades 7-12

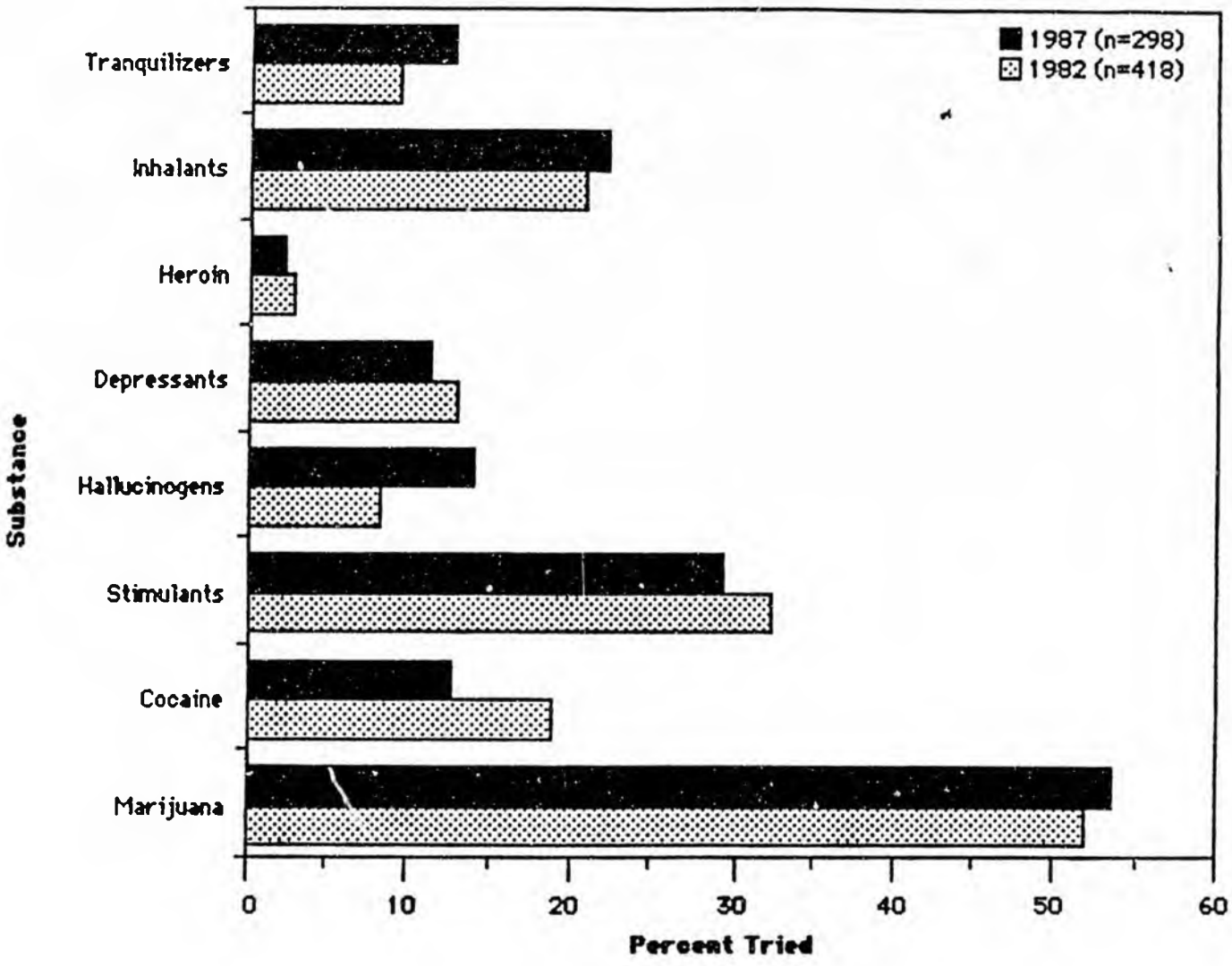


Table 2
Lifetime Experience with One or More Chemical Substances
1982 and 1987
Juneau Schools
Grades 7-12

Drug	Lower* Limit	1987 (n=418)	Upper* Limit	1982 (n=298)	Change
Marijuana	48.5	**53.3**	58.1	51.7	+ 1.6%
Hallucinogens	10.6	**13.9**	17.2	8.1	+ 5.8%
Cocaine	9.5	**12.7**	15.9	18.8	- 6.1%
Heroin	0.8	**2.2**	3.6	2.7	- .5%
Inhalants	18.2	**22.2**	26.2	20.8	+ 1.4%
Stimulants	25.0	**29.4**	33.8	32.2	- 2.8%
Depressants	8.2	**11.2**	14.2	12.8	-1.6%
Tranquilizers	9.5	**12.7**	15.9	9.4	- 3.3%
Crack	0.3	**1.4**	2.5	--	--

*95% Condifence Interval. These figures represent the lower and upper confidence intervals within which the true population value lies (95 out of 100 times).

sample indicated having tried one or more of the different substances during their lifetime. (Also incorporated in Table 2 are the upper and lower confidence levels for the statistics obtained from the 1987 sample. These figures represent the range within which the true population value would be found 95 out of 100 times.) Based on these findings it is clear that marijuana was the most commonly experienced drug, but that the number of adolescents trying it has increased very slightly since 1982 (+1.6%). The largest increase in lifetime experience was for hallucinogens (+5.8%). Experiences with cocaine have shown a decrease (-6.1%), and stimulant use has also declined (-2.8%). Inhalants have shown a modest increase of 1.4%.

The overall pattern of use, however, has generally remained the same since the initial study. Marijuana, stimulants, and inhalants, continue to be the top three drugs tried, respectively. Cocaine, which was fourth in 1982, is presently tied for fifth place with tranquilizers. The decline in the prevalence of cocaine is consistent with national trends indicating a decrease in its use among youth (NIDA, 1987).

Number of Drugs Tried

Figure 3 shows the number of drugs tried by gender. The largest number of students tried only one drug, with males exceeding females by 14.2%, but more females tried two or three drugs than males. An equal number of males and females have tried four drugs (50%), after which the pattern varies between males and females as to who had tried more drugs. After four drugs, however, as the number of drugs tried increases, the numbner of students trying five or more drugs decreases.

Experience With Drugs by Grade

Figure 4A provides a report of drug use according to grade and gender. What this table describes is the percentage of students who have tried one or more drugs by the time they have reached their current grade level. Inspection of the data shows that as grade level increases there is a corresponding increase in drug-taking behavior. The increase between grades 7 - 10 is particularly striking, increasing at what appears to be a consistent rate of about 6 percent per year. Although there is a slight decrease in the number of students who tried drugs by the 11th grade, this decline is offset by a slight increase in drug use among seniors (12th grade).

Experience with Drugs by Gender Within Grade Levels

Figure 4B expands the data in Table 4A by including gender. As can be observed, in the early grades (7 and 8) males tend to have tried more drugs than females, but that by the 9th and 10th grades, females begin to exceed males with respect to experiences with chemical substances. These two grades also appear to be the grades levels during which drug-taking behavior

Figure 3
Number of Drugs tried by Gender
Juneau Schools
Grades 7-12
1987

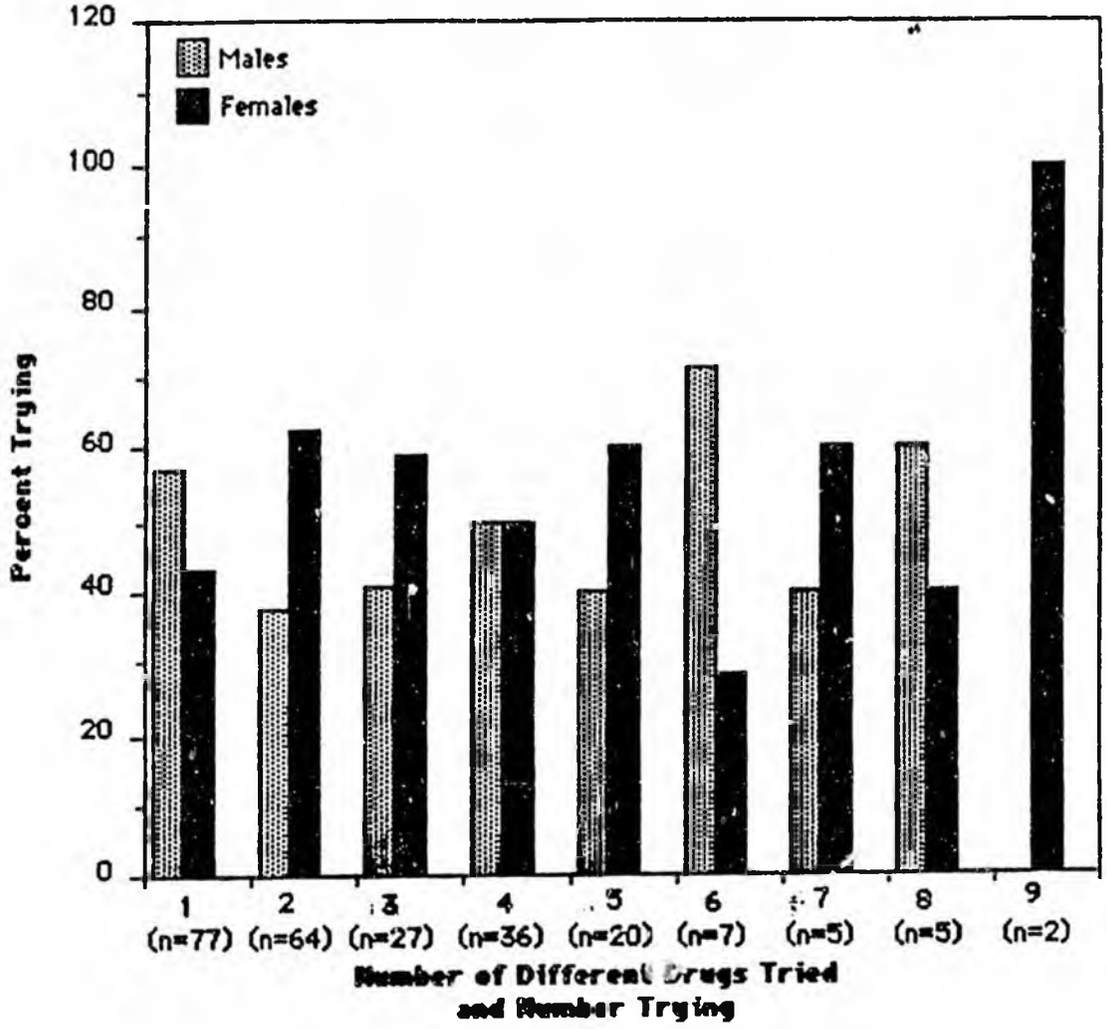


Figure 4A
Experience with Drugs by Grade
Juneau Schools
Grades 7-12
1987

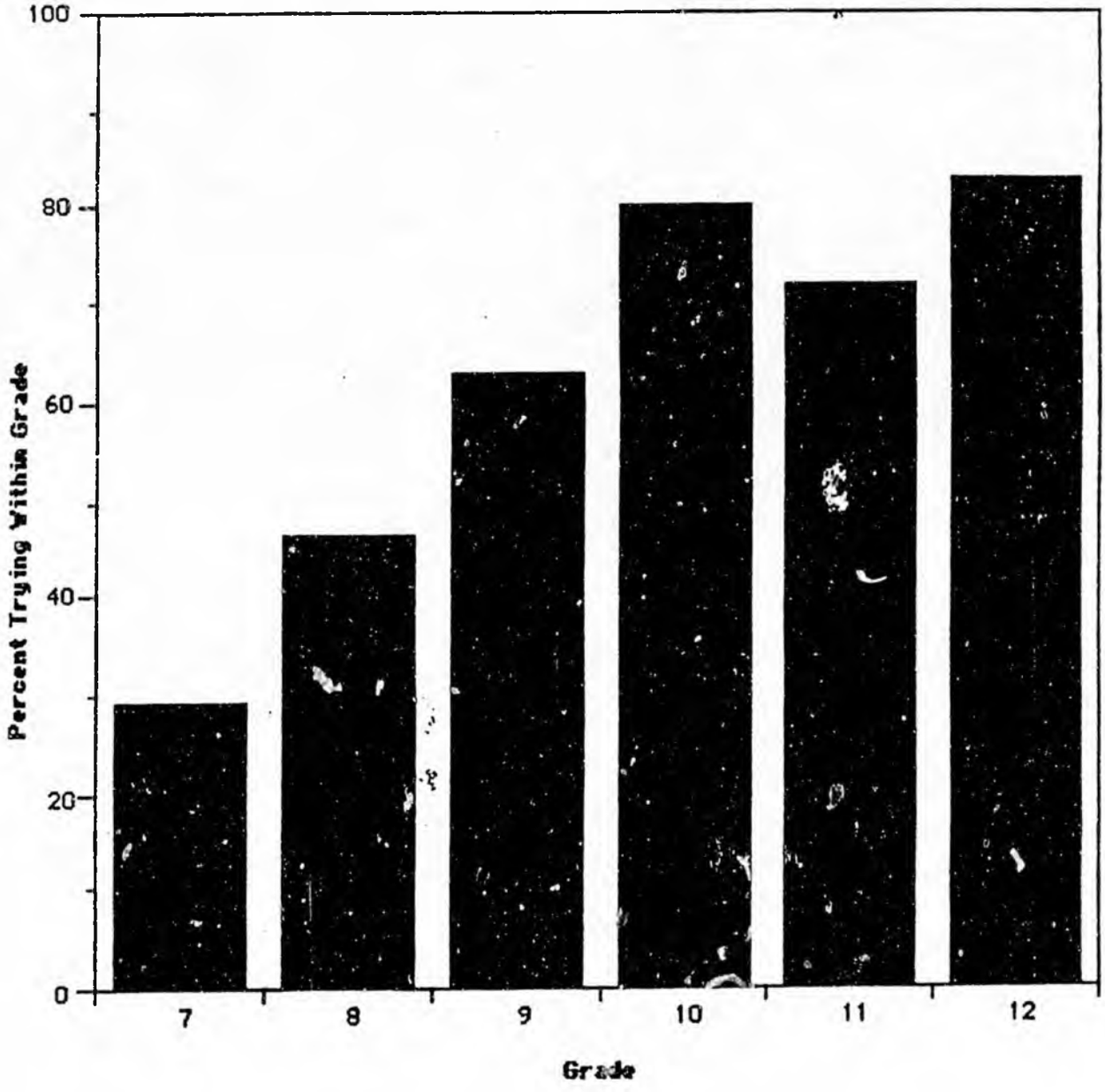
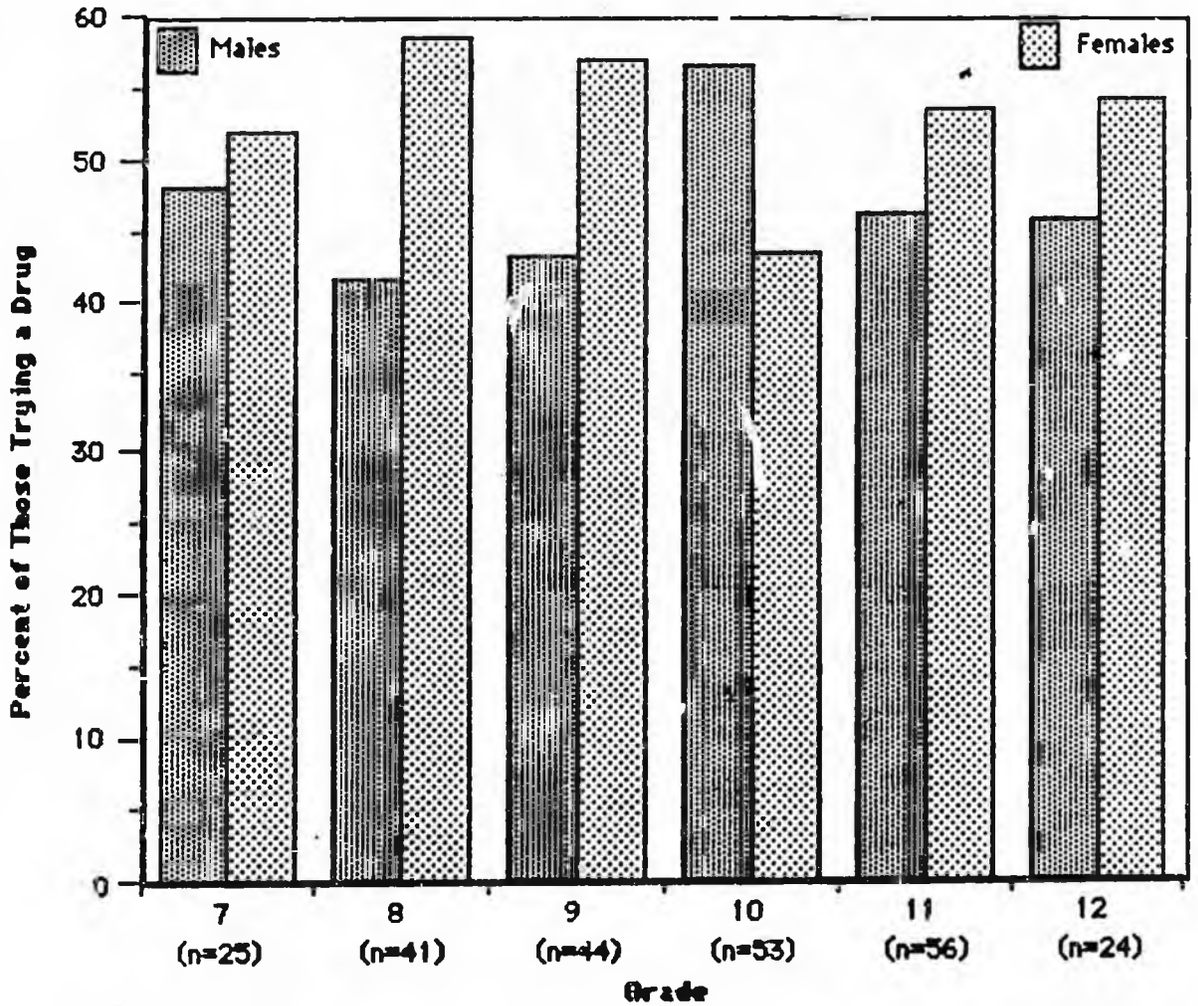


Figure 4B
Experience with Drugs by Gender and Grade
Juneau Schools
Grades 7-12
1987



begins to peak. By the 11th and 12th grades drugs-taking behavior begins to decline, with more females having experienced drugs in the 11th grade than males. This process is dramatically reversed in the 12th grade where females exceeded the number of males with respect to drug- taking behavior.

Frequency and Recency of Use

The report thus far has described data pertaining to lifetime experience with drugs, that is, ever having tried one or more drugs without respect to the number of times tried or how recently a drug may have been taken. This section focuses on how may times respondents reported having used a drug during the month prior to sampling (past month), during past year, and during their lifetime. The data is based on an analysis of the reports of use by those adolescents who have indicated that they have tried any substance. Both crack and heroin were not included because of their low prevalence rates. It should be noted that the reports of lifetime experience, past year, and past month experiences may not have been treated as mutually exclusive categories by the respondents. Therefore the data presented may reflect a summation of experiences, in which an individual reported that he or she tried a substance once during their lifetime, which occurred either during the past year or past month or both. It is imperative to recognize that the following seven figures (5A-5G) depict three unique percentages (lifetime, past year, past month) derived from the total number of students who ever tried each of the substances. The number of students who have ever tried each substance for the given time period is included in the legend within each figure.

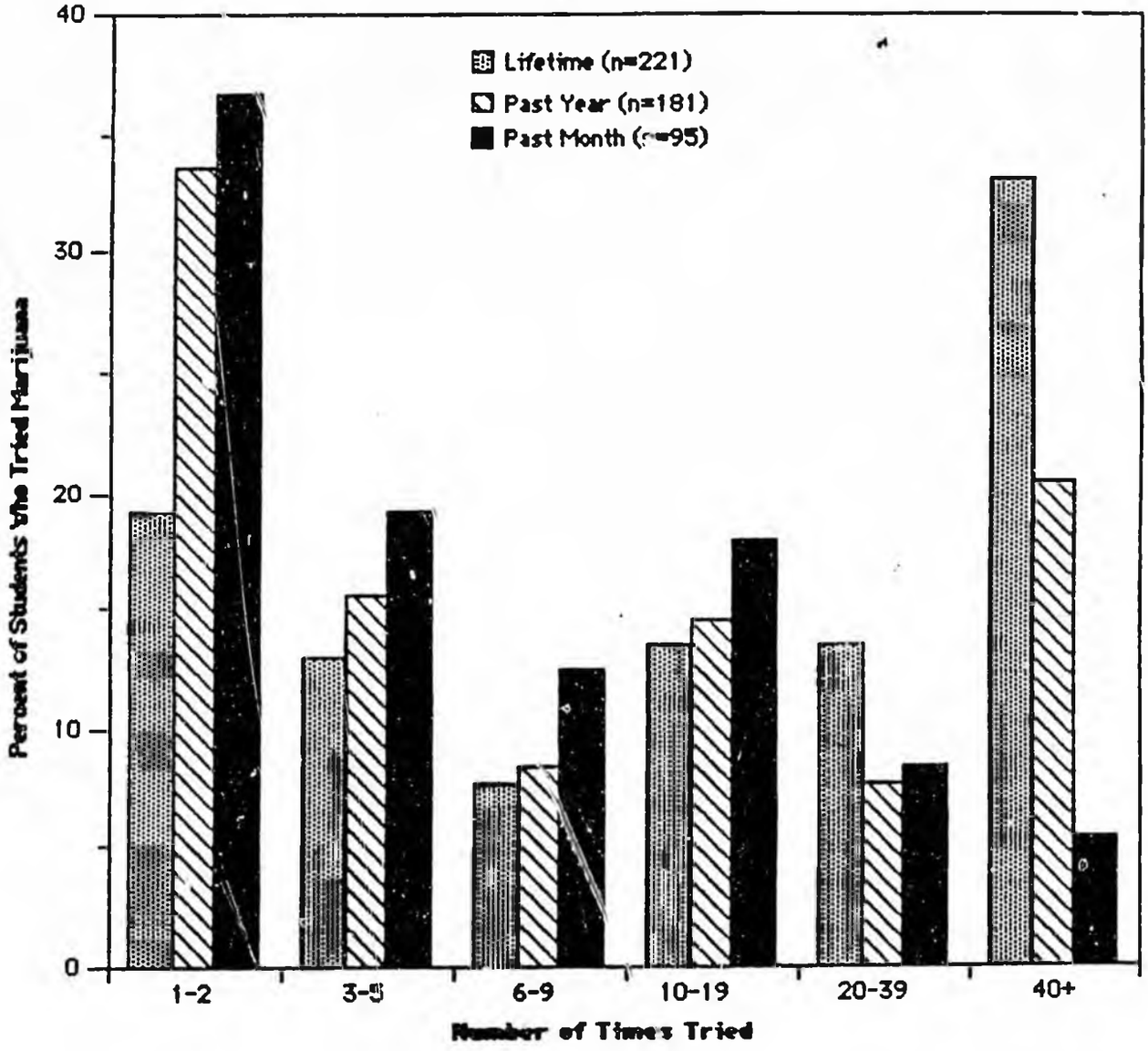
1. Marijuana

Figure 5A shows the distribution of reports of frequency and recency of use of marijuana. What is evident is that the prevalence of marijuana has been high, and that both experimental and regular use has occurred. Experimental use (1-2 times) was highest during the past month, suggesting ongoing infrequent or experimental use. In contrast to this pattern, a large number of students have used marijuana more extensively. Over 30% of those having used marijuana did so 40 or more times during their lifetime, over 20 percent did so during the past year, and slightly over 5 percent reported having used marijuana forty or more times during the past month. Overall, many students have apparently tried and continue to use marijuana, following a pattern that ranges from infrequent to what may be termed "regular" use.

2. Cocaine

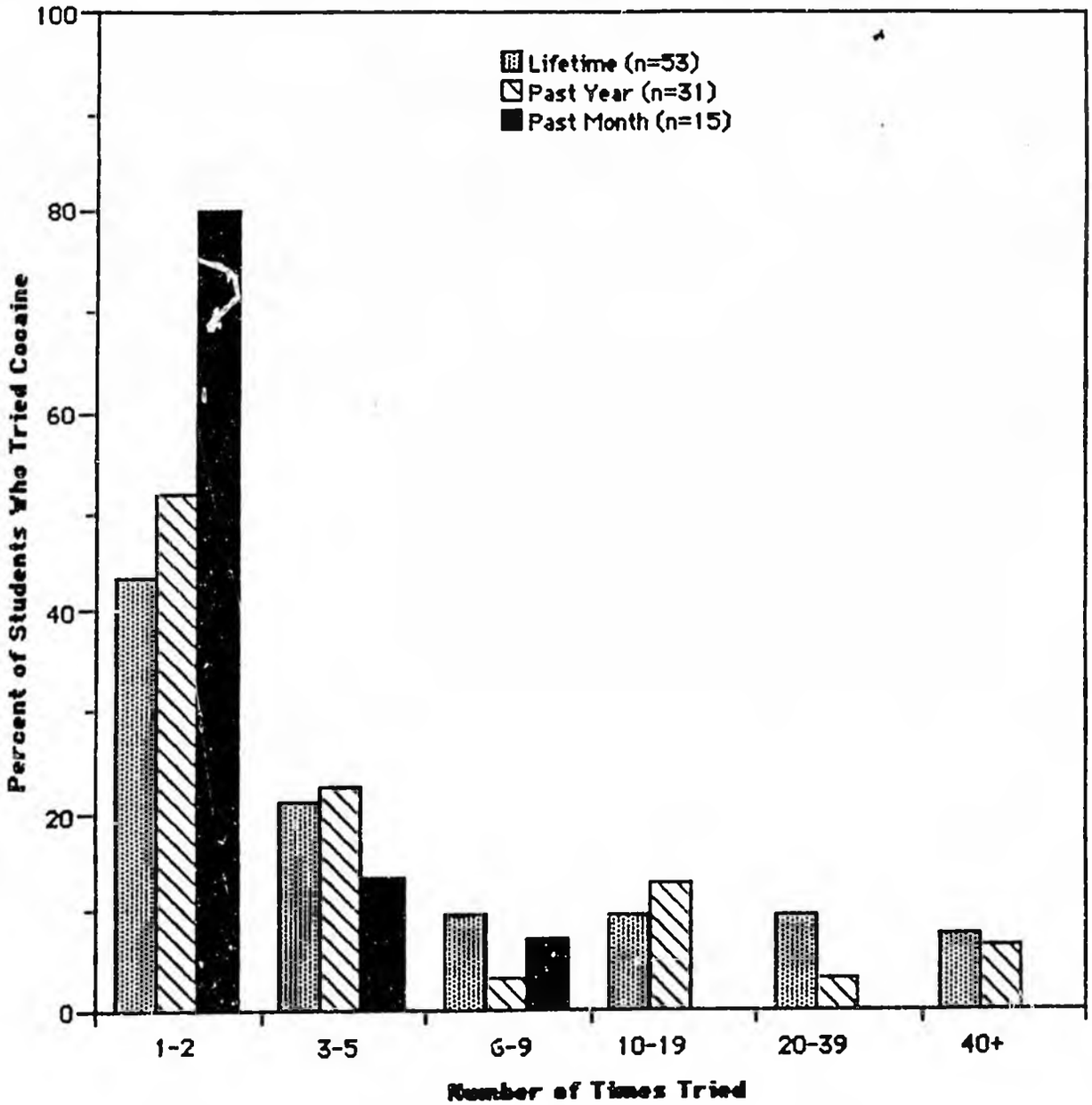
Table 5B shows that of those adolescents who have indicated having tried cocaine at some point in their life, the clear majority do so experimentally or infrequently (five times or less). Of these, 80 percent had tried it during the past month, over 50 percent reported having tried it during the past year, and over 40 percent had tried it at some point during their lifetime. A small

Figure 5A
Frequency and Recency of Marijuana Use
Juneau Schools
Grades 7-12
1987



Source: Adolescent Drug-Taking Behavior Followup Study/The Center for Alcohol and Addiction Studies/Bernard Segal, Ph.D., University of Alaska Anchorage, October, 1987. Same study done for the cities of Anchorage, bethel, Fairbanks, Kotzebue, Nome, and Sitka.

Figure 5B
Frequency and Recency of Cocaine Use
Juneau Schools
Grades 7-12
1987



number of students (6.7%) have indicated that they used cocaine 6-9 times during the past month. More frequent use of cocaine has occurred among a small number of students one or more years ago.

3. Stimulants

Figure 5C reports on the pattern of stimulant use. As can be observed, among those who indicated having tried stimulants a large percentage of have done so experimentally (less than five times) during the past month and year. More recent and frequent is also reported by a small number of students, some of which occurred during the past month.

4. Hallucinogens

An active pattern of hallucinogen use is evident among the number of students who reported having tried a hallucinogenic substance. The results, shown in Figure 5D, indicate that the predominant level of use has been one or two times, but 75% of those who have tried it did so during the past month. More recent and frequent use is also reported, with 6.3 percent having used such substances 10-19 times during the past month. More extensive use has also occurred, but this has taken place a year or more ago.

5. Depressants

The predominate mode of experience with depressant substances, as shown in Table 5E, appears to be primarily experimental (1-2 or 3-5 times), but some students have used depressants more extensively.

6.Inhalants

Inhalant use, as revealed in Table 5F, shows a varying pattern of use, ranging from infrequent (1-2 times) during the past month to more frequent (40+ times) during the past month. The overall pattern suggests that an active involvement with inhalant substances is occurring.

7. Tranquilizers

Figure 5G shows that use of tranquilizer type drugs has been chiefly experimental, but that students have used it within the past month, and that a small number have also used such substances extensively.

In summarizing the findings pertaining to recency and frequency of drug-taking behavior, it appears that there is a mixed pattern of ongoing experimental and more sustained use of most substances. The substances used most recently and with greater frequency are marijuana, cocaine, stimulants, hallucinogens, and inhalants.

<u>Age of First Experience With Marijuana,Stimulants, and Inhalants</u>

Figure 6 shows the ages with which respondents indicated having first tried

Figure 5C
Frequency and Recency of Stimulant Use
Juneau Schools
Grades 7-12
1987

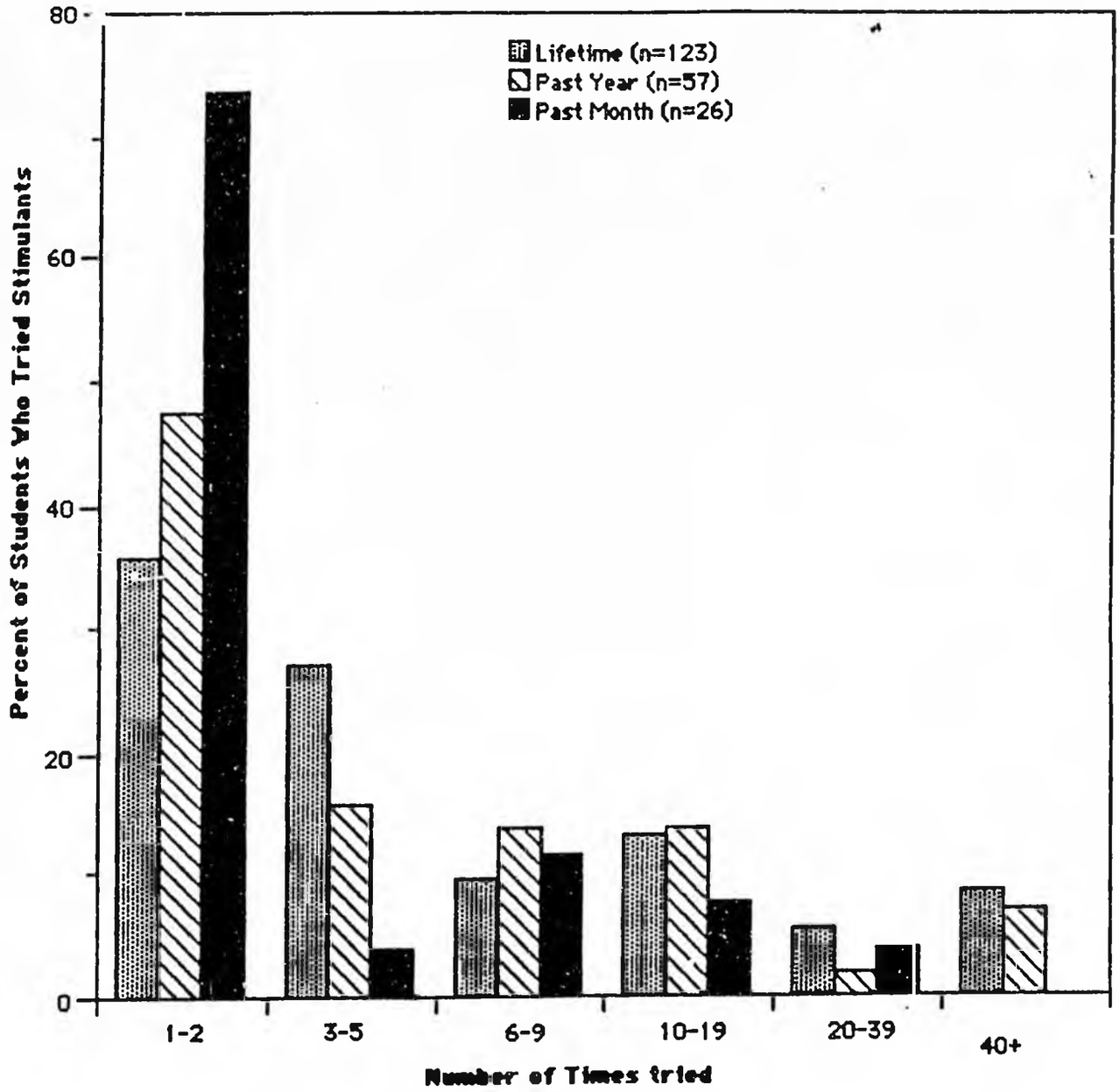


Figure 5D
Frequency and Recency of Hallucinogen Use
Juneau Schools
Grades 7-12
1987

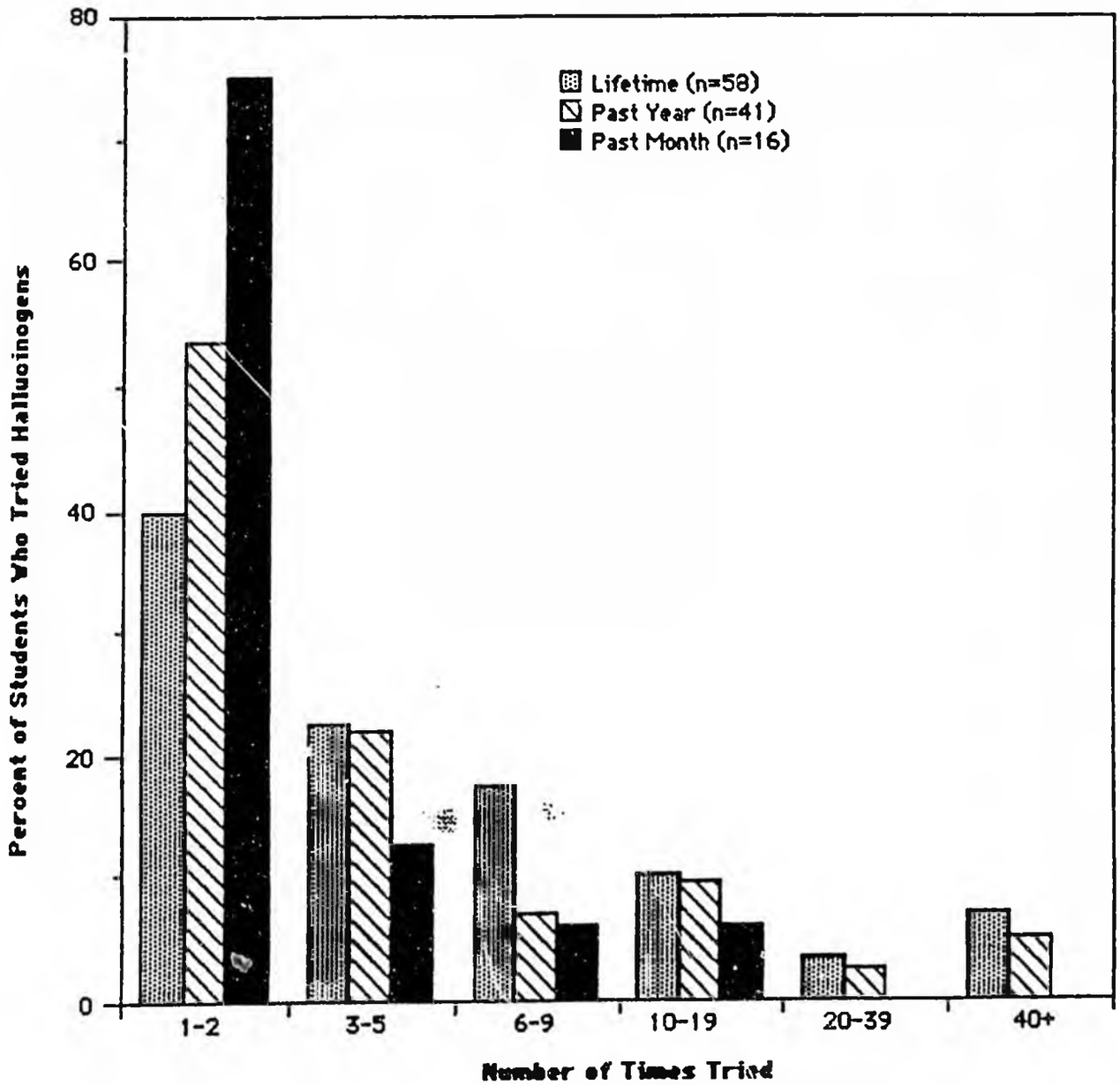


Figure 5E
Frequency and Recency of Depressant Use
Juneau Schools
Grades 7-12
1987

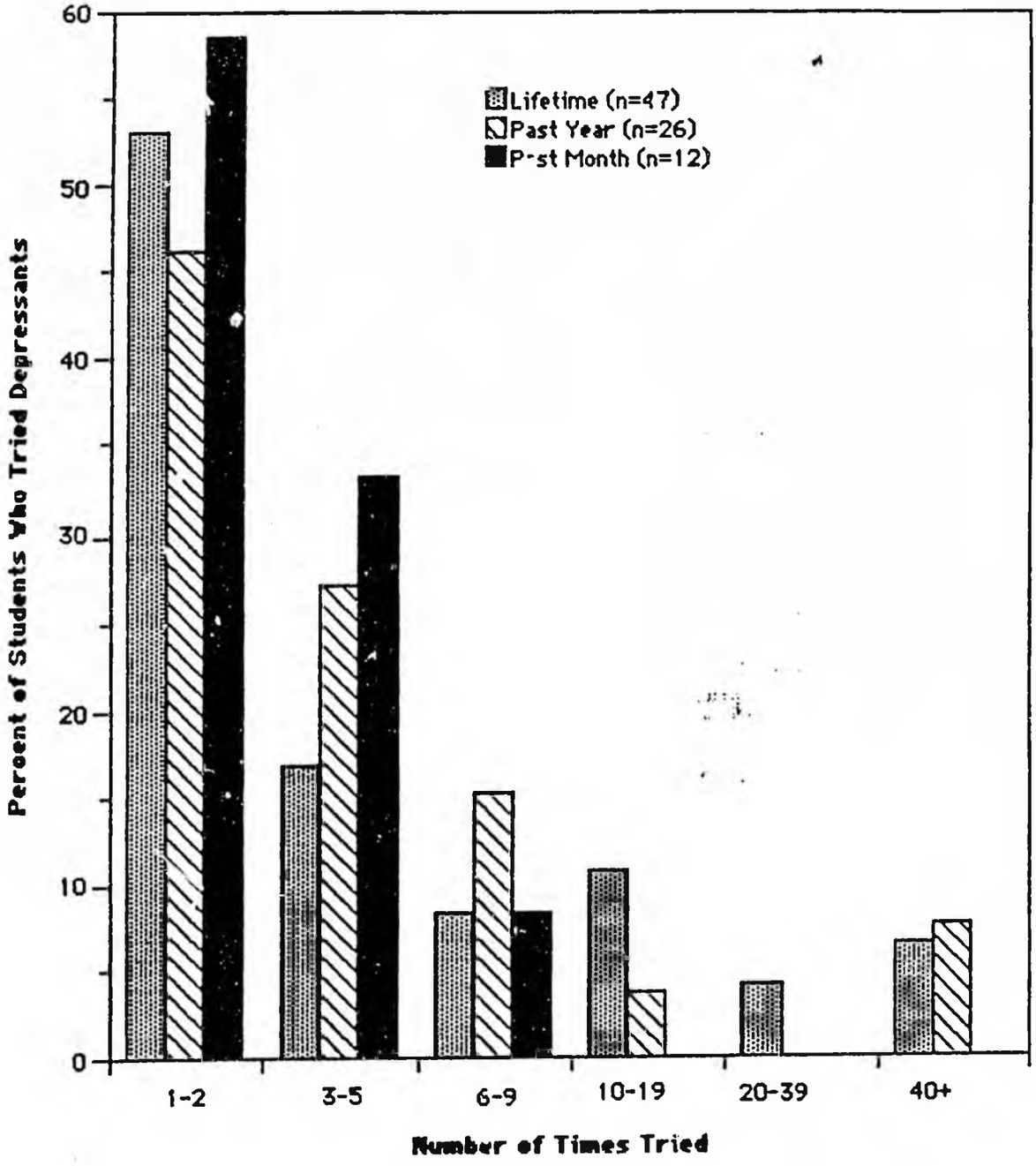


Figure 5F
Frequency and Recency of Inhalants Use
Juneau Schools
Grades 7-12
1987

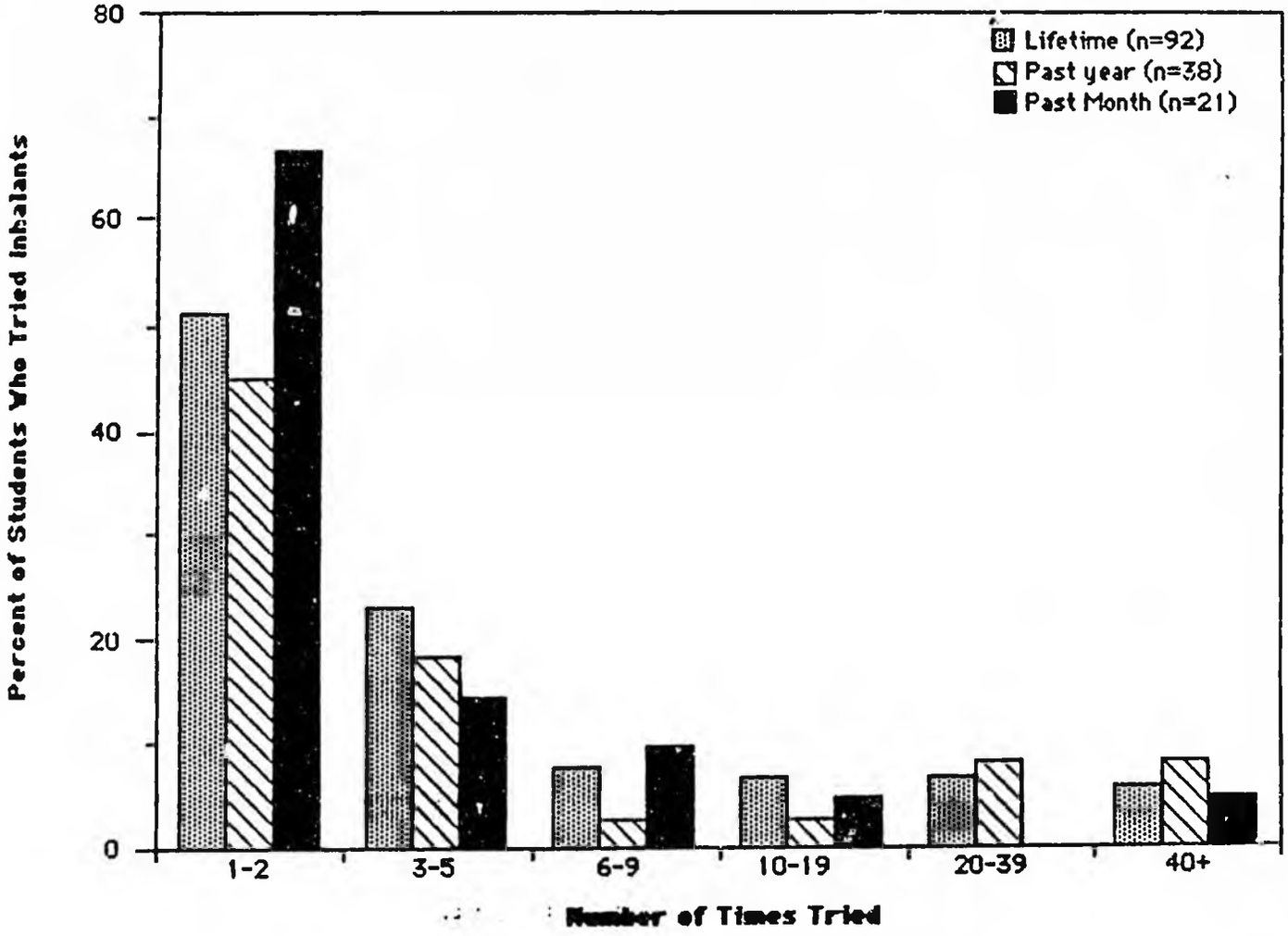


Figure 56
Frequency and Recency of Tranquilizers Use
Juneau Schools
Grades 7-12
1987

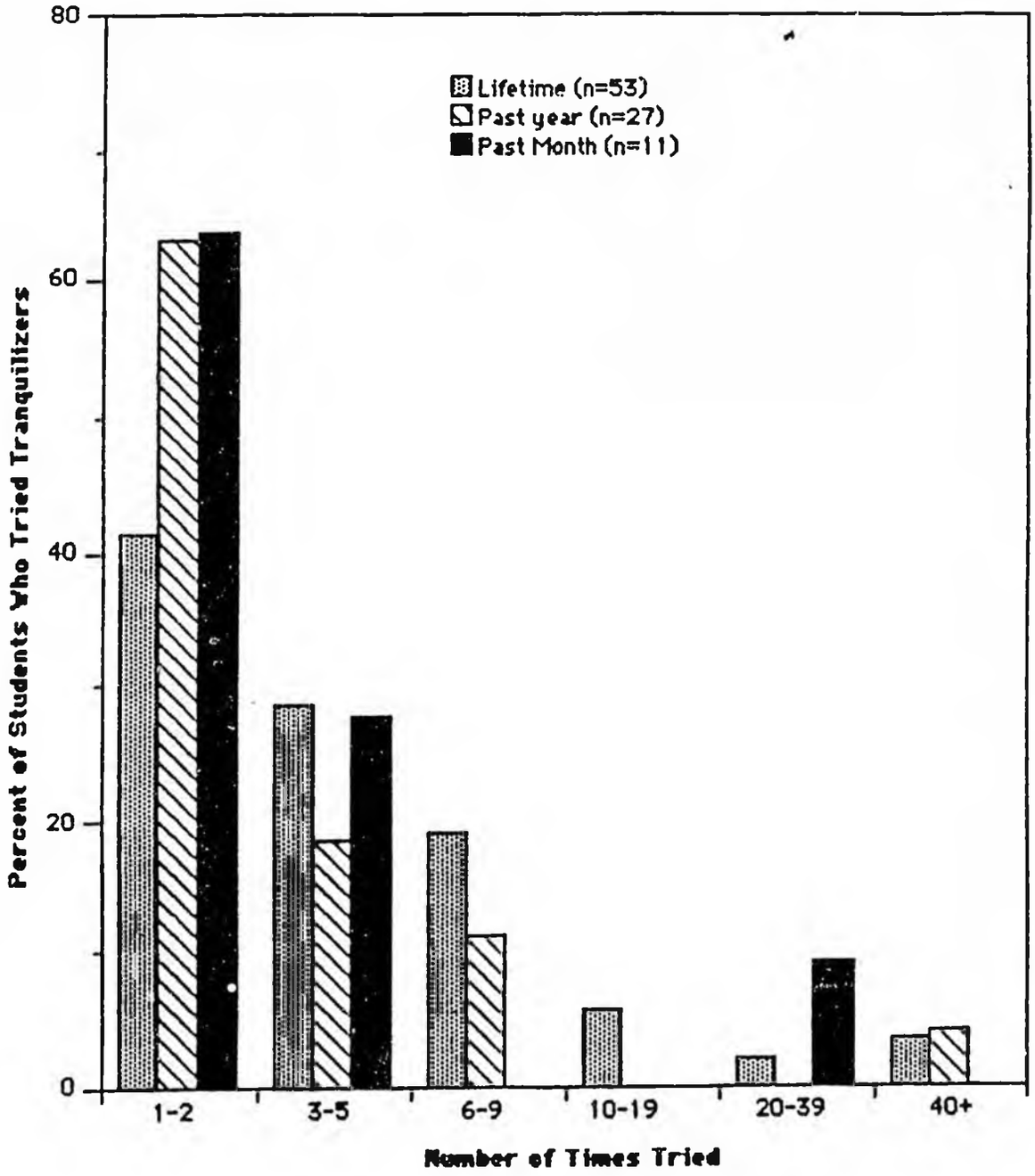
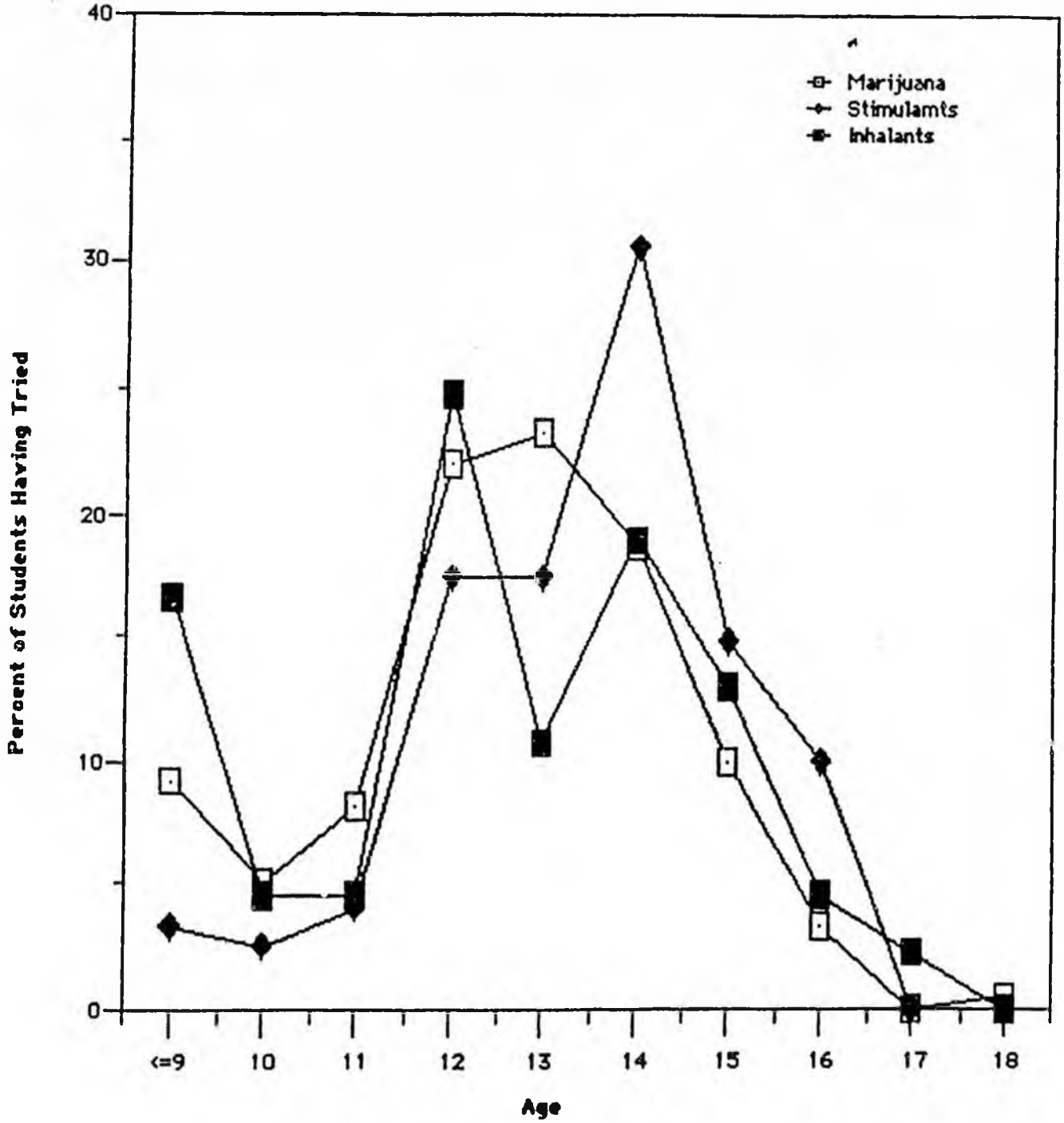


Figure 6
Age of Iniation into Marijuana, Stimulants, and Cocaine Juneau Schools Grades 7-12 1987



Source: Adolescent Drug-Taking Behavior Followup Study/ The Center for Alcohol and Addiction Studies/Bernard Segal, Ph.D., University of Alaska Anchorage, October, 1987. Same study done for the cities of Anchorage, Bethel, Fairbanks, Kotzebue, Nome, and Sitka.

marijuana, stimulants, and inhalants, the three drugs tried most frequently by the sample. At nine years years or less a small number of students have been initiated into substance use, with the highest number trying an inhalant type substance. Subsequent to nine years there is a decrease in initiation until age 12, where the first major peak occurs for all three substances. This high initiation level then drops sharply for inhalants, increases slightly for marijuana, and remains stable for stimulants at age 13. Subsequent to this point initiation into marijuana declines sharply. By age 14 initiation into stimulants peaks again at age 14, then drops sharply. Initiation into inhalants also increases, and then declines.

What the configuration of these three curves suggests is that inhalants tended to be used more than marijuana and stimulants at an early age, but that as age increases, interest shifts to experiencing marijuana and stimulants. Twelve years appears to correspond to a "critical period" of initiation into tying marijuana, inhalants, and stimulants. Subsequent to age 12 initiation to these substances declines, except for stimulants, which seems to attract the attention of 14 year olds. The data also suggests that if these substances were not tried by or before age before age 17, initiation into their use declines.

Part II. Alcohol

Lifetime Prevalence of Experience with Alcohol

Figure 7 shows the number of students who reported ever having tried alcohol in 1987 and 1982. (The lower confidence limit for the statistic pertaining to the number of students who drank is 64.7; the upper limit is 73.5.) As can be observed, the prevalence of lifetime experience with alcohol has decreased very slightly (1.4%) since 1982. The difference, however, is sufficiently small to conclude that the number of students who tried alcohol in 1982 and in 1987 remains at a consistent level.

Frequency of Drinking During the Past 30 Days

Figure 8 reports the frequency of alcohol consumption among students who indicated having consumed alcohol during the past 30 days. Of those, over 30% indicated that they did not drink during the past 30 days. Among those who did report that they consumed alcohol, the largest number reported drinking 2-3 times a week. What seems evident from the data is that alcohol is being consumed, and its use ranges from infrequent for a majority of respondents, to more frequently (more than 3-4 times a week) for a smaller number of students.

Drinking by Gender

Figure 9 reports on use of alcohol by gender, comparing lifetime and past year experience with alcohol. Interestingly, more females than males showed

Figure 7
Lifetime Experience With Alcohol
Comparison of 1982 and 1987
Juneau Schools
Grades 7-12

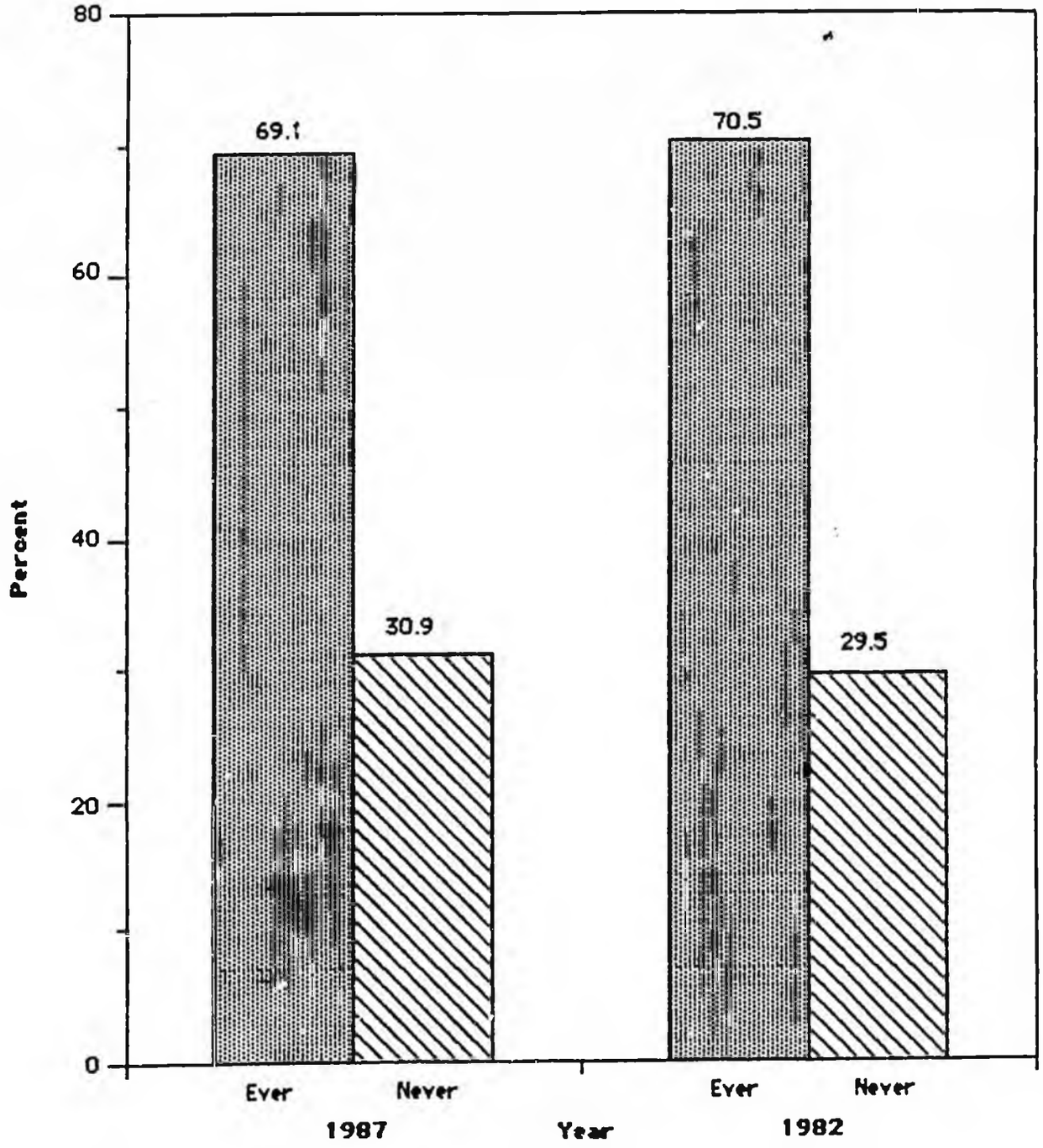


Figure 8
Frequency of Drinking Past 30 Days
Juneau Schools Grades 7-12
1987
(n=289)

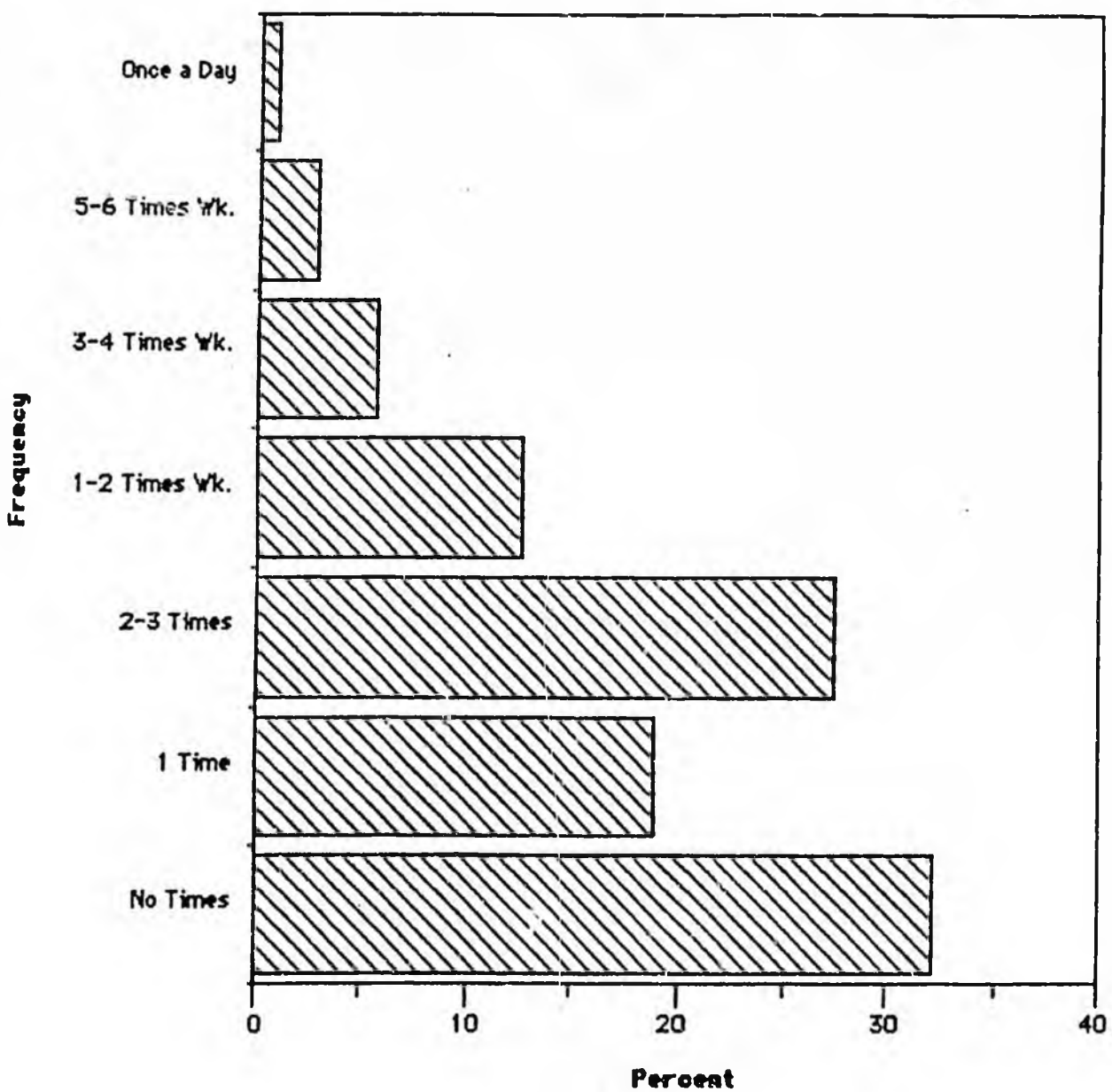
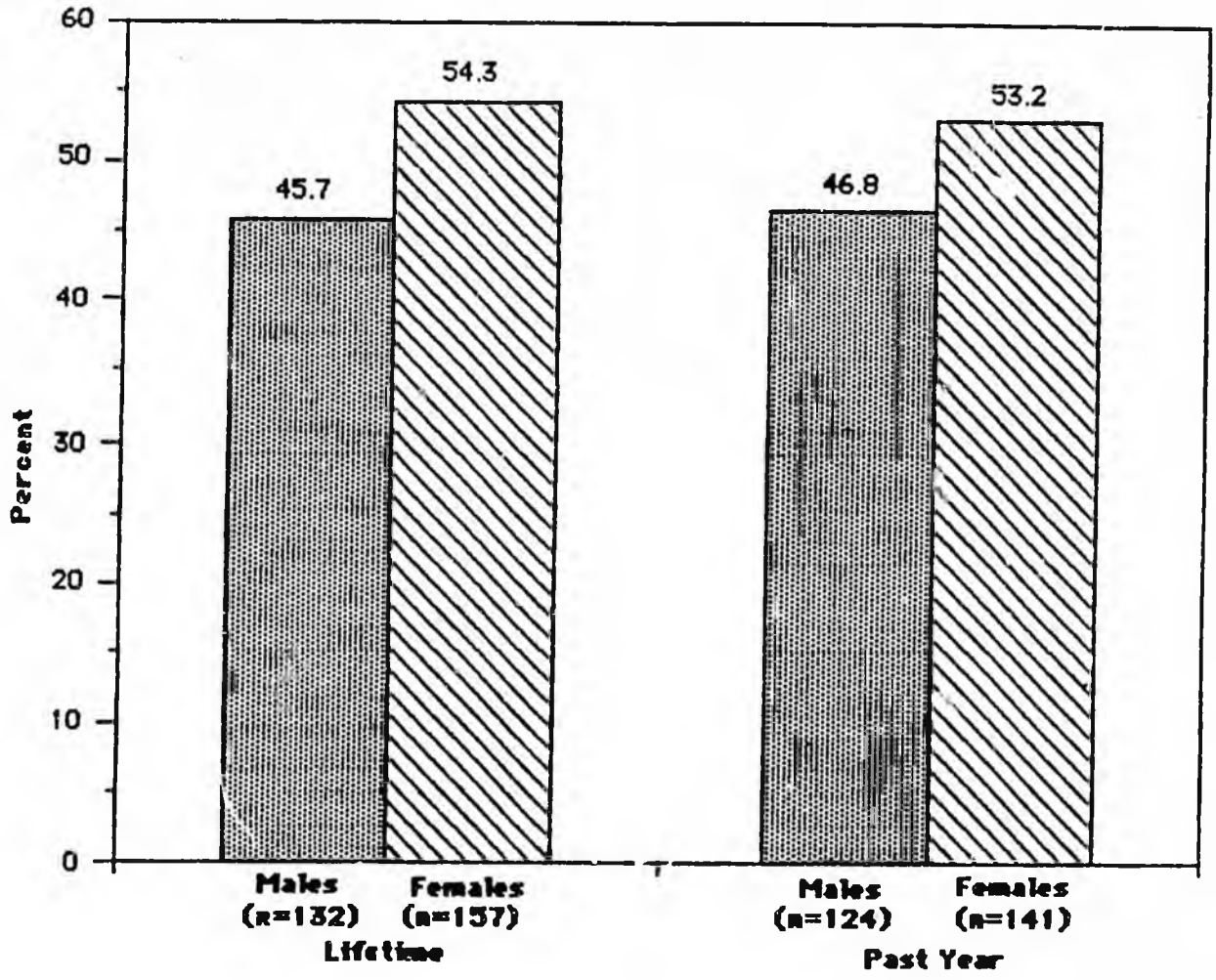


Figure 9
Alcohol Use by Gender During Lifetime and Past Year
Juneau Schools
1987



both higher rates of lifetime prevalence and use during the past year

Consequences of Drinking

Figure 10 shows how many respondents reported the frequency with which their drinking resulted in either feeling high, getting drunk or very high, or in having gotten sick during the past year. Inspection of the findings indicate that most of the students who drank did so to get high, but many of those who did drink experienced drunkenness or became sick one or more times. There are some students, however, who report more frequent incidents of adverse consequences associated with their drinking, and if these self-reports are accurate, these occurrences meet established criteria representative of "problem drinking" among adolescents (Rachel et al., 1980).

Part III. Tobacco

Smoking and Chewing/Smokeless Tobacco

Figure 11 provides a description of the prevalence rates for lifetime use of tobacco (ever tried), and a comparison of the present findings with those obtained in 1982. Data for comparing the prevalence rates from the 1982 sample for chewing/smokeless tobacco were unavailable. As can be noted, the prevalence of cigarette smoking has increased (by 24.7 percent) since 1982. Over a third of those sampled have also indicated having used smokeless or chewing tobacco.

Part IV. Students' Perception of Increase or Decrease in Drug Use

Figure 12 presents the summarized results of questions that asked students to report whether they thought use of any of the substances had increased or decreased in their school during the past year. The students' perception of the level of use, for the most part, appears to be consistent with the pattern of drug use observed with respect to the reports of recency and frequency of substance use. Marijuana, cocaine, hallucinogens, and stimulants, which showed a recent and frequent pattern of use, are all perceived by the students as having increased in use during the past year. Surprisingly inhalants, which shoed a recent and frequent pattern of use, was perceived as having decreased in use by the students. The students also report that alcohol and tobacco use have increased during the past year, and this perception is almost universal.

Part V. Comparison with Other Alaska Communities

Figure 13 provides a comparison of the findings for reports of lifetime experience with chemical substances from Juneau with two other Alaskan communities surveyed in the spring of 1987. As can be observed Juneau, except for lifetime experiences with stimulants, either shows the lowest, or second lowest, prevalence rate among the three communities.

Figure 10
Consequences of Drinking During the Past Year
Juneau Schools
Grades 7-12
1987

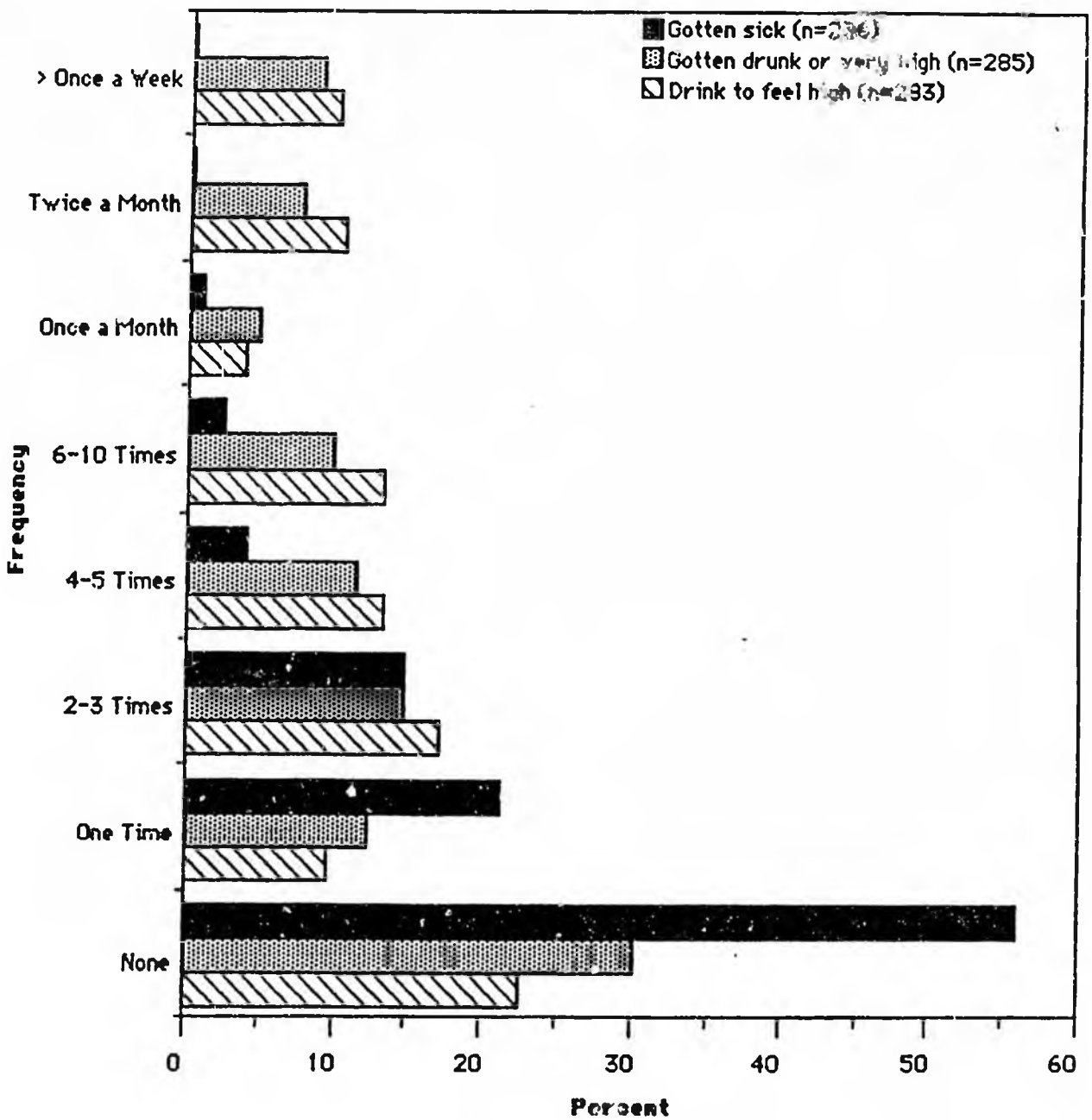


Figure 11
Use of Tobacco Products
Lifetime Experience
Juneau Schools

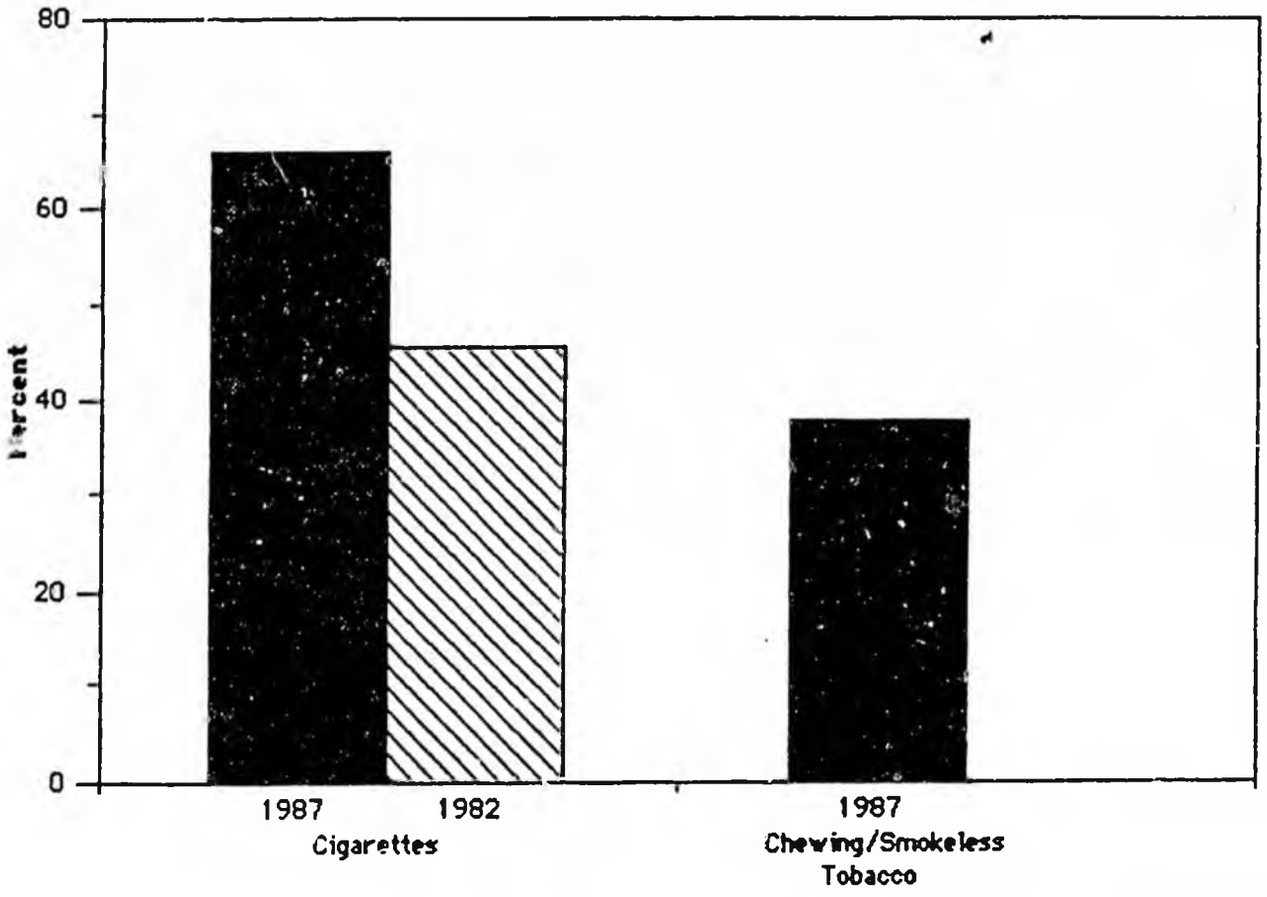
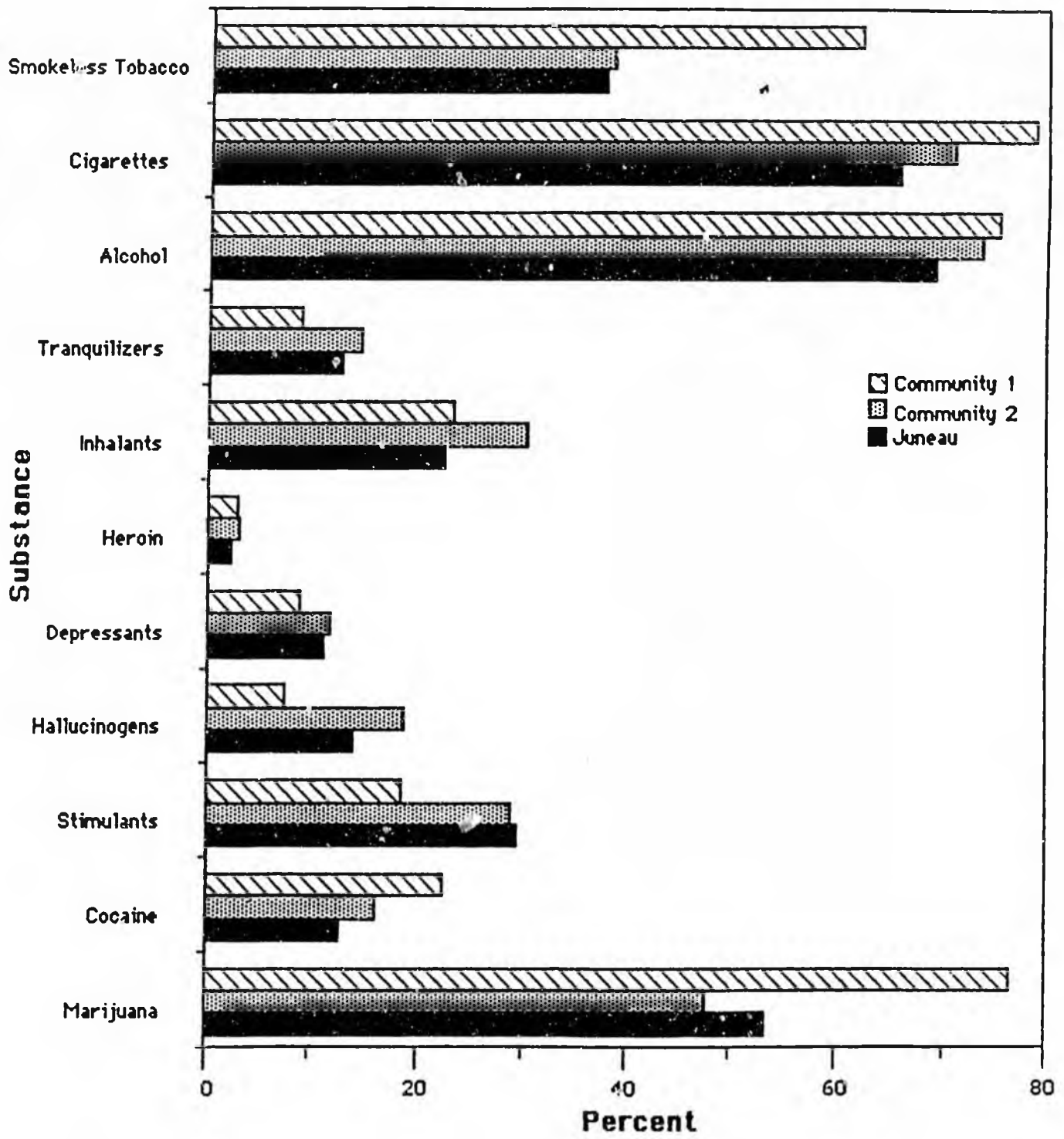


Figure 13
Lifetime Prevalence
Comparison of Experiences with Chemical Substances Among Three Alaska Communities
1987



Discussion and Implications

In summarizing the findings, it is apparent that drug-taking behavior is prevalent in varying degrees among the students responding to the questionnaire, and that changes in the pattern of drug use has taken place since the previous survey was undertaken in 1982. Increases have occurred in the use of some substances, some have appeared to stabilize, while others have decreased. Although marijuana continues to show the highest overall prevalence, experience with hallucinogens and inhalants have increased slightly, while cocaine has decreased. While the findings do suggest that the drug-taking behavior reported by the students can largely be described as experimental or infrequent use, a pattern of more frequent use is also evident. Of special interest in this pattern of use is that more females than males are involved in drug-taking behavior. Additionally, the present findings indicate a downward trend in age of initiation into drug use. Previous research (Segal, 1986) suggested that age 13 was the peak year for initiation into drugs, but the present finding indicate that age 12 now appears to be the critical year for initiation into drug use.

The prevalence of alcohol use was also high, and encompassed a wide range of different types of consumption, one of which is consistent with criteria indicating problem drinking among a small number of students. The extent of smoking is also high, having increased by 25 Percent since 1982.

The findings suggest that efforts are needed to reduce or minimize teenage involvement with chemical substances, tobacco products, drinking, and its associated negative consequences. Both direct and indirect strategies can be utilized to modify the situation. Direct strategies encompass drug education or prevention programs within the school setting that deal directly with the problem. Indirect strategies focus on modifying conditions believed to influence adolescents' behavior with respect to use of drugs. An example of an indirect strategy is a program to help students develop decision making skills useful in dealing with high risk situations. Such a program, however, needs to correspond to the point at which students are at a high risk for initiation into drugs, alcohol, or tobacco products. Based on the results of this study, a critical point would be at the grade level corresponding to age 11, one year before the first peak initiation period occurs.

In approaching the problem of preventing/minimizing the use of mood-altering substances, smoking or use of chewing/smokeless tobacco, and use of alcohol, it is important to take note that illicit drug use, smoking, and drinking, have become incorporated into the American lifestyle. Adolescents are thus, to a large extent, reflecting the value system of the larger society, and their behavior with respect to alcohol, drugs, and tobacco, can be

considered, to some extent, to be "normative" behavior. Many adolescents thus become involved with drugs in order to know what drug experience are like. Segal (1985-86) has shown that a major reason given by adolescents who try drugs is to experience the sensation that drugs provide. This does not diminish the need, however, to eliminate or reduce drug use among youth, particularly when other adolescents have reported that they used drugs to reduce stress (Segal, 1985-86), a motive that suggests that some adolescent drug users may be in need of help.

An effective way to combat the problem of drug use is a combination of both direct and indirect programs, in which the school and community cooperate on establishing an education/prevention program that is designed to meet common goals and objectives. A broadbased, community-wide approach, involving all elements of the community (parents, children, educators, police, governmental officials, counselors, etc.) is required to alleviate the problem of teenage smoking, drinking, and drug-taking behavior.

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The Center for Alcohol and Addiction Studies

University of Alaska, Anchorage

Confidential Student Questionnaire

Dear Student:

The purpose of this study is to help us to understand better your feelings and experiences with respect to alcohol and other drugs. About 3,000 students across Alaska will take part in this study. Your answers will be kept absolutely confidential. There is no way to identify any student who responds. We do not ask your name - do not write it anywhere on the questionnaire. Your participation is voluntary. We need your help, and hope that you will contribute to the success of this study.

Thank you for your cooperation.

Directions

This is not a test and you are not timed on any section or group of questions. Please read carefully all the directions for each question. It is important that you follow the order of questions within each section. If you do not understand or cannot read a question raise your hand and someone will assist you.

When you have finished the questionnaire put it in the envelope that has been provided by the monitor. No one at the school will see or read your answers. The envelope will be sealed after the last questionnaire is completed. All the envelopes will be immediately taken to the University to be coded and entered into the computer. All questionnaires will be destroyed after the computer file has been set up.

Part 1. Background Information

1. I am
   ___Female
   ___Male

2. My ethnic background is? (Please check the correct one.)
   ___Alaska Native
   ___American Indian
   ___Asian or Pacific Islander
   ___Black
   ___Hispanic
   ___White
   ___Other: Which_____

3. How old were you as of your last birthday?_____

4. What grade are you in? (Please check the correct one.)

   ___6th ___7th ___8th ___9th ___10th ___11th ___12th

5. Have you ever taken part in an alcohol or drug education/prevention program in one of your classes?
   ___No (Go to #7)
   ___Yes (continue)

6. At which grade did you take part? (Check all that apply)
   ___5th grade or below
   ___6th grade
   ___7th grade
   ___8th grade
   ___9th grade
   ___10th grade
   ___11th grade
   ___12th grade

7. What grades do you usually get? (Check the one that applies to you for each column.)

<u>During this school year</u>	<u>During the year before</u>
___Mostly A's	___Mostly A's
___Mostly A's and B's	___Mostly A's and B's
___Mostly B's	___Mostly B's
___Mostly B's and C's	___Mostly B's and C's
___Mostly C's	___Mostly C's
___Mostly C's and D's	___Mostly C's and D's
___Mostly D's and F's	___Mostly D's and F's

8. How many years have you lived in this community?_____

Part 2. This set of questions asks about your experiences with recreational drugs used to get high or to feel good.

<u>Section 1. Marijuana</u>

Marijuana, which is sometimes called "grass," "pot," "weed," "smoke," "bud," "Mary Jane," or "joint," is a substance that is usually smoked.

9. Have you ever had a chance to try marijuana? ___No ___Yes

10. Have you ever tried marijuana?
    ___No (Go to Section 2)
    ___Yes (Continue)

11. How old were you when you first tried it?_____

12. Have you <u>ever</u> been high or stoned on marijuana to the point where you were pretty sure that you had experienced its effect?
    ___I never got high
    ___Have gotten high once
    ___Have gotten high more than once
    ___I get high almost every time I use it

13. How many different times have you used marijuana?

	No times	1-2 times	3-5 times	6-9 times	10-19 times	20-39 times	40+ times
In your lifetime	—	—	—	—	—	—	—
During the last 12 months	—	—	—	—	—	—	—
During the last 30 days	—	—	—	—	—	—	—

Section 2. Cocaine.

Cocaine, which is called "coke," "toot," "blow," or "snow," or other names, is a white powdery substance that is usually sniffed or smoked.

14. Have you ever had a chance to try cocaine? ___No ___Yes

15. Have you ever tried cocaine?
    ___No (Go to Section 3)
    ___Yes (Continue)

16. How did you use it? (Check all the apply to you.)
    ___I have sniffed it
    ___I have smoked it
    ___I have injected it (shot it up)
    ___I have used it in freebase form

17. How old were you when you first tried it?_____

18. Have you ever been high on cocaine to the point where you were pretty sure that you had experienced its effect?
    ___I never got high
    ___Have gotten high once
    ___Have gotten high more than once
    ___I get high almost every time I use it

19. How many different times have you used cocaine?

	No times	1-2 times	3-5 times	6-9 times	10-19 times	20-39 times	40+ times
In your lifetime	—	—	—	—	—	—	—
During the last 12 months	—	—	—	—	—	—	—
During the last 30 days	—	—	—	—	—	—	—

Section 3. Crack

Another type of cocaine is called "crack." This form of cocaine looks like a piece of rock or soap, and is smoked.

20. Have you ever had a chance to try crack? ___No ___Yes

21. Have you ever tried crack?
    ___No (Go to Section 4)
    ___Yes (Continue)

22. How old were you when you first tried it?_____

23. Have you ever been high on crack to the point where you were pretty sure that you had experienced its effect?
    ___I never got high
    ___Have gotten high once
    ___Have gotten high more than one
    ___I got high almost every time I use it

24. How many different times have you used crack?

	No times	1-2 times	3-5 times	6-9 times	10-19 times	20-39 times	40+ times
In your lifetime	—	—	—	—	—	—	—
During the last 12 months	—	—	—	—	—	—	—
During the last 30 days	—	—	—	—	—	—	—

Section 4. Stimulants ("Uppers")

Stimulants or amphetamine drugs, known as "uppers," "speed," "crystal," "bennies," "dexies," "pep pills," "crosstabs," "crossroads," and "crisscross," among other names, are used to make one feel more alert, energetic, or to obtain a high. They are usually taken in pill form.

25. Have you ever had a chance to try stimulants? ___No ___Yes

26. Have you ever tried stimulants?
___No (Go to Section 5)
___Yes (Continue)

27. How old were you when you first tried any?_____

28. Have you ever been high on a stimulant to the point where you were pretty sure that you had experienced its effect?
___I never got high
___Have gotten high once
___Have gotten high more than once
___I get high almost every time I use it

29. How many different times have you used stimulants?

	No times	1-2 times	3-5 times	6-9 times	10-19 times	20-39 times	40+ times
In your lifetime	—	—	—	—	—	—	—
During the last 12 months	—	—	—	—	—	—	—
During the last 30 days	—	—	—	—	—	—	—

Section 5. Hallucinogens

Hallucinogens, which are also called psychedelics, consist of such substances as LSD ("Acid"), Mescaline, and PCP, among other substances. Some of the slang names for hallucinogens are "mushrooms," "ecstasy," or "angel dust," "window pane," and "blotter acid." These substances are used to experience hallucinations, or to alter how things are seen, change one's mood, feelings, or level of awareness.

30. Have you ever had a chance to try hallucinogens? ___No ___Yes

31. Have you ever tried hallucinogens?
___No (Go to Section 6)
___Yes (Continue)

32. How old were you when you first tried any?_____

33. Have you ever been high on an hallucinogen to the point where you were pretty sure that you had experienced its effect?

___I never got high
___Have gotten high once
___Have gotten high more than once
___I get high almost every time I use it

34. How many different times have you used hallucinogens?

	No times	1-2 times	3-5 times	6-9 times	10-19 times	20-39 times	40+ times
In your lifetime	—	—	—	—	—	—	—
During the last 12 months	—	—	—	—	—	—	—
During the last 30 days	—	—	—	—	—	—	—

Section 6. Depressants ("Downers")

Depressant or "downer" type drugs, known as barbiturates, one of which is called Quaalude, are chemical substances used to calm oneself down or to get a high, much like using alcohol. Such drugs are usually taken in pill form, and are called "barbs," "blues" or "blue devils," "yellow jackets," "purple hearts," "soapers," or "dudes."

35. Have you ever had a chance to try depressants? ___No ___Yes

36. Have you ever tried depressants?
___No (Go to Section 7)
___Yes (Continue)

37. How old were you when you first tried any?_____

38. Have you ever been high on a depressant to the point where you were pretty sure that you had experienced its effect?
___I never got high ___Have gotten high more than once
___Have gotten high once ___I get high almost every time I use it

39. How many different times have you used depressants?

	No times	1-2 times	3-5 times	6-9 times	10-19 times	20-39 times	40+ times
In your lifetime	—	—	—	—	—	—	—
During the last 12 months	—	—	—	—	—	—	—
During the last 30 days	—	—	—	—	—	—	—

Section 7. Heroin

Heroin, which is sometimes called "H," "horse," "junk," "Mexican brown," or "smack," can be a white or brownish powdery substance that can be injected (shot up), sniffed, or smoked.

40. Have you ever had a chance to try heroin? ___No ___Yes

41. Have you ever tried heroin?
___No (Go to Section 8)
___Yes (Continue)

42. How old were you when you first tried it?_____

43. Have you ever been high on heroin to the point where you were pretty sure that you had experienced its effect?
___I never got high ___Have gotten high more than once
___Have gotten high once ___I get high almost every time I use it

44. How many different times have you used heroin?

	No times	1-2 times	3-5 times	6-9 times	10-19 times	20-39 times	40+ times
In your lifetime	—	—	—	—	—	—	—
During the last 12 months	—	—	—	—	—	—	—
During the last 30 days	—	—	—	—	—	—	—

Section 8. Inhalants

Inhalants are chemical substances, such as gasoline, kerosene, aerosol sprays, paint, glue, and other chemicals, or drugs such as nitrous oxide or amyl nitrate, that are sniffed or inhaled to induce a high.

45. Have you ever had a chance to try inhalants? ___No ___Yes

46. Have you ever tried any inhalants?
___No (Go to Section 9)
___Yes (Continue)

47. How old were you when you first tried any?_____

48. Have you ever been high on an inhalant to the point where you were pretty sure that you had experienced its effect?

___Not sure I ever got high ___Have gotten high more than once
___Have gotten high once ___I get high almost every time I use it

49. How many different times have you used inhalants?

	No times	1-2 times	3-5 times	6-9 times	10-19 times	20-39 times	40+ times
In your lifetime	—	—	—	—	—	—	—
During the last 12 months	—	—	—	—	—	—	—
During the last 30 days	—	—	—	—	—	—	—

Section 9. Tranquilizers

Tranquilizers are substances used to calm oneself, to relax or to get high. One such drug is Valium.

50. Have you ever had a chance to try tranquilizers? ___No ___Yes

51. Have you ever tried any tranquilizers?

___No (Go to Part 3)
___Yes (Continue)

52. How old were you when you first tried any?_____

53. Have you ever been high on a tranquilizer to the point where you were pretty sure that you had experienced its effect?

___I never got high ___Have gotten high more than once
___Have gotten high once ___I get high almost every time I use it

54. How many different times have you used tranquilizers?

	No times	1-2 times	3-5 times	6-9 times	10-19 times	20-39 times	40+ times
In your lifetime	—	—	—	—	—	—	—
During the last 12 months	—	—	—	—	—	—	—
During the last 30 days	—	—	—	—	—	—	—

Part 3.

If you have never tried a drug answer #54. If you have tried a drug, skip to #55.

54. If you have never tried a drug, was it because of any of the following?
(Check the column that best applies to you for each item.)

	Very True of me	Often True of me	Sometimes True for of me	Seldom True of me	Not True of me
Fear of damage to my mind	—	—	—	—	—
Moral reasons	—	—	—	—	—
Knowing friends who had a bad trip	—	—	—	—	—
Fear of having a bad experience	—	—	—	—	—
No opportunity to try a drug	—	—	—	—	—
Disappoint my parents	—	—	—	—	—
Pressure from friends	—	—	—	—	—
May cause addiction	—	—	—	—	—
It is illegal	—	—	—	—	—
Not important for me to try	—	—	—	—	—
Because of something I learned in school	—	—	—	—	—

(Skip to #56)

55. Have any of the following ever happened to you as a result of your experience with any type of drug? (Check all that apply to you.)

	Never	Once	2-3 Times	4 or more Times
Gotten into trouble with your teachers or principal	—	—	—	—
Had it get in the way of school work	—	—	—	—
Gotten you in trouble with your friends	—	—	—	—
Gotten you in trouble with the police	—	—	—	—
Had a bad trip	—	—	—	—
Resulted in an accident or injury to you or others	—	—	—	—
Been suspended from school	—	—	—	—

(Continue below)

56. Do you think the use of any of the substances listed below has increased in your school during the past year? (Please check all the ones you believe have gone up.)

___Alcohol	___Cocaine	___Stimulants
___Tobacco	___Crack	___Depressants
___Marijuana	___Hallucinogens	___Inhalants
___Heroin	___Tranquilizers	

57. Do you think the use of any of the substances listed below has decreased in your school during the past year? (Please check all the ones you believe have gone down.)

___Alcohol	___Cocaine	___Stimulants
___Tobacco	___Crack	___Depressants
___Marijuana	___Hallucinogens	___Inhalants
___Heroin	___Tranquilizers	

58. About how many of your friends have tried: (Check the appropriate place)

	None	1 or 2	Several	Most	All	Don't Know
Marijuana	—	—	—	—	—	—
Cocaine	—	—	—	—	—	—
Crack	—	—	—	—	—	—
Stimulants	—	—	—	—	—	—
Hallucinogens	—	—	—	—	—	—
Depressants	—	—	—	—	—	—
Heroin	—	—	—	—	—	—
Inhalants	—	—	—	—	—	—
Tranquilizers	—	—	—	—	—	—
Alcohol	—	—	—	—	—	—
Cigarettes	—	—	—	—	—	—
Smokeless tobacco	—	—	—	—	—	—

59. About how many of your friends use: (Check the appropriate place)

	None	1 or 2	Several	Most	All	Don't Know
Marijuana	—	—	—	—	—	—
Cocaine	—	—	—	—	—	—
Crack	—	—	—	—	—	—
Stimulants	—	—	—	—	—	—
Hallucinogens	—	—	—	—	—	—
Depressants	—	—	—	—	—	—
Heroin	—	—	—	—	—	—
Inhalants	—	—	—	—	—	—
Tranquilizers	—	—	—	—	—	—
Alcohol	—	—	—	—	—	—
Cigarettes	—	—	—	—	—	—
Smokeless tobacco	—	—	—	—	—	—

Part 4. The questions in this part ask about your experiences with beer, wine, and liquor.

60. Have you ever had a drink of wine, beer, or liquor - not just a sip or taste - with friends outside of your home?
___No (Go to Part 5)
___Yes (Continue)

61. Have you had a drink of wine, beer, or liquor - not just a sip or taste - with friends outside of your home during the past year?
___No
___Yes

62. How old were you when you had your first drink (not just a sip or taste) with friends at a party or some other kind of get together outside of your home? _____

63. How many times did you drink beer, wine, or liquor during the past 30 days?
___No time
___1 time
___2-3 times
___1-2 times a week
___3-4 times a week
___5-6 times a week
___Once a day
___More than once a day

64. Think of all the times when you had beer, wine, or liquor during the past 30 days. How many drinks do you usually have?
(Think of one can of beer, a glass of wine, or a mixed drink as equal to one drink.)
___I did not drink during this time
___1 drink
___2 drinks
___3-5 drinks
___6-10 drinks
___11 or more drinks

65. During the past year, about how many times did you drink just to feel a little high or light-headed?
___None ___2-3 times ___6-10 times ___Twice a month
___One time ___4-5 times ___Once a month ___Once a week or more

66. During the past year, about how many times have you gotten drunk or very, very high?
___None ___2-3 times ___6-10 times ___Twice a month
___One time ___4-5 times ___Once a month ___Once a week or more

67. During the past year, about how many times have you gotten sick (nauseas or vomiting) as a result of drinking?
___None ___2-3 times ___6-10 times ___Twice a month
___One time ___4-5 times ___Once a month ___Once a week or more

68. Have you ever had any of the following happen to you as a result of drinking?
(Place a check where it applies to you for each item.)

	Never	Once	2-3 Times	4 or more Times
Gotten into trouble with your teachers or principal.....	—	—	—	—
Had it get in the way of school work.....	—	—	—	—
Gotten you in trouble with your friends.....	—	—	—	—
Gotten you in trouble with the police.....	—	—	—	—
Gotten you in a fight.....	—	—	—	—
Resulted in an accident or injury to you or others.....	—	—	—	—
Have driven when drinking?.....	—	—	—	—

69. How many of your close friends drink alcoholic beverages at least once a week?
___Most of my friends don't drink at all
___None of my friends drink at least once a week
___Some of my friends drink at least once a week
___Most of my friends drink at least once a week
___All of my friends drink at least once a week

Part 5. Tobacco

70. Have you <u>ever</u> tried smoking cigarettes?
___No (Go to #78)
___Yes (Continue)

71. Have you smoked more than two or three times?
___No
___Yes

72. How old were you when you <u>first</u> tried smoking cigarettes?_____

73. How many times during the <u>past 30 days</u> have you smoked cigarettes?
___None (Go to #77)
___1 time
___2-3 times
___1-2 times a week
___3-4 times a week
___5-6 times a week
___Once a day
___Two or three times a day
___More than four times a day

74. Think of all the times when you have smoked during <u>the past 30 days</u>. About how many cigarettes did you smoke during a day?
___1-5 cigarettes a day
___6-10 cigarettes
___11-15 cigarettes
___16-20 cigarettes
___21 or more cigarettes

75. Would you consider yourself:
___An occasional smoker (go to #79)
___A light smoker (Go #76)
___A moderate smoker (Go to #76)
___A heavy smoker(Go to #76)

76. How old were you when you became a light, moderate, or heavy smoker?_____
(Skip to #79)

77. If you have stopped smoking, was it for any of these reasons? (Check all that apply to you.)
___Just didn't feel a need to smoke anymore
___Fear of damage to my body
___Parents disapproved
___Friends disapproved
___Because of something I learned in school
___Other:_____
(Go to #79)

78. If you have <u>never</u> smoked, was it for any of the following reasons? (Check all that apply to you.)
___Just don't feel a need to smoke
___Fear of damage to my body
___Parents disapproved
___Friends disapproved
___Because of something I learned in school
___Other:_____
(Go to #79)

79. Have you ever tried chewing tobacco or smokeless tobacco (such as Skoll)?
    ___No (Go to #85)
    ___Yes

80. How old were you when you first tried smokeless tobacco?_____

81. How many times during the past month (30 days) have you used either chewing or smokeless tobacco? (Check the columns that apply to you for both types of smokeless tobacco.)

	Chewing Tobacco	Smokeless Tobacco
None.....	___	___(Go to #84)
1 time.....	___	___
2-3 times.....	___	___
1-2 times a week...	___	___
3-4 times a week...	___	___
5-6 times a week...	___	___
Once a day.....	___	___
More than once a day.	___	___

82. Would you consider yourself:
    ___An occasional user (Go to #84)
    ___A moderate user (Go to #83)
    ___A light user (Go to #83)
    ___A heavy user (Go to #83)

83. How old were you when you became a light, moderate, or heavy smokeless or chewing tobacco user?_____
    (Skip to Part 6)

84. If you have used smokeless or chewing tobacco but have now stopped, was it for any of these reasons? (Check all that apply to you.)

    ___Just didn't feel a need to use it anymore
    ___Fear of damage to my body
    ___Parents disapproved
    ___Friends disapproved
    ___Other:_____

85. If you have never used smokeless tobacco, was it for any of the following reasons? (Check all that apply to you.)

    ___Just don't feel a need to use it
    ___Friends disapproved
    ___Parents disapproved
    ___Fear of damage to my body
    ___Because of something I learned in school
    ___Other:_____

Please Continue on the Next Page

Part 6

Please answer the following questions, whether you have used drugs or not, concerning some different feelings or experiences that people have. Read each item and check the statement that best describes you. Answer every item.

	Very True of me	Often True of me	Sometimes True of me	Seldom True of me	Not True of me
I would enjoy being a famous person.	—	—	—	—	—
I don't really have fun at parties.	—	—	—	—	—
I often act without thinking.	—	—	—	—	—
I enjoy being alone.	—	—	—	—	—
I am pretty cautious.	—	—	—	—	—
I daydream about doing hard tasks.	—	—	—	—	—
I care what others think about me.	—	—	—	—	—
I do not give up easily on a problem.	—	—	—	—	—
I feel that I have a lot of control over my future.	—	—	—	—	—
I often wish I had more good friends.	—	—	—	—	—
My daydreams often cheer me up when I feel sad.	—	—	—	—	—
I almost never ask for help or advice.	—	—	—	—	—
Being successful is important to me.	—	—	—	—	—
I like to tell others how to do things.	—	—	—	—	—
I try not to take life very seriously.	—	—	—	—	—
When I want something - I want it now - not later.	—	—	—	—	—
I'm afraid I'm not very popular.	—	—	—	—	—
I am not interested in anything unless it is exciting.	—	—	—	—	—
My feelings are easily hurt.	—	—	—	—	—
I sometimes question the reason why I do things.	—	—	—	—	—
Sometimes I take myself too seriously.	—	—	—	—	—
Being successful at what I do is important to me.	—	—	—	—	—
What others think of me is not important to me.	—	—	—	—	—
I like to feel free to come and go as i please	—	—	—	—	—
I am not easily pressured by my friends.	—	—	—	—	—

This is the end of the questionnaire.

Thank you for filling it out.

THE FOLLOWING PAGES WERE TREATED AS
A UNIT IN THE ORIGINAL FILE.

SB 32, ORIGINAL BILL

CS SB 32 (HESS)

SECTIONAL ANALYSIS

FISCAL NOTES

RESOLUTIONS IN SUPPORT OF SB 32

INDEX OF STUDIES, ARTICLES & PUBLICATIONS

SYNOPSIS OF S. HESS COMMITTEE ACTION

EVIDENCE & STUDIES SUPPORTING FINDINGS

STATE OF ALASKA
THE LEGISLATURE

LEGISLATIVE AFFAIRS AGENCY

POUCH Y STATE CAPITOL
JUNEAU, ALASKA 99811
907 465 3800

M E M O R A N D U M April 3, 1987

SUBJECT: Sectional analysis of CSSB 32(HESS), relating to marijuana

TO: Senator Paul Fischer
Chairman, HESS Committee

FROM: Keith B. Levy KBL
Legislative Counsel

You have requested a sectional analysis of CSSB 32(HESS). As a preliminary matter, note that a sectional analysis or summary of a bill should not be considered an authoritative interpretation of the bill and the bill itself is the best statement of its contents. If you would like an interpretation of the bill as it may apply to a particular set of circumstances, please advise.

Section 1 sets out legislative findings related to marijuana, including the finding that the state has a compelling interest in regulating even small amounts of marijuana.

Section 2 amends existing law to make the possession of up to one-half pound of a "schedule VIA controlled substance," i.e., marijuana, a class B misdemeanor (AS 11.71.060(a)).

Section 3 repeals AS 11.71.070, because that section applies to amounts of marijuana that would be covered by AS 11.71.060, as amended by section 2 of the bill.

Under current law, it is already a class B misdemeanor:

(1) to use or display any amount of marijuana in public (AS 11.71.060(a)(1));

(2) to possess any amount of marijuana in a propelled vehicle (AS 11.71.060(a)(2));

(3) for a person under 19 years of age to possess less than four ounces of marijuana (AS 11.71.060(a)(3)); or

(4) for anyone to possess four ounces of marijuana or more anywhere (AS 11.71.060(a)(4)).

It is a class A misdemeanor under current law to manufacture or deliver one-half ounce or more of marijuana (AS 11.71.050(a)(1)) or to possess a half-pound or more of marijuana (AS 11.71.050(a)(3)). It is a class C felony under current law to manufacture or deliver one ounce or more of marijuana (AS 11.71.040(a)(2)) or to possess any amount of marijuana on school grounds if the person is 18 years of age or older (AS 11.71.040(a)(4). And it is a class B felony to deliver any amount of marijuana to a person under 19 years of age if the person is at least three years younger than the person delivering the marijuana. Thus, the use, possession, or sale of marijuana is already a crime under existing law except for the possession of under four ounces of marijuana by an adult in the home. The bill adds this narrow area to the criminal law. As discussed in the memorandum dated October 29, 1986, it is this narrow area of marijuana possession that presents constitutional problems under the ruling of the Alaska Supreme Court in Ravin v. State, 537 P.2d 494 (Alaska 1975).

If I may be of further assistance, please advise.

KBL:mkr
m10/100

STATE OF ALASKA 1987 LEGISLATIVE SESSION
FISCAL NOTE

REQUEST:

Bill Version : Senate Bill 32
Publish Date :

Revision Date:
Title : "An act relating to marijuana"

Agency Affected : Department of Corrections
BRU :

Sponsor : Senator Paul Fischer
Requestor : Senator Paul Fischer

Components :

EXPENDITURES/REVENUES: (Thousands of Dollars)

OPERATING	FY 87	FY 88	FY 89	FY 90	FY 91	FY 92
PERSONAL SERVICES						
TRAVEL						
CONTRACTUAL						
SUPPLIES						
EQUIPMENT						
LAND & STRUCTURES						
GRANTS, CLAIMS						
MISCELLANEOUS						
TOTAL OPERATING	0	0	0	0	0	0
CAPITAL	0	0	0	0	0	0
REVENUE	0	0	0	0	0	0

FUNDING: (Thousands of Dollars)

GENERAL FUND	0	0	0	0	0	0
FEDERAL FUNDS						
OTHER						
TOTAL						

POSITIONS:

FULL-TIME	0	0	0	0	0	0
PART-TIME						
TEMPORARY						

ANALYSIS : (Attach a separate page if necessary)

Prepared by : Susie Riley, Budget Analyst
Phone : 465-3376
Division : Administrative Services
Date : 01/26/87

Approved by Commissioner : William W. Ladwig
Date : 01/26/87
Agency : Department of Corrections

Distribution (by preparer):
- Legislative Finance
- Legislative Sponsor
- Requestor
- Office of Management and Budget
- Impacted Agency(ies)
- Senate Secretary

BILL NO: SB 32 DATE: 1/21/87

TITLE: "An Act relating to marijuana; and providing for an effective date.

CONTACT: Maj. Walter J. Gilmour
Acting Director

The Division of Alaska State Troopers is neutral on this legislation.

Many individuals and groups in Alaska feel that the use of marijuana is harmful to public health and welfare. The purpose of this legislation is to recriminalize the possession of any amount of marijuana.

Presently the state law allows up to four ounces of marijuana for personal use. This is in direct conflict with the existing Federal law. This in effect encourages the violation of Federal law.

The existing conflict of Federal and State law is confusing in the mind of the public. The public expects consistency rather than diversity in the law. Such diversity tends to breed disrespect for the law in general, especially upon the impressionable minds of our youth.

Alaska's lenient attitude toward marijuana in effect creates a legal market for a substance that is illegally grown in other states.

Alaska's legalization of small amounts of marijuana directly contravenes the terms of the Single Narcotics Convention, the international treaty which outlaws marijuana and other controlled substances. The United States is one of numerous countries which are signators to the convention.

Recriminalizing marijuana would not, as some fear, result in wholesale arrest of individuals possessing small amounts of marijuana. The present drug enforcement philosophy of source interdiction recognizes the far greater cost-effectiveness of striking against high-level distributors, and sadly, there is no lack of high-level drug dealers in Alaska to occupy the enforcement efforts of narcotics officers.

William R. Nix
Acting Commissioner

DEPARTMENT OF PUBLIC SAFETY

STATE OF ALASKA 1987 LEGISLATIVE SESSION
FISCAL NOTE

Bill Version: SB 32
Publish Date:

REQUEST
Revision Date:
Title: "An Act relating to marijuana; and providing for an effective date."
Sponsor: Sen. Fischer
Requestor: Senate HESS

Agency Affected: Public Safety
BRU: Alaska State Troopers
Components: Detachments & C.I.B.
Narcotics

EXPENDITURES/REVENUES: (Thousands of Dollars)

	FY 87	FY 88	FY 89	FY 90	FY 91	FY 92
OPERATING						
PERSONAL SERVICES						
TRAVEL						
CONTRACTUAL						
SUPPLIES						
EQUIPMENT						
LAND & STRUCTURES						
GRANTS, CLAIMS						
MISCELLANEOUS						
TOTAL OPERATING	0	0	0	0	0	0
CAPITAL						
REVENUE						

FUNDING: (Thousands of Dollars)

GENERAL FUNDS						
FEDERAL FUNDS						
OTHER						
TOTAL	0	0	0	0	0	0

POSITIONS:

FULL-TIME	0	0	0	0	0	0
PART-TIME						
TEMPORARY						

ANALYSIS: (Attach a separate page if necessary)

No additional enforcement activities are anticipated and thus no fiscal impact is anticipated.

F.C.C.

Prepared by: Francis C. Allan
Division: Alaska State Troopers
Phone: 269-5691
Date: 1/21/87

Approved by Commissioner:
Date: 1/26/87
Agency: Public Safety

Distribution (by preparer):
Legislative Finance
Legislative Sponsor
Requestor
Office of Management and Budget
Impacted Agency(ies)
Senate Secretary

POSITION PAPER/Department of Health & Social Services

POSITION PAPER
SB 32

For an Act entitled: "An Act Relating to Marijuana; providing for an effective date."

The Department of Health and Social Services is neutral regarding this legislation. The department, through the State Office of Drug and Alcohol Abuse, discourages the use of drugs of all kinds, including marijuana, and promotes this position through its support of community education and treatment of individuals who use drugs or alcohol. The criminalization of the use of marijuana by adults will not affect these programs.

The use of marijuana by youth is already a violation of law. These laws are enforced by local law enforcement agencies with the support of the Division of Family and Youth Services through its juvenile intake functions and delinquency programs. Discouraging the use of drugs and alcohol by youth is accomplished, again, through the work of the Division of Family and Youth Services in its direct contact with youth who may be using drugs or alcohol, and through the community education and treatment programs sponsored through the State Office of Drug and Alcohol Abuse.

Myra M. Munson

Myra M. Munson, Commissioner
Department of Health
and Social Services

DATE: March 4, 1987

POSITION PAPER

SB 32

The Alaska Public Defender Agency and the Office of Public Advocacy are totally reactive agencies which provide representation to indigent persons when appointed by the court. These agencies do not make policy nor do they initiate litigation. Only proposed legislation with fiscal or program ramifications for these agencies can be said to have a direct agency impact. Thus, the Public Defender Agency and Office of Public Advocacy submit position papers for legislation which will affect these agencies fiscally or programatically or will require these agencies to litigate constitutional issues raised by the legislation.

Fiscal impact: _____ None See attached fiscal note __X__

Program impact: _____ None See analysis below __X__

Contitutional impact: _____ None See analysis below __X__

This bill recriminalizes the use of marijuana in the home.

This bill appears to be violative of the Alaska Supreme Court's holding in Ravin v. State and will certainly lead to extensive trial and appellate court hearings on the issue of its constitutionality.

Furthermore, in a time of declining revenues, this bill may divert costly law enforcement, prosecution, defense and court resources from more serious cases.

Dana Fabe, Director
Public Defender

Date 3/5/87

Brant McGee, Director
Office of Public Advocacy

Date 3/5/87

Commissioner Garrey Peska
Department of Administration

Date 3/6/87

4/2K1/0305-03/2

STATE OF ALASKA 1987 LEGISLATIVE SESSION
FISCAL NOTE

Bill Version: SB 32
Publish Date:

REQUEST:

Revision Date:
Title: "An Act relating to marijuana..."
Sponsor: Fischer, Faiks
Requestor: Senate Judiciary

Agency Affected: Administration
BRU: Office of Public Advocacy

Components:

EXPENDITURES/REVENUES: (Thousands of Dollars)

OPERATING	FY 87	FY 88	FY 89	FY 90	FY 91	FY 92
PERSONAL SERVICES	-0-	93.4	97.1	101.0	105.0	109.2
TRAVEL		0	0	0	0	0
CONTRACTUAL		60.0	62.4	64.9	67.5	70.2
SUPPLIES		2.0	2.1	2.2	2.3	2.4
EQUIPMENT		9.3	0	0	0	0
LAND & STRUCTURES						
GRANTS, CLAIMS						
MISCELLANEOUS						
TOTAL OPERATING	-0-	164.7	161.6	168.1	174.8	181.8

CAPITAL						

REVENUE						

FUNDING: (Thousands of Dollars)

GENERAL FUND	-0-	164.7	161.6	168.1	174.8	181.8
FEDERAL FUNDS						
OTHER						
TOTAL	-0-	164.7	161.6	168.1	174.8	181.8

POSITIONS:

FULL-TIME		2.0	2.0	2.0	2.0	2.0
PART-TIME						
TEMPORARY						

ANALYSIS: (Attach a separate page if necessary)

Prepared by: Brant McGee, Public Advocate
Phone: 274-1684
Division: Office of Public Advocacy
Date: 2/23/87

Approved by Commissioner: Garrey Peska
Date: 3/6/87
Agency: Department of Administration

Distribution (by preparer):
Legislative Finance
Legislative Sponsor
Requestor
Office of Management and Budget
Impacted Agency(ies)
Senate Secretary

RECEIVED
MAR 09 1987
LEGISLATIVE FINANCE

CONTINUATION of FISCAL NOTE ANALYSIS

For Bill/Resolution No. SB32

This bill will recriminalize the use or possession of marijuana at any location and would result in a significant increase in the number of prosecutions for such offenses.

The Department of Law has requested 2.5 attorney in Anchorage and Fairbanks in order to enforce this statute. The constitutionality of the statute, which appears to directly conflict with the Supreme Court's 1975 holding in Raven v. State, will undoubtedly be tested in extensive trial and appellate court proceedings.

The Office of Public Advocacy requests one new Attorney III position for Anchorage -- where the greatest number of prosecutions is likely to arise -- and $60,000 in contractual funds to pay for representation in other areas and for expert witness fees necessary for trial proceedings.

Personal Services			
Anchorage			
Attorney III Salary & Benefits	=	63,198	63.2
Legal Secretary I Salary & Benefits	=	30,184	30.2
		Subtotal Personal Services	93.4
Contractual			
Contract attorneys in rural areas and expert witnesses	=	60,000	60.0
Supplies			
Stationary & library supplies for two new positions at 1,000 per position	=		2.0
Equipment			
Office furniture & equipment for one professional position at 2,429 and one secretary at 6,838			9.3
		Total:	164.7

Position Title	No. of Positions	Range/Step	Barg. Unit
Attorney III	1	22/A	X

Time Status	Staff Months	Location	Election District
PFT	12	EBA-Anchorage	8

Type of Expenditure		Amount
1	2	3
Salary	49,140	
Benefits	14,058	
Premium Pay		
Other		
Total Personal Services		63,198
Travel		
Contractual		
Commodities		
Equipment		
Other		
Total Cost		63,198

Funding Source for Total Cost		
Federal Receipts	1002	
G. F. Match	1003	
General Fund	1004	63,198
I-A Receipts	1006	
CIP Receipts	1061	
Other		

Justification

The Anchorage OPA office presently has 3 attorney positions devoted to criminal defense. These attorneys are also handling several major cases outside the Anchorage area as staff coverage and travel is more cost effective than contracting major cases to private attorneys in rural areas. Current caseloads indicate that these three attorneys cannot absorb the additional cases which would result from this legislation. It is necessary that an additional attorney be added to the Anchorage staff to cover the resultant increased caseload.

Request For New Position

Agency: Administration

BRU: Office of Public Advocacy

Component:

Revised Date

FY 88

Position Title	No. of Positions	Range/Step	Barg. Unit
Legal Secretary I	1	10/A	G

Time Status	Staff Months	Location	Election District
PFT	12	EBA-Anchorage	8

Type of Expenditure		Amount
1	2	3
Salary	22,020	
Benefits	8,164	
Premium Pay		
Other		
Total Personal Services		30,184
Travel		
Contractual		
Commodities		
Equipment		
Other		
Total Cost		30,184

Funding Source for Total Cost		
Federal Receipts	1002	
G. F. Match	1003	
General Fund	1004	30,184
I-A Receipts	1006	
CIP Receipts	1061	
Other		

Justification

The Anchorage OPA office presently has 3 legal secretary positions providing clerical support to 12 professional positions, 2 vista volunteers, and the VGAL program. The addition of an attorney with a full caseload necessitates the addition of a legal secretary. The present ratio of 4 professionals to each secretary is the maximum that each secretary can handle. The additional workload created by an additional attorney carrying a full caseload cannot be absorbed by the present secretarial staff.

Request For New Position

Agency: Administration

BRU: Office of Public Advocacy

Component:

Revised Date

FY 88

Alaska State Legislature

Senator Paul A. Fischer
Senate District D
Box 784
Soldotna, Alaska 99669
(907) 262-9420 W
262-9269 H

While in Juneau
Pouch V
Juneau, Alaska 99811
(907) 465-3791

State Senate

STUDIES & MATERIALS AVAILABLE IN SENATOR FISCHER'S OFFICE

Study/Article/Publicatio	Date	Author
1) Gateway Drugs	1984	Robert L. DuPont Jr. M.D.
2) Presidential Newsconference Transcripts	Aug, '86	Ronald Reagan
3) Ravin Decision	1975	Judge Rabinowitz
4) Maijuana & Health	1982	New Egland Journal of Medicine
5) Clinical Toxicology of Cannabis	1983	Forest S. Tennant M.D.
6) Clinical Syndrome of Marijuana Dependence	Apr, '86	Forest S. Tennant M.D.
7) Attorney General Opinion State of Pennslyvania	Nov, '86	Roy Zimmerman
8) Legislator's Survey on Recriminalization	Oct, '86	Anchorage Times
9) ACLU Position Paper	Feb, '87	Alaska Chapter ACLU
10) Marijuana Study compliation of 19 different studies	nov, '85	Anchorage Crime Commission
10a) Aircraft Accident Report	Apr, '85	National Transportation Safety Board
b) Marijuana; A Head-master's Perspective	Jun, '80	Various Canadian School Principals
c) A Whole New Ball Game	Mar, '82	Robert Dupont, M.D.
d Death On the Highways	1981	Peggy Mann, from the Saturday Evening Post
e) Health Consequences of Marijuna	Mar, '80	William Pollin, M.D.

Study/Article/Publication	Date	Author
Anchorage Crime Commision Report cont.		
f) Retarding Reproduction	Feb., '83	Dr. Carol Smith An interview
g) Biological Effects of Marijuana	Mar, '84	Connie & Otto Moulton Drug Abuse Newsletter
h) Why I changed My Mind About Marijuna	?	Robert DuPont, M.D. Listen magazine
i) Marijuana Reconsidered	Feb, '84	Helen C. Jones
j) Our Most Dangerous Drug	1980 ?	Dr. Harvey Powelson
k) FDA's Marijuana Recommendations	Jun, '82	Food & Drug Admistration Docket # 82N-0182
l) Cannabis: Adverse Effects on Health	Jan, '80	John B. McDonald Addiction Research Foundatio Toronto, Canada
m) Respiratory Status of 74 Habitual Marijuana Smokers	Nov, '80	Donald Tashkin, M.D. & Bertrand J. Shapiro, M.D.
n) Narcotic Information Bulletin #1-80	1980	Many
o) Marijuana & the Brain	1980+	Robert J. Heath, M.D.
p) Marijuana & Reproduction	1982	Smith & Asch, Ph.D. & M.D. The American Council On Marijuana
q) The Marijuana Controversy	1981	Carlton E. Turner, Ph.D. The American Council On Marijuana
r) Marijuana: The Myth of Harmlessness Goes up in Smoke	?	Peggy Mann, Saturday Evening Post
11) Drug Report	Mar, '85	Ak. Dept of Public Safety
12) 10 Startling Facts About Marijuana & Brain Damage	1983	David Goodman, Ph.D.
13) Marijuana Update	Mar, '87	Donna J. Hymes, R.N.
14) Minutes of Anchorage Municipal Assembly on Marijuana Resolution	Dec.9, '86	Municipal Clerk

Study/Article/Publication	Date	Author
15) Accomplishments of the National Campaign Against Drug Abuse	Sept,'84	The White House
16) Bibliography of Adverse Effects of Marijuana, over 100 articles	Apr, '85	Alaskanet/Dialog Computer Search, File= "Medline"
17) Marijuana & Health, 8th Annual Report to Congress	1980	National Institute on Drug Abuse
18) The Purpose of Pleasure	1983	Robert A. Hawley
19) Marijuana Alert	1985	Peggy Mann
20) Marijuana & Public Health An Analysis of 4 Major	Dec, '82	Sidney Cohen, M.D. Drug Abuse Newsletter
21) Various Marijuana Articles	1980+	Peggy Mann, Saturday Evening Post & Readers Digest
22) Marijuana: A Crude Drug with a Spectrum of Under-appreciated Toxicity	Apr, '84	Richard H. Schwartz
23) PharmAlert - Marijuana Effects on Sperm and Testosterone	1982	University of Maryland School of Pharmacy
24) Levels of Processing and Acute Effects of Marijuana on Memory	1980	Susan M. Bellmore Lorren L. Miller
25) Health Questions about Marijuana	1983	U.S. House Select Committee Narcotics Abuse and Control
26) Mariuana Warnings: New Evidence Against the Soft Drug	Sept, '80	Milan Korcok Canadian Medical Association

27) Miscellaneous Copies of Various Drug Abuse Newsletters and phamplets.

a0R

Alaska State Legislature

SENATOR PAUL FISCHER, Chairman
SENATOR JOE JOSEPHSON, Vice Chairman
SENATOR LLOYD JONES
SENATOR JAY KERTULLA
SENATOR RICK HALFORD

P. O. BOX V
ROOM 508
STATE CAPITOL
(907) 465-3762

Senate Committee on Health, Education and Social Services

Date: April 9, 1987

To: Members Senate Judiciary & Finance Committees

From: Senator Paul Fischer

Subject: Resolutions Supporting SB 32, Recriminalizing Marijuana

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Following please find resolutions of support for SB 32 from:

Anchorage Municipal Assembly
Anchorage Crime Commission
Anchorage Police Department
Kiwanis Club of Anchorage
Anchorage School District
Alaska Association of Chiefs of Police
FBI National Academy Associates
Alaska ASSociations of School Governments
Alaskans for Drug-Free Youth
Cook Inlet Council on Alchol & Drug Abuse
Galena Police Department
Galena City School District
Valdez Rotary Club
City of Valdez
Juneau Police Department
Central Council of Tlingit & Haida Indian Tribes
City & Borough of Sitka
City & Borough of Sitka Police Department
Kenai Peninsula Borough School District
City of Wrangell
Wrangell Police Department
Petersburg General Hospital
City of Ketchikan
Ketchikan Gateway Borough School District
City of Saxman
Boys & Girls Clubs of Alaska

Submitted by: Assemblyman
Brad Bradley

Prepared by: Assemblyman
Brad Bradley

AMENDED AND APPROVED
Date: 12-9-86

For Reading: November 25, 1986

AR No. 86-284

A RESOLUTION OF THE MUNICIPALITY OF ANCHORAGE SUPPORTING REPEAL OF AS 11.71.070 AND AMENDMENT OF AS 11.71.060(a) TO MAKE MARIJUANA ILLEGAL

WHEREAS, Alaska is the only state in the union with a permissive statute for personal possession of marijuana, and

WHEREAS, findings of local, state and federal authorities conclude that marijuana is detrimental to the health, welfare and public safety of all people, and

WHEREAS, the Supreme Courts of other states and the U.S. Supreme Court have upheld state statutes prohibiting the use and possession of marijuana, and

WHEREAS, current Alaska state statutes are not in conformity with federal drug enforcement laws controlling drug abuse, and

WHEREAS, the conflict between federal and state law pertaining to marijuana causes unnecessary barriers for local police and Alaska State Troopers in protecting the public from drug abusers, and

WHEREAS, the Anchorage Crime Commission has for the past three years concluded that Alaska's permissive laws on marijuana should be repealed, and

WHEREAS, representatives of 60 Alaskan high schools at the Alaska Association of School Governments' Annual Fall Conference on October 18 of this year unanimously passed a resolution to repeal the current marijuana law and make the drug in all its forms illegal in Alaska.

NOW THEREFORE, the Anchorage Assembly resolves:

That the Governor of the State of Alaska, the Alaska State Legislature and the Alaska Supreme Court ~~is~~ are petitioned to take immediate steps to repeal / ~~AS 11.71.070 and amend~~ statutory and constitutional protections for the ~~AS 11.71.060(a) to make~~ use and possession of marijuana ~~illegal~~ in order in the State of Alaska/to promote the general health, welfare and public safety of the citizens of Anchorage and the State of Alaska.

PASSED AND APPROVED by the Anchorage Assembly this 9th day of December, 1986.

Chairman

ATTEST:

Municipal Clerk

Anchorage Chamber of Commerce

Crime Commission

February 25, 1987

Representative Terry Martin
Alaska House of Representatives
Pouch V
Juneau, Alaska 99811

Dear Terry:

The Anchorage Crime Commission has endorsed the recriminalization of marijuana as one of its 1987 goals. The Commission enthusiastically supports your previously stated position on this issue.

The Commission's Public Opinion survey, conducted in the Anchorage area, indicated that there was a strong desire by the general public to change the present law.

This correspondence is to reiterate our strong support of this issue and request your continued support and endorsement of HB 55. We believe the passage of this legislation will be beneficial to Alaska and its citizenry.

We further request your support in enlisting other members of the State Legislature to help assure passage of this bill into law.

If the Anchorage Crime Commission can be of further assistance in this matter please contact me.

Thank you for your support.

Sincerely,

Harold C. Heinze

Harold C. Heinze
Chairman

A Committee of the
Anchorage Chamber
of Commerce

415 F Street
Anchorage AK 99501
(907) 272-2401

ANCHORAGE POLICE DEPARTMENT

4501 SOUTH BRAGAW STREET • ANCHORAGE, ALASKA 99507-1599
TELEPHONE (907) 786-8500

TONY KNOWLES
MAYOR

RONALD L. OTTE
CHIEF

March 13, 1987

MAR 18 1987

Senator Paul Fischer
Chairman, H.E.S.S. Committee
Alaska State Legislature
Pouch V (MS 3100)
Juneau, Alaska 99811

Dear Senator Fischer,

The purpose of this letter is to inform you of our support for Senate Bill 32 addressing the recriminalization of marijuana.

We believe that recent research may indicate that marijuana is more of a health hazard than originally thought. We believe that the legislature of the State of Alaska should take a serious look at recriminalization and hold hearings regarding its potential medical effects upon the populace. In addition, we believe that the youth of Alaska receive a mixed signal regarding the appropriateness of drug usage when marijuana is essentially legal in this state. In addition to that, we feel that the populace develops a scoff law attitude when the possession of marijuana is legal, but the purchase of and transportation of is illegal.

We urge that the recriminalization of marijuana be brought from the committee and addressed on the floor of the State Legislature.

If we can be of any further assistance regarding this issue or any other law enforcement related issue that you wish to call upon us for, feel free to do so.

Sincerely,

Del Smith
Deputy Chief of Operations

DS:dl

KIWANIS CLUB OF ANCHORAGE
P.O. BOX 101404
ANCHORAGE, ALASKA 99510

Anchorage Assembly

Whereas, it is a major emphasis of Kiwanis International to enrich the lives of our youth, and

Whereas, the Kiwanis Club Of Anchorage is currently participating in a nationally promoted activity of drug abuse prevention and education through the Just Say No Foundation, and

Whereas, the current laws in Alaska do not consider it a crime to possess certain combinations of controlled substances in certain amounts, which is counterproductive to our efforts in the Just Say No [to drugs] Program,

Now therfore, be it resolved that the Kiwanis Club of Anchorage hereby encourages the Anchorage Municipal Assembly to adopt a resolution in support of changing our statutes to make possession of a controlled substance, other than by prescription, a crime.

Jeff Thon
President

KIWANIS RESOLUTION

ANCHORAGE
SCHOOL DISTRICT
4600 DeBarr Avenue - Anchorage, Alaska
99504
AREA CODE 907-333-9561
2508 Blueberry Phone #276-1992

October 23, 1986

Ms. Alyce Hanley
Representative
1024 E. 6th Ave., Suite 200 A
Anchorage, Ak 99501

Dear Rep. Hanley:

I have enclosed for your information the names of the schools that were in attendance at the Alaska Association of School Governments fall conference held at Dimond High school. The list also contains the name of the student that was designated by their school to serve as the spokes-person on business items.

The students did finish the just say no flag and have made arrangements for the flag to be sent to Juneau and presented to the governor. The students also passed a resolution during their business meeting to support the establishment of Just say No clubs in schools, support for additional Drug Education Programs and unanimous support for repealing the current marijuana statute for the state of Alaska. I have taken the liberty of enclosing a copy of the resolution for you. I think it would be wonderful if you would present this resolution to the house for the students. Likewise, if you could recommend a senator, perhaps Jan Faiks, that would like to do the same in the senate, I would be interested in your recommendation.

Please let me know if it is possible for you to present the resolution on behalf of the students. If I can be of any further assistance to you, please let me know.

Also for your information, the Alaska Association of Secondary School Principals passed a resolution for repeal of the marijuana statute. Larry Graham would be the contact person for information about that resolution.

Thank you for your continued support of students & education.

Sincerely,

Teresa Johnson, Program Administrator

TJ:srv
cc: Dennis Johnson
St. Dir. AASG

ANCHORAGE SCHOOL DISTRICT

Alaska Association Chiefs of Police

625 C Street • Anchorage, Alaska 99501

March 26, 1985

Mr. George N. Nelson
Anchorage Crime Commission
415 F Street
Anchorage, Alaska 99501

Dear Mr. Nelson,

Our Association conducted its annual meeting on March 22, 1985 in Anchorage.

Legislation pending before the Alaska State Legislature was extensively discussed. The Association has identified several pieces of legislation that it feels merit support. Among those bills we will be commenting on to the Governor and individual legislators are four that we understand have been identified as priority legislation by your Commission.

These bills are as follows:

HB 178	Conspiracy
HB 179	Hearsay
HB 205	Juvenile Waiver
SB ~~163~~ 32	Recriminalization of Marijuana

As stated previously, these bills were thoroughly discussed by the Association membership. The consensus was a directive to relay our strong support for passage of the legislation.

I understand that members of your Commission will be going to Juneau shortly to meet with legislators. Please feel free to make those legislators aware of our support for your legislative priorities.

If we can be of any additional assistance please do not hesitate to contact us.

Sincerely,

Del Smith

Del Smith
Secretary-Treasurer, ACOP

FBI National Academy Associates
Alaska Chapter

FEB 12 1987

February 9, 1987

Representative Terry Martin
Alaska State Legislature
P.O. Box V, State Capitol
Juneau, AK 99811

Dear Terry:

I received your letter of February 5, 1987, concerning the teleconference hearing on Senator Paul Fischer's bill to recriminalize marijuana and to be held on February 18, 1987.

Unfortunately, I will be out of the state, attending an Energy Security Conference and will be unable to personally testify. I have been very interested in this particular subject for a number of years and, as you are aware, I served as Vice Chairman of the Anchorage Crime Commission in 1984-85. This subject was one of our priorities then and it is still a current priority of the present Crime Commission members.

In 1985, we prepared an extensive review of information developed since 1976, when the existing law was passed. I was rather taken back that the Director of the State Office of Drug and Alcohol Abuse stated that there had been no new scientific information gathered since 1976 which would support the changing of the law. Obviously, this particular individual has not done the research that I have and I'm confident that there is substantial scientific evidence to support the health problem created by the use of marijuana.

One of the major arguments used to state that the law should remain the same is the amount of manpower and commitment that would be necessary in order to enforce any changes in the law. In my opinion, this is not an issue--the issue is the health problem created by the continuous use of marijuana and, equally important if not more so, the illusion it gives to our young people that marijuana in Alaska is legal and, therefore, its usage must not be harmful.

FBINA
1986 Officers
Executive Board

Pat Wellington, 75th, President

President
1835 South Bragaw Street, MS 540 S
Anchorage, Alaska 99512

Secretary
PO Box 53
Willow, Alaska 99688
(907) 495-6413

Dean Bivins, 90th, Vice President, South Central
Dale Florian, 98th, Vice President, Northern
Ben Neff, 94th, Vice President, Southeast
Turk Mayfield, 84th, Secretary-Treasurer



Alaska Association of School Governments

RESOLUTION: ALASKA ASSOCIATION OF SCHOOL GOVERNMENTS
FALL CONFERENCE
DIMOND HIGH SCHOOL
October 18, 1986

Whereas the student leaders of Alaska recognize that there is a severe Drug and Alcohol problem in Alaska,

Whereas the student leaders of Alaska recognize this problem exists in the Alaskan elementary, junior and senior high schools,

Whereas the students believe it is necessary for them to take a united stand against Drugs and Alcohol,

Therefore, be it resolved that the students representing the Alaska Association of School Governments (AASG), endorse the nationally known "Just Say No" Drug Prevention Program

Be it further resolved the AASG students will present a flag to Governor Sheffield to be flown over the capitol building that states: "Alaska Students/Just Say No" and

Be it further resolved the AASG students request the Governor and the Alaska Legislature to repeal the current marijuana law and make marijuana illegal in this state.

Resolution passed unanimously by 60 alaskan high schools in attendance at the AASG fall conference.

ALASKA ASSOCIATION OF STUDENT GOVTS.



Alaskans for Drug-Free Youth

7765 Glacier Highway
Juneau, AK. 99801

February 18, 1987

Dear Members of the Juneau Board of Education:

Alaska is the only state in the U.S.A. that allows a person to possess 4 ounces of marijuana. At the time the Alaska law was changed to allow this, marijuana was not considered harmful. Since then research has shown that it has many adverse effects. These effects are very detrimental to youth and their development and growth.

Some of the effects that are now known are:

1. Marijuana affects sexual development, fertility and sexual functioning.
2. Marijuana affects the immune system, causing increased susceptibility to infection.
3. It impairs memory, concentration, coordination and results in symptoms called amotivational syndrome.
4. It is psychologically addicting as well as physically addicting, builds tolerance and results in the need to continue to use.

We are very concerned about the social acceptability of marijuana and its prevalent use in Alaska by adults and school age children. We ask that you pass the following resolution urging our public officials to make the possession of any amount of marijuana illegal - by all appropriate and lawful means.

Thank you most sincerely,

Bobi Lani, Chairperson
Safe Streets / Parents Against Drugs

Marijuana Resolution

Whereas- We, the citizens of the state of Alaska are concerned about the prevalent use and abuse of the drug Marijuana.

Whereas- Adults may now possess 4 oz. of Marijuana for their own personal use in their home, even though in these homes may reside children.

Whereas- Research has demonstrated that Marijuana usage is occuring more frequently in earlier age groups.

Whereas- Marijuana has been found to be harmful both mentally and physically, to be addictive, to build tolerance and may be 10 times more potent than 10 years ago, significantly increasing health risks.

Whereas- Marijuana has been found to impair motor skills, making it dangerous to operate any mechanical equipment.

Whereas Marijuana remains in the body up to 30 days, being stored in the body's fat cells.

Whereas- Marijuana is considered a "gateway drug" the use of it introduces the "high" experience and may lead to users seeking stronger drugs.

Whereas- The state of Alaska statutes pertaining to Marijuana are not in conformity with National and International laws.

Whereas- The Supreme Court of Alaska has stated that "no one has the right to do things in their own home which will affect others adversely." *

Whereas- The Supreme Court of Alaska further stated "when there is a substantial doubt as to the safety of a substance or situation of Public Health, controls to obviate the danger will usually be upheld." *

Therefore be it resolved that We the citizens of Alaska respectfully urge our public officials in the State Goverment including the legislature to make the possession of any amount of Marijuana illegal- by all appropriate and lawful means.

* Reference- Ravin Case 1975

Cook Inlet Council On Alcohol And Drug Abuse

"A PRIVATE NON-PROFIT CORPORATION"

MAIN OFFICE
255 Willow Street, Rm. 203
KENAI PROFESSIONAL BUILDING

P.O. Box 882
Kenai, Alaska 99611

PHONE:
283-3658

LAKE STREET CENTER
P.O. Box 2362
Homer, Alaska 99603

PHONE:
235-8001

MAR 24 1987

A RESOLUTION OF THE COOK INLET COUNCIL ON ALCOHOL AND DRUG ABUSE OF KENAI, ALASKA, URGING THE ALASKA LEGISLATURE TO REPEAL LAWS ALLOWING FOR THE PERSONAL POSSESSION AND USE OF MARIJUANA.

WHEREAS, the Cook Inlet Council on Alcohol and Drug Abuse is committed to the education, the prevention and treatment of drug abuse: and

WHEREAS, we believe countless lives are distorted through the availability and use of drugs, most particularly the lives of our young people; and

WHEREAS, socially responsible states are recognizing the need for limited access to dangerous drugs; and

WHEREAS, Federal law mandates criminal penalties for possession and use of marijuana; and

WHEREAS, current Alaska statutes threaten the State of Alaska's eligibility for federal funds for control of narcotics:

BE IT THEREFORE RESOLVED that laws shall be enacted in the State of Alaska to establish criminal penalties for the use and possession of marijuana.

DATED at Kenai, Alaska, this sixteenth day of March, 1987.

COOK INLET COUNCIL ON ALCOHOL
AND DRUG ABUSE

Roger Seibert

Roger Seibert, President
Board of Directors

ATTEST:

Kay Mayes

Kay Mayes, Secretary
Board of Directors

Galena Police Department
P.O. Box 208 • Galena, Alaska 99741 • Telephone (907) 656-1303

February 24, 1987

The Honorable Terry Martin
Hess Committee
Pouch V
Juneau, Alaska 99811

Re: Recriminalization of Marijuana, Senate Bill 32

Dear Mr. Martin:

I am writing this letter to formally advise you that this Department thoroughly supports the above-captioned Senate bill pertaining to the recriminalization of marijuana; and to also solicit your support of the same, for the following reasons:

First, let me begin by stating that proper drug abuse education is probably one of our most effective overall means of combating the abuse of controlled substances. Our Youth and others are being taught that marijuana is a controlled substance which can produce harmful effects. To confuse this issue, the State of Alaska, first defines marijuana as a controlled substance, pursuant to Title 11 of the Alaska Statutes (Criminal Code); and then, within the same breath of the law, condones the possession of up to four (4) ounces of marijuana by a person within their own residence for their own consumption. How are our youth and others suppose to respond to what they are being taught, when they see others using marijuana in what is supposedly a lawful manner. This is not only contradictive, but also counterproductive.

Secondly, Law Enforcement has a difficult enough job attempting to deal with controlled substance abuse which involves those drugs that are strictly illicit. To interject a decriminalization law into the Controlled Substance Act, only serves to make their work that much more difficult and confusing. After attempting to deal with the same, certain Law Enforcement factions may begin to develop a disinterested attitude toward the enforcement of marijuana abuse, thinking if the State of Alaska doesn't care, why should we. Additionally, State Prosecutors are justifiably less than enthusiastic about prosecuting cases involving marijuana.

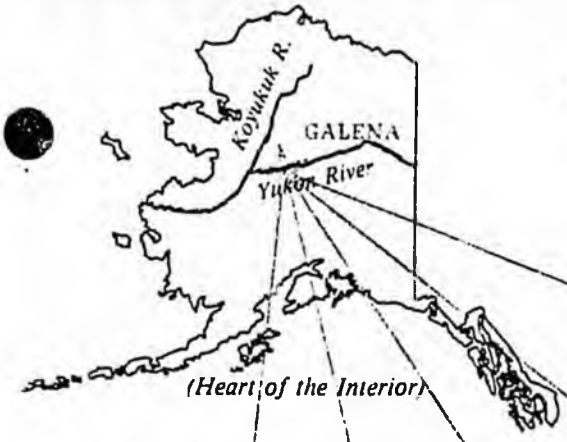
Finally, the State of Alaska has been receiving nationwide recognition through television talk shows where marijuana is the topic of discussion. On one such show, a guest emphasized several times that marijuana has been "LEGALIZED" in Alaska. The word: DECRIMINALIZATION" was never mentioned. That little advertisement should give our tourist industry quite a boost.

In closing, this Department will appreciate any effort you may put forth in guiding Senate Bill 32 out of committee and to the floor of both the Senate and House for a vote.

Respectfully Submitted,

Robert A. Harrington
Chief of Police

san/RAH



GALENA CITY SCHOOL DISTRICT

GALENA, ALASKA 99741
PHONE (907) 656-1205

SUPERINTENDENT'S
OFFICE

January 7, 1987

Representative Terry Martin
P.O. Box V
Mail Stop 3100
Juneau, Alaska 99811

Dear Representative Martin:

The Board of Education for the Galena City School District is appalled at the free uncontrolled flowing use of controlled drugs including marijuana.

We are aware of the detrimental effect that drugs have on the education of students who use drugs and that schools are held accountable for the learning that should take place Therefore, it is very important that those negative effects on learning be eliminated.

One of the big reasons that larger and larger numbers of students are failing in school is the use of drugs and marijuana.

Our School Board strongly encourages you to support stricter laws on possession, sale and use. Further, we would ask for your support laws that will facilitate the arrest and conviction of dealers.

We appreciate your positive attitude and support.

Sincerely,

Carole C. Huntington

Carole C. Huntington, President
Board of Education

CCH/elb
069/87

cc: School Board Members
Galena City School District

GALENA SCHOOL DIST

ROTARY CLUB

MAR 9 1987

February 26, 1987

Senator Paul Fisher
Pouch V (Mail Stop 3100)
Juneau, AK 99811

Dear Senator Fisher:

The Rotary Club of Valdez supports the City of Valdez Resolution No.8711 which urges the repeal of laws allowing for the personal use of marijuana.

Sincerely,

Patrick M. Shely
President
P.O. Box 307
Valdez, AK 99686

CITY OF VALDEZ, ALAKSA

RESOLUTION NO. 8711

A RESOLUTION OF THE CITY OF VALDEZ URGING THE ALASKA LEGISLATURE TO REPEAL LAWS ALLOWING FOR THE PERSONAL USE OF MARIJUANA.

WHEREAS, the State of Alaska is eligible for certain Federal grants for control of narcotics; and

WHEREAS, the dangerous and grievous use of unlawful narcotics threatens the lives and well-being of many citizens of Alaska, especially, our young people; and

WHEREAS, the Alaska State Statutes allow for personal possession and use of amounts of contraband and dangerous substances that would otherwise be illegal under Federal and State laws; and

WHEREAS, these peculiar provisions of State law threaten the State of Alaska's eligibility for Federal funds for control of narcotics; and

WHEREAS, these provisions serve no useful purpose in a society that is outraged at the suffering and expense caused by drug abuse; and

WHEREAS, the right to privacy in the home in Alaska is a constitutional protection and that right can be protected by allowing the exception to be a lawfully obtained search warrant,

NOW, THEREFORE, BE IT RESOLVED that the Valdez City Council urges the Legislature of the State of Alaska to repeal those sections of the Alaska Statutes which allow personal possession and use of marijuana and support the recriminalization of marijuana.

PASSED AND APPROVED BY THE COUNCIL OF THE CITY OF VALDEZ, ALASKA this 17th day of February, 1987.

CITY OF VALDEZ, ALASKA

BY: John Devens
John Devens, Mayor

ATTEST:

BY: John Thorp
John Thorp
Acting City Manager

BILL NO: HB 55
TITLE: "An Act relating to marijuana; and providing for an effective date"
DATE: 3/4/87

The Juneau Police Department is supportive of this legislation.

The purpose of HB 55 is to recriminalize the possession of any amount of marijuana. By achieving this end a number of purposes will be served.

Increasingly it has been shown that the long term consumption of marijuana poses a health hazard of serious consequence. A number of medical studies substantiate this fact. It is necessary to reflect that the possession of any amount of marijuana will not be tolerated so as to reinforce the concept that health hazards do exist when marijuana is used. Marijuana has been targeted as the single best predicator of other future illegal drug use.

The present conflict that exists between current state and federal law tends to create confusion in the mind of the public. This conflict creates apathy on the part of the public and flies in the face of the need for consistency in the law. Disregard and apathy are most readily apparent in the minds of the young people of the community. This conflict also creates impediments in the discharge of local police responsibilities in addressing the problem of drug traffickers.

The relaxed attitude toward marijuana in Alaska creates in the minds of people that this is a state that condones this and other types of drug usage. It creates a marked placed for a substance that is legal here but illegal in all other states.

The recriminalization of marijuana would not, as some sources are concerned, create a large scale impact on the criminal justice system. The primary focus is and will continue to be on interception, interdiction and prosecution of drug sources. This is a demonstrated philosophy that provides cost effective results for resources expended.

Michael S. Gelston
Chief of Police
Juneau Police Department

MSG/ps6

CENTRAL COUNCIL
tlingit and haida indian tribes of alaska
320 West Willoughby Avenue • Suite 300
Juneau, Alaska 99801

February 23, 1987

Senator Paul Fisher
Chairman, Hess Committee
Pouch V - M/S 3100
Juneau, Alaska 99811

FEB 24 1987

Dear Senator Fisher:

I am writing this letter in support of Senate Bill Number 32 on the recriminalization of marijuana.

I believe this Bill will help stop some of the hypocricy involved around the issues of substance/controlled substance use, whether it be in or out of a person's residence.

With all the problems our society suffers with the legal and socially accepted use of alcohol I cannot in any way accept or support the use of any other mind altering substance. Your support for passage of Senate Bill 32 is needed and will be greatly appreciated.

If there is anything I can personally do to assist the Hess Committee on this matter please do not hesitate to contact me.

Sincerely,

Brent C. Moody
Village Public Safety Officer
Program Coordinator

cc: Evelyn E. Myers, Executive Director
Representative Terry Martin

BCM:wb

TELEPHONE: 907/ 586-1432

City and Borough of Sitka

304 LAKE STREET. SITKA, ALASKA. 99835

March 26, 1987

Senator Paul Fischer, Chairman
Health, Education, & Social Services Comm.
Box V
Juneau, Alaska 99811

Dear Senator Fischer:

Enclosed is our Resolution No. 87-341 which urges the enactment of Senate Bill 32. Thank you for considering our comments on this very important legislation.

Sincerely yours,

Richard Anderson
Administrator

enclosure

cc: Senator Lloyd Jones/encl.

C I T Y A N D B O R O U G H O F S I T K A

RESOLUTION NO. 87-341

A RESOLUTION OF THE ASSEMBLY OF THE
CITY AND BOROUGH OF SITKA
URGING THE ALASKA LEGISLATURE
TO ENACT SENATE BILL 32

WHEREAS, the use of marijuana is damaging to the human mind and body; and

WHEREAS, marijuana represents a special danger to our children, our most important asset; and

WHEREAS, our society needs to express its abhorrence for the possession and use of this drug; and

WHEREAS, our authorities need the means to combat the possession and use of marijuana,

NOW, THEREFORE, BE IT RESOLVED by the Assembly of the City and Borough of Sitka that the Legislature of the State of Alaska is urged to enact Senate Bill 32.

PASSED, APPROVED, AND ADOPTED by the Assembly of the City and Borough of Sitka, Alaska this 24th day of MARCH, 1987.

Dan Keck, Mayor

A T T E S T:

Dolores Ingwersen,
Municipal Clerk

KENAI PENINSULA BOROUGH SCHOOL DISTRICT

RESOLUTION 86-87-9

WHEREAS, the physiological, psychological and sociological effects of marijuana use are well documented; and

WHEREAS, the use of this substance by some elements of the school age population continues to be a disruptive force; and

WHEREAS, current state statute permits possession of marijuana for private use which makes this substance more accessible to the school age population;

NOW THEREFORE BE IT RESOLVED, that the Kenai Peninsula Borough School District Board of Education supports the recriminalization of marijuana and the provisions for enforcement as set forth in Senate Bill 32.

ADOPTED THIS 16th DAY OF MARCH, 1987.

Debra Mullins

Debra Mullins, President
Kenai Peninsula Borough School Dist.
Board of Education

ATTEST:

Penny L. Little

Penny Little
Notary Public

CITY of WRANGELL, ALASKA

INCORPORATED JUNE 15, 1903

BOX 531, 99929 (907) 874-2381

ADOPTED AUGUST 1972

February 11, 1987

The Honorable Steve Cowper
Governor of Alaska
Pouch A
Juneau, Alaska 99801

Dear Governor Cowper:

Attached hereto is a copy of the City of Wrangell Resolution No. 02-87-263 urging the Alaska Legislature to criminalize the act of possession of marijuana in any amount.

The Wrangell City Council respectfully request your support in this matter.

Sincerely,

Joyce Rasler
City Manager

Attachment:

cc: Representative Taylor
Representative Sund
Senator Jones

CITY OF WRANGELL, ALASKA

RESOLUTION NO. 02-87-263

A RESOLUTION OF THE COUNCIL OF THE CITY OF WRANGELL, ALASKA, URGING THE ALASKA LEGISLATURE TO CRIMINALIZE THE ACT OF POSSESSION OF MARIJUANA IN ANY AMOUNT.

WHEREAS, THC is the ingredient in marijuana that goes into the fatty tissues of the brain and other internal organs and takes thirty days to be eliminated from the body; and

WHEREAS, THC is reported to cause effects to a person that may result in the birth of deformed or undersized offspring; and

WHEREAS, the THC content of a marijuana cigarette is as high as ten percent today as compared to one percent ten years ago; and

WHEREAS, numerous psychological and physical reactions result from the use of marijuana which impair the health and well being of the public; and

WHEREAS, Alaska's law which allows the possession of certain amounts of marijuana is contrary to the Federal Government's laws and the "war on drugs" being waged across the nation by Cities and States.

NOW, THEREFORE BE IT RESOLVED BY THE COUNCIL OF THE CITY OF WRANGELL, ALASKA, that the Alaska Legislature is urged to amend the law to criminalize the act of possession of marijuana in any amount in the best interests of the public, except as authorized in AS 17.30l. Be it further resolved that copies of this Resolution be forwarded to Governor Steve Cowper, Senator Lloyd Jones, Representative Robin Taylor and Representative John Sund.

PASSED AND APPROVED February 10, 1987

MAYOR

ATTEST: Kenneth Anderson
CITY CLERK

WRANGELL POLICE DEPARTMENT

CITY OF WRANGELL, ALASKA
POST OFFICE BOX 531 • WRANGELL, ALASKA 99929
(907) 874-3304

WILLIAM G KLEIN
CHIEF OF POLICE
106TH SESSION

March 4, 1987

MAR 5 1987

Senator Paul Fisher
Hess Committee Chairman
P.O. Box V
Juneau, Alaska 99811 (Mail Stop 3100)

Dear Senator Fisher:

On behalf of this department and the concerned members of this community, I sincerely urge that all possible efforts and support be afforded to Senate Bill 32, Recriminalization of Marijuana, in order that said bill be brought to the floor of the Senate and House for a vote.

As an Alaska law enforcement officer for the past 21 years I can state without reservation that one of the greatest errors consumated by a legislative body was the decriminalization of marijuana. Not only is it in violation of Federal Law, its usage among the youth of this state has escalated like a malignant growth.

In all frankness, I must state that the time is long overdue for positive action on behalf of our elected officials to combat and control this statewide problem. Give law enforcement in the State of Alaska the weapons, in the form of realistic and effective laws, and we will do our part.

Respectfully submitted,

William G. Klein
Chief of Police

WGK:rrk

cc: Representative Terry Martin
Senator Lloyd Jones
Representative Robin Taylor
Representative John Sund

PETERSBURG GENERAL HOSPITAL
and Long Term Care Facility
Phone: (907) 772-4291
P.O. Box 589
Petersburg, Alaska 99833

MAR 1 1 1987

March 5, 1987

Representative John Sund
Representative Robin Taylor
Senator Lloyd Jones
State of Alaska
Pouch V
Juneau, Alaska 99811

Gentlemen:

I appreciated the opportunity of sharing dinner with you and your spouses and talking about various legislative matters.

However, I did not feel inclined that evening to fully express myself on SB 32 "Recriminalization of Marijuana" but wish to do so at this time.

To me, this issue goes beyond right to privacy vs. harm to society. I look at it as a health issue also. For this reason I support Senate Bill #32. I listened to two hours of testimony on the matter on February 25, 1987.

I add some points that were not made in those hearings. First, people do have a right to privacy in their own homes, to a point. However, we cannot do certain things there such as child abuse or assault of our spouse or criminal acts such as murder, rape, incest, and other moral crimes without being arrested. I put marijuana in that category.

Second, I have a hard time seeing marijuana allowed in Alaska if there are federal laws on the books making it a violation to possess marijuana in any form in the United States. Along with this, how can an Alaskan citizen have marijuana in their homes without first breaking a State law in getting it into the home and that includes seeds to grow the plants? Marijuana in any form has to first pass thru the streets, highways, or airways of the State, which is against the law.

Third, you might want to talk to some newborn care nurses in hospitals such as Ketchikan or Juneau who will tell you that babies whose mothers have been smoking marijuana are more restless, cry more, and have drug withdrawal symptoms to varying degrees. On the other hand, they will testify that any mother who does not drink alcohol, smoke cigarettes, do drugs, or smoke marijuana have the most healthy and best behaved babies.

I believe these innocent newborns have a God-given right to start life without being in subjection to problems created by their mother's marijuana habits.

I will not repeat the many comments made in the hearings but I did hear a majority of testimony in favor of SB #32. I also believe that the majority of citizens in Petersburg and Alaska support SB #32. You will receive or the Hess Committee will receive a petition from people in Petersburg who support SB #32. Therefore, I solicit your vote in favor of SB #32 when it reaches the floor of the legislature.

Sincerely,

Gary W. Grandy

Gary W. Grandy
Administrator

cc: Hess Committee - Recriminilization of Marijuana
Ben Grussendorf, Senator
Ed Malewski - Sitka Community Hospital
Frank Sutton - Mt. Edgecume Hospital

Incidentally, I have just learned that Senator Ben Grussendorf may attempt to retain SB #32 in Committee. Bluntly, that stinks and I resent any important legislation being retained in Committee. Politically, those actions can hurt legislators as the majority of people in a democratic society want those issues debated and voted upon.

CITY OF KETCHIKAN

RESOLUTION NO. 87-1498

A RESOLUTION OF THE CITY OF KETCHIKAN, ALASKA, SUPPORTING REPEAL OF A.S. 11.71.070 AND AMENDMENT OF A.S. 11.71.060(a) TO MAKE MARIJUANA ILLEGAL AND ESTABLISHING AN EFFECTIVE DATE

WHEREAS, Alaska is the only state in the union with a permissive statute for personal possession of marijuana, and

WHEREAS, findings of local, state and federal authorities conclude that marijuana is detrimental to the health, welfare and public safety of all people and of all ages, and

WHEREAS, the Supreme Courts of other states and the U.S. Supreme Court have upheld state statutes prohibiting the use and possession of marijuana, and

WHEREAS, current Alaska state statutes are not in conformity with federal drug enforcement laws controlling drug abuse, and

WHEREAS, the conflict between federal and state law pertaining to marijuana causes unnecessary barriers for local police and Alaska State Troopers in protecting the public from drug abusers, and

WHEREAS, Ketchikan Youth Services, Families in Action and other concerned local citizens have expressed concern over the drug abuse problem in the community, and

WHEREAS, representatives of sixty (60) Alaskan high schools at the Alaska Association of School Governments' Annual Fall Conference held on October 18, 1986, unanimously passed a resolution to repeal the current marijuana law and make the drug in all its forms illegal in Alaska.

NOW, THEREFORE, BE IT RESOLVED BY THE COUNCIL OF THE CITY OF KETCHIKAN, ALASKA as follows:

Section 1. The City Council of the City of Ketchikan, Alaska hereby petitions the Governor of the State of Alaska, the Alaska State Legislature and the Alaska Supreme Court to take immediate steps to repeal statutory and constitutional protections for use and possession of marijuana in the State of Alaska in order to promote the general health, welfare and public safety of the citizens of Ketchikan and the State of Alaska.

Section 2. The City Clerk is hereby directed to send copies of this resolution to Governor Cowper, Senator Jones, Representative Taylor, Representative Sund, the Attorney General and the Alaska Municipal League.

Section 3. This resolution shall become effective immediately upon passage.

PASSED AND APPROVED this_____day of_____, 1987.

_____
Ted Ferry, Mayor

ATTEST:

_____
Karen Miles, CMC
City Clerk

KETCHIKAN GATEWAY BOROUGH SCHOOL DISTRICT

Darroll Hargraves
SUPERINTENDENT

Resolution No. 210
Ketchikan Gateway Borough School District

A REQUEST FOR CHANGING THE
STATE STATUTES TO MAKE THE POSSESSION AND USE OF
MARIJUANA ILLEGAL

WHEREAS, the State of Alaska allows legal private possession and use of marijuana,

WHEREAS, Alaska's present statutes regarding possession and use of marijuana appear to be in conflict with the laws of the United States, and

WHEREAS, the problem of drug and alcohol abuse in our schools and our society appears to be on the rise, and

WHEREAS, the President of the United States initiated a national crusade to counter the current drug problem, and

WHEREAS, many students find easy access to illegal drugs, particularly marijuana, and

WHEREAS, Alaska statutes present a mixed message by currently allowing the use and possession of marijuana in the home, and

WHEREAS, current research and medical opinion concerning marijuana indicates that marijuana is harmful and does present a serious health problem, and

WHEREAS, the utilization of marijuana possession in Alaska sends the message to outside suppliers that Alaska is an open state which condones the "personal use" of marijuana, and

WHEREAS, a show of community resolve against the legal possession and use of marijuana sends a message to the state legislature and the governor's office,

POUCH Z • KETCHIKAN, ALASKA 99901-5026 • (907) 225-2118

KETCHIKAN SCHOOL DIST.

THEREFORE BE IT RESOLVED by the Ketchikan Gateway Borough School District that:

1. The School District encourages and supports the reinactment of statutes which will recriminalize the possession of marijuana.

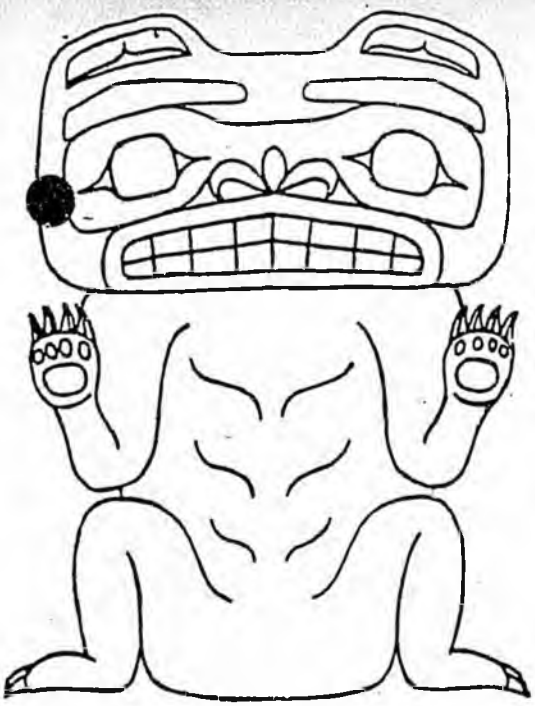
2. The School District makes this position one of public record so that all in the community, in other school districts, and across the state will understand our position that the present statutes in Alaska governing marijuana are not in the best interest of its citizens.

3. The School District requests our legislators, locally and across the state, to give the recriminalization of marijuana immediate attention during the 1st session of the 15th legislature so that effective July 1, 1987 the possession and use of marijuana will be illegal and carry consequences.

PASSED, APPROVED, AND ADOPTED BY THE BOARD OF EDUCATION OF THE KETCHIKAN GATEWAY BOROUGH SCHOOL DISTRICT OF KETCHIKAN, ALASKA THIS _____ DAY OF _____, 1987.

_____
President of the Board

_____
Clerk-Treasurer of the Board







City of Saxman

Rt. 2, Box 1
Saxman, Alaska 99901
907-225-4166

CITY OF SAXMAN

RESOLUTION NO. 87-01-030

A RESOLUTION OF THE CITY OF SAXMAN, ALASKA, SUPPORTING REPEAL OF A.S. 11.71.070 AND AMENDMENT OF A.S. 11.71.060(a) TO MAKE MARIJUANA ILLEGAL AND ESTABLISHING AN EFFECTIVE DATE.

WHEREAS, Alaska is the only state in the union with a permissive statute for personal possession of marijuana; and

WHEREAS, findings of local, state and federal authorities conclude that marijuana is detrimental to the health, welfare and public safety of all people and of all ages; and

WHEREAS, the Supreme Courts of other states and the U.S. Supreme Court have upheld state statutes prohibiting the use and possession of marijuana; and

WHEREAS, current Alaska state statutes are not in conformity with federal drug enforcement laws controlling drug abuse; and

WHEREAS, the conflict between federal and state law pertaining to marijuana causes unnecessary barriers for local police and Alaska State Troopers in protecting the public from drug abusers; and

WHEREAS, Ketchikan Youth Service, Families in Action and other concerned local citizens have expressed concern over the drug abuse problem in the community; and

WHEREAS, representatives of sixty (60) Alaska high schools at the Alaska Association of School Governments' Annual Fall Conference held on October 18, 1986, unanimously passed a resolution to repeal the current marijuana law and make the drug in all its forms illegal in Alaska.

BOYS & GIRLS CLUBS
OF ALASKA

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2300 W. 36th Avenue
Anchorage, Alaska 99517
(907) 248-0088

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Alaska Heritage Club
Standard Alaska Production Co.
Anchorage Daily News

Executive Director
Richard L. Hanlin

*Past Presidents

March 27, 1987

Representative Terry Martin
P.O. Box V
Juneau, AK 99811

Dear Terry:

On behalf of Boys & Girls Clubs of Alaska and its Board of Directors, I urge your continued support for House Bill ~~85~~ 55. As you are aware, substance abuse among Alaska's young continues to prevail in alarming numbers. The recriminalization of marijuana is an important step the State must take to bring those numbers down.

Boys & Girls Clubs have addressed the drug and alcohol problem with today's youth and are developing programs aimed at education and service of needs related to substance abuse. The State of Alaska's recriminalization of marijuana will not only boost our efforts, but also the work of many other agencies, schools and private businesses throughout Alaska. Your participation is appreciated.

Sincerely,

David Choquette PM.

David Choquette
Board Member

cc: David G. Kolesky, President

Alaska State Legislature

SENATOR PAUL FISCHER, Chairman
SENATOR JOE JOSEPHSON, Vice Chairman
SENATOR LLOYD JONES
SENATOR JAY KERTULLA
SENATOR RICK HALFORD

P. O. BOX V
ROOM 508
STATE CAPITOL
(907) 465-3762

Senate Committee on Health, Education and Social Services

April 9, 1987

To: Senator Jay Kerttula, Chairman &
Members of Senate Judiciary Committee

From: Senator Paul Fischer

Subject: SB 32, Recriminalizing Marijuana

The Senate Health Education and Social Services Committee has held extensive hearings on the marijuana issue. The Committee held 4 public hearings including 2 statewide teleconferences. A total of 85 people testified of which 50 testified for recriminalization and 29 against. Six people gave us their undecided philosophical reflections. The written testimony and POMs have been overwhelming in favor of recriminalization.

Throughout the course of our hearings, it became apparent that the first section of the bill, "Legislative Findings", was going to be the emphasis and heart of the bill. We must draft a law that is capable of persuading the Courts that the detrimental effects of marijuana override the Constitutional questions to the right to privacy laid out in the Ravin decision. We do not have a right to privacy with respect to cocaine, LSD, or heroin for obvious reasons. The Senate HESS Committee found, that some of these same reasons now apply to marijuana based upon new scientific evidence that was not previously available during the Ravin decision. The conclusions of this new evidence is listed in the first section of the bill entitled "Legislative Findings". Further information substantiating these findings can be found in an accompanying memo and reference materials in my office.

The CS offered by the Senate HESS Committee incorporates these new findings in a convincing and compelling format that will both aid in the bill's passage and State's defense in court if the new law should be challenged.

Attached please find the minutes of our Committee hearings.

STATE OF ALASKA
THE LEGISLATURE

POUCH Y · STATE CAPITOL
JUNEAU, ALASKA 99811
907-465-3100

LEGISLATIVE AFFAIRS AGENCY

LEGISLATIVE REFERENCE LIBRARY

Copies of minutes listed below were originally included in this file. The minutes are available on the STAIRS database CMPR. In order to save space copies of minutes have not been left in the files.

Mary Van Nimwegen

S. HESS Feb. 18, 1987 7:10 pm
S. HESS Feb. 25, 1987. 7:07 pm
S HESS Feb. 27, 1987 3:30pm

mentioned IN previous S. Hess committee minutes Feb. 1987

LIST OF DOCUMENTS

1. Institute of Medicine, Division of Health Sciences Policy. Marijuana and Health. 1982.

2. State Troopers and Public Health Department. Annual Drug Report to the Alaska Legislature. 1984.

3. Anchorage Crime Commission. Marijuana Study. 1985.

Harold Heinze, Chairman of the Anchorage Crime Commission. Letter dated 2/25/87.

4. Robert A. Harrington, Chief of Galena Police Department. Letter dated 2/24/87.

Brent C. Moody, Village Public Safety Officer. Letter to Senator Paul Fischer.

Central Council, Tlingit and Haida Indian Tribes of Alaska. Letter dated 2/23/87.

D. A. Anslinger, III, Chief of Ketchikan Police Department. Letter dated 2/24/87.

5. Municipality of Anchorage, Anchorage Assembly. Resolution.

6. Dalterio, Dr. Susan L. "Marijuana and the Unborn." Listen, a Journal of Better Living. 1984.

7. Spence, W.R., M.D. Marijuana and Its Effects. March, 1985.

8. Secretary of the Department of Health and Human Services. Drug Abuse and Drug Abuse Research: The First in a Series of Triennial Reports to Congress. 1984.

9. McCoy, Kathleen. "Scared Straight." We Alaskans. February, 1987.

10. Secretary of Health and Human Services. Marijuana and Health: Eighth Annual Report to the U.S. Congress. 1980.

11. Secretary of Health and Human Services. Marijuana and Health: Ninth Annual Report to the U.S. Congress. 1982.

12. National Institute on Drug Abuse, Department of Health and Human Services. For Parents Only: What you need to know about marijuana. 1981.

13. National Institute on Drug Abuse, Department of Health and Human Services. Marijuana: Just Say No.

14. National Institute on Drug Abuse, Department of Health and Human Services. For Kids Only: What you should know about marijuana.

15. Mann, Peggy. "Marijuana Alert III: The Devastation of Personality." Readers Digest. December, 1981.

16. Bromwell, Susan. "How I got my Daughter to Stop Smoking Pot." Good Housekeeping. March, 1979.

17. "Drugs: Use and Abuse in the Southern Panhandle." New Alaskan. September, 1983.

"Drugs: Use and Abuse in the Southern Panhandle." New Alaskan. January and February, 1982.

18. Editorial from Ketchikan Daily News. Anchorage Times.

Konet, Bob. Letter to the Editor. Ketchikan Daily News. 2/6/84.

19. Kiwanis Club of Anchorage. Resolution.

20. Reagan, President. The White House, Office of the Press Secretary, Remarks by the President. 8/4/86.

21. The War on Drug Abuse

22. Continuation of Fiscal Note Analysis for HB 55.

23. Alaska Court of Appeals. Marijuana is a controlled substance: State v. Resek.

24. Jennings, Mary. Effects of the Decriminalization of Marijuana. March, 1986.

25. FBI National Academy Associates, Alaska Chapter. Letter to Representative Martin from Pat Wellington, President. 2/9/87.

26. Congressional Delegation Request.

27. City of Saxon. City of Wrangell. City of Ketchikan. City of Valdez. Ketchikan Gateway Borough School District. Galena City School District. Alaska Association of School Governments.

28. National Institute on Drug Abuse, Department of Health and Human Services. Research 31: Marijuana Research Findings. June, 1980.

Others:

National Institute of Justice, U.S. Department of Justice. Drug Use and Pretrial Crime in the District of Columbia. October, 1984.

Konet, Bob. Letter to Walt Furnace. Ward Cove. 2/18/85.

Smith, Carol, Dr. "Retarding Reproduction: How marijuana users impair their sexuality and fertility." Listen. February, 1983.

Committees of Correspondence. "Nipping marijuana in the bud: A comparison of paraquat, the herbicide, with Cannabis, nature's toxic plant." Drug Abuse Newsletter.

Adams, Robert. Letter to all House members. 4/30/84.

Burrell, Sharon. Letter to Joe Hayes. 4/16/84.

Committees of Correspondence. "A Straight Pitch about Marijuana." Junior League of Dallas. 1982.

Committees of Correspondence. "What Parents Must Learn about Marijuana."

Mann, Peggy. "Death on the Highways: Driving on Drink and Pot." Published in Families, a Reader's Digest Publication condensed from The Saturday Evening Post. 1981.

Alaska State Legislature

SENATOR PAUL FISCHER, Chairman
SENATOR JOE JOSEPHSON, Vice Chairman
SENATOR LLOYD JONES
SENATOR JAY KERTULLA
SENATOR RICK HALFORD

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Senate Committee on Health, Education and Social Services

REFERENCES FOR LEGISLATIVE FINDINGS TO CS SB 32 (HESS)

Subsection (a)

1. Marijuana and Health, Institute of Medicine, National Academy Press, 1982. Page 10

2. Institute, page 20.

3. Institute, page 26

4. original *(original bill finding, see House Research Report #87.158)*

5. original

6. Institute, page 16. Also, conversation with officials at state crime lab.

7. Conversation with crime lab officials.

8. original

9. original

10. original

11. original

12. original

13. original

14. 21 U.S.C. 812.

Subsection (b)

1. Essentially a conclusion

2. "Patterns of Drug Use: Community Survey", Center for Alcohol and Addiction Studies, UAA; Benard Segal, Ph.D., editor; 1983. Also "Patterns of Drug Use: School Survey", same publisher and editor.

3. Same as 2.

4. Conversation with Teresa Johnson, Anchorage School District, March 1987. Includes elements of a legislative conclusion and finding.

5. Conclusion.

6. A conclusion

Consult the attached House Research Agency report dated February 27, 1987 for those items marked as being from the original bill.

ALASKA STATE LEGISLATURE
HOUSE OF REPRESENTATIVES
RESEARCH AGENCY

P.O. Box Y, State Capitol
Juneau, Alaska 99811-3100
Mail Stop 3100
(907) 465-3991

February 27, 1987

MEMORANDUM

TO: Representative Terry Martin

ATTN: John Manley

FROM: Penelope Weyhrauch
Legislative Analyst

RE: Findings on Marijuana (House Bill 55)
Research Request 87.158

You asked us to substantiate the findings on marijuana included in House Bill 55. I have addressed each of the findings included in the bill with the most applicable research available to me. Wherever possible, I have presented the research without paraphrasing it. For this reason, the memorandum may not read smoothly. As you requested, I have not included any research which disputes the findings set out in the bill.

1. **Delta-9-tetrahydrocannabinol (THC), the mind-altering ingredient in marijuana, is not soluble in water, but goes into the fatty tissues of the brain, testicles, ovaries, and other internal organs, and takes 30 days to be eliminated from the body.**

According to Dr. W.D.M. Paton, Professor of Pharmacology at Oxford University, "the various cannabinoid substances are highly soluble in fat, but have a low solubility in water".[1] Other research shows that "THC--the principal psychoactive ingredient of marijuana...tends to accumulate in the brain and gonads and other fatty tissues.." [2]

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[1]George K. Russell, "Marihuana Today--A Compilation of Medical Findings for the Layman," p. 45.

[2]Senator Eastland, Chairman of the Internal Security Subcommittee of the United States Senate, May 1974, summarizing testimony given before the Subcommittee. Quoted in "Marihuana Today", p. 14.

Research completed by the National Institute on Drug Abuse shows that THC tends to remain for long periods of time in fatty tissues. Five days after a single injection of THC, 20 percent of the THC remains stored in body fats. Complete elimination of a single dose can take 30 days.[3]

2. **The buildup of THC in the body causes the user to smoke more marijuana to achieve the desired high and may result in loss of sleep, appetite, initiative, as well as moodiness and depression.**

Studies indicate that a tolerance to THC can develop, when increasing doses of a drug are required to produce the same effect.[4] "It appears now, both in animals and in humans, that tolerance develops quite rapidly to many of the effects of THC. The more frequent the administration and the higher the dose the more rapidly it develops, but even subjects smoking as little as one marijuana cigarette per day in a laboratory experiment demonstrate tolerance on some behavioral and physiologic dimensions."[5]

To maintain constant blood levels of THC, healthy subjects were given doses of the oral equivalent of several marijuana cigarettes a day. Within hours after the last dose of THC, subjects showed "irritability, restlessness, decreased appetite, sleep disturbances, sweating, tremor, nausea, vomiting and diarrhea."[6]

3. **It is possible for a human being to overdose from the use of marijuana especially if it is used in conjunction with alcohol, because it increases the effects of alcohol.**

"We have found tha....behaviors are linked behaviors, so that the consumption of any substance, licit or illicit, is positively correlated with an increased consumption of all other substances."[7] "Taking the total of animal and human research, simultaneous use of both alcohol and marijuana

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[3]"Marijuana Research Findings: 1980," Research Monograph Series 31, National Institute on Drug Abuse, U.S. Department of Health and Human Services, p. 57.

[4]"Marijuana Today," pp. 73 - 74.

[5]"Marijuana Research Findings: 1980," p. 74.

[6]"Marijuana Research Findings: 1980," p. 75. See also "Marijuana and Health," Report of a Study by a Committee of the Institute of Medicine, Division of Health Sciences Policy, 1982, p. 27.

[7]R.L DuPont, testimony before the Senate Subcommittee on Internal Security, May 1975, ref. 90, pp. 461-471. Quoted in "Marijuana Today," p. 16.

typically has more profound effect than the use of either alone."[8] "From the evidence it can be said that these two psychochemicals add to the effects of each other. This is common 'street' knowledge, and it is confirmed in the laboratory. The degree of intoxication is increased, and it lasts longer. This means that behavior and psychomotor functioning are more impaired."[9]

4. **The THC content of a marijuana cigarette 10 years ago was one percent, but it is as high as 10 percent per cigarette today.**

"The marijuana used today is many times--five to ten times--stronger than in the 60s. At the beginning of the drug movement, marijuana with THC content as low as .02 to .5 percent was commonly available and marijuana with two percent THC was considered 'real good grass.' Now confiscated marijuana analyzed in government laboratories has been found to have THC content as high as 14 percent."[10]

"'Street' marijuana has increased markedly in potency over the past five years. Confiscated materials in 1975 rarely exceeded one percent THC content. By 1979, samples as high as five percent THC content were common. 'Hash oil,' a marijuana extract unavailable a decade ago, has been found to have a THC content as high as 28 percent, with more typical samples analyzed by University of Mississippi chemists ranging from 15 to 20 percent THC."[11]

5. **Marijuana causes schizophrenia, illusions, and hallucinations, including a dulling of the senses, creating the possibility that the user is unable to respond to body signals, such as pain.**

"The acute anxiety reaction that may occur during marijuana intoxication can include paranoid delusions,... a full blown acute toxic psychosis with loss of contact with reality, delusions, hallucinations... These acute reactions seem to occur most frequently in individuals who are under stress, depressed, or have a history of schizophrenia."[12]

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[8]"Marijuana Research Findings: 1980," pp. 38, and 170.

[9]Sidney Cohen, M.D., and Phyllis J. Lessin, "Marijuana and Alcohol," American Council for Drug Education, 1982, p. 21.

[10]Helen C. Jones, "On Marijuana Reconsidered," Executive Health, Volume 10, Number 5, February, 1984.

[11]"Marijuana Research Findings: 1980," p. 2.

[12]"Marijuana Research Findings: 1980," pp. 71-72. See also "Marijuana and Health," p. 126.

One researcher described a higher dose-related phase of cannabis intoxication as "...the appearance of delusions, labile emotions, particularly anxiety, decreased impulse control and, at the highest doses, profound sensory illusions and hallucinations."[13] Dr. Harris Isbell, with the University of Kentucky Medical Center, confirmed these findings, stating that "...the data in our experiments definitely indicate that the psychotomimetic (capable of inducing altered states of consciousness) effects of THC are dependent on dosage and that sufficiently high does can cause psychotic reactions in any individual." Dr. Isbell classified cannabis among the hallucinogens.[14]

One report stated that "...acute psychotic behavior resembling schizophrenic psychosis..." had been reported.[15] Another said that "Sufficient clinical information is available to recommend abstinence for schizophrenics in remission, because of the danger of relapse."[16]

6. **Although it may take a heavy cigarette smoker as long as 20 years to develop lung cancer, one marijuana cigarette a day may cause lung cancer in three years.**

"Recent clinical evidence and findings from several research laboratories demonstrate that cannabis inhalation may have seriously damaging effects on human lung tissue... The damage is described as 'pre-cancerous.' The caustic and irritating effects of cannabis smoke are well known to users, and recent work has shown that 'like tar from tobacco cigarettes, reefer tar is carcinogenic when painted onto mouse skin.' Benzopyrene, a potent carcinogenic agent, is 50 percent more concentrated in the smoke of marijuana than smoke from varieties of high tar Kentucky tobacco."[17]

Dr. Cecile Leuchtenberger of the Swiss Institute for Experimental Cancer Research exposed small portions of excised mouse lung tissue to standardized puffs of marijuana. She summarized her work by stating: "The observations that marihuana cigarette smoke stimulates irregular growth in the respiratory system which resembles closely precancerous lesions would indicate that long-term inhalation of marijuana cigarette smoke may either directly evoke lung cancer or may at least contribute to the development of lung cancer."[18]

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[13]"Marijuana Research Findings: 1980," p. 62.

[14]"Marijuana Today," p. 24.

[15]Robert G. Heath, M.D., "Marijuana and the Brain," The American Council on Marijuana and Other Psychoactive Drugs, 1981, p. 6.

[16]"Drug Abuse and Drug Abuse Research," The first in a Series of Triennial Reports to Congress, Department of Health and Human Services, 1984, p. 77.

[17]"Marijuana Today," pp. 54 - 55.

[18]"Marijuana Today," pp. 55 - 56.

"According to researchers at the American Health Foundation, marijuana smoke contains 50 percent more cancer-producing hydrocarbons than tobacco smoke."[19] Further, "...abnormalities suggestive of cancerous lesions have been recorded."[20]

7. **THC affects eggs, sperm, sexual hormones, and the development of a fetus, and marijuana use may result in deformed or undersized offspring.**

"Studies have shown that THC accumulates in the ovaries of the female, where it will kill and injure eggs" and that a "...significant decrease in sperm concentration and total sperm count occurs."[21] "This effect is apparently accompanied by a decline in sperm motility and an increase in abnormal sperm forms."[22]

"Studies with laboratory animals clearly show that the crude drug marijuana and THC...inhibit secretion of the pituitary hormones, luteinizing hormone and follicle stimulating hormone as well as prolactin. These changes in pituitary hormone levels produce decreases in sex steroid hormones and cause disruption of ovulation and spermatogenesis. With chronic drug use, disruption of sex accessory organs (e.g., uterus and vagina in the female; prostate gland and seminal vesicles in the male) has also been observed."[23]

Other studies show that "...the risks of pregnancy loss and other adverse effects on the fetus are increased by marijuana use...significant changes consistent with retardation of fetal growth and development have been observed."[24]

"Low maternal weight gain during pregnancy, maternal illnesses during pregnancy, and cigarette and marijuana smoking during pregnancy were consistently related to adverse fetal development. Women who used marijuana during pregnancy delivered infants with significantly smaller

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[19]"On Marijuana Reconsidered," p. 2.

[20]"Marijuana and Health," p. 63. See also "Effects of Long Term Marijuana Use", p. 156, and, "Marijuana and Health," pp. 3, and 62.

[21]"Marijuana," Narcotic Information Bulletin, No.1-80, p. 2.

[22]Carol Grace Smith, Ph.D. and Ricardo H. Asch, M.D., "Marijuana and Reproduction," the American Council for Drug Education, 1982, pp. 16, 17.

[23]"Marijuana and Reproduction," p. 7.

[24]"Marijuana and Reproduction", p. 8.

birth weight, body length and head circumference, as well as infants who were five times more likely to have features compatible with the fetal alcohol syndrome."[25]

"In males, marijuana has been found temporarily to lower testosterone, the principal male sex hormone, decrease sperm count, cause abnormalities in the sperm...In women, a study of marijuana users done at the Masters and Johnson Institute found that the drug disrupted the menstrual cycle...At the University of California, Davis, Dr. Ethel Sassenrath, on exposing pregnant rhesus monkeys (who have a reproductive system similar to humans), to THC in doses equal to one or two marijuana cigarettes a day for humans, found significantly lower weight gains during pregnancy and 40 percent of the conceptions ending in miscarriages, fetal deaths, stillbirths, or infant deaths shortly after birth."

8. **Other physical reactions to marijuana include irreversible changes in the brain, sinusitis, pharyngitis, bronchitis, emphysema, increased heart rate, and decreased blood circulation.**

One study stated that "The findings reported here indicate that exposure to ...THC...at doses commensurate with those used by human marijuana smokers, produces permanent changes in brain function and structure of monkeys, a subhuman primate close to man."[26]

Testimony on this subject before the Senate Subcommittee on Internal Security was summarized by finding that: "1) Chronic cannabis smoking can produce sinusitis, pharyngitis, bronchitis, emphysema and other respiratory difficulties in a year or less, as opposed to ten or twenty years of cigarette smoking to produce similar complications; and 2) Cannabis smoke, or cannabis smoke mixed with (tobacco) cigarette smoke, is far more damaging to lung tissue than tobacco smoke alone."[27]

"There is good evidence to show that marijuana increases the work of the heart, usually by raising heart rate and in some persons, by raising blood pressure."[28]

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[25]"Marijuana and Reproduction," p. 16, 17.

[26]Robert G. Heath, M.D., "Marijuana and the Brain," The American Council on Marijuana and Other Psychoactive Drugs, Inc., 1981, p. 10.

[27]"Marijuana Today," p. 14. See also "Marijuana and Health," p. 60.

[28]"Marijuana and Health," p. 3.

9. Other psychological reactions to marijuana include loss of memory, impairment in thinking, reading comprehension, and verbal and arithmetic problem solving; impairment of perception of distance and time; and anxiety, panic, paranoia, psychosis, and psychological dependence.

Dr. Ronald C. Bloodworth, Clinical Director at the Psychiatric Institute of Atlanta, reported that "...Many heavy users suffer from distorted emotional responses, disordered thinking, and loss of memory and motivation." Dr. Bloodworth also reported that there is enough evidence to confirm that psychologic dependence is common among marijuana users and that physical dependence can also occur.[29]

Other studies concur with Dr. Bloodworth's findings: "...cannabis intoxication...impairs judgments of distance and time, memory for recent events, ability to learn new information, and physical coordination,"[30] and, "...several studies have shown that marijuana intoxication impairs driving, flying and other complex skilled activities. Many elements of effective psychomotor performance are worsened by the drug because of decrements in recent memory, tracking performance, glare recovery, motor coordination, depth perception, time sense, and peripheral vision.[31]

"Under the influence of moderate doses of the drug, most investigators report that subjects consistently overestimate the amount of time that has elapsed. Thus, under the influence of marijuana, a given event is reported to last longer than it actually does last."[32]

"Marijuana's popularity notwithstanding, a surprisingly high proportion of users report reactions that they regard as unpleasant or undesirable. For example, 33 percent of regular users reported that while intoxicated they occasionally experienced such symptoms as acute panic, paranoid reaction, hallucinations, and unpleasant distortions in body image."[33]

Another study reported that "16 percent of regular users reported anxiety, fearfulness, confusion, dependency, or aggressive urges as a usual occurrence. Acute paranoic reactions under controlled conditions has also been reported."[34]

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[29]"On Marijuana Reconsidered," p. 4.

[30]"Marijuana Research Findings: 1980," page 67.

[31]"Marijuana Research Findings: 1980," p.71.

[32]"Marijuana and Health," p. 116.

[33]"Marijuana and Health," p. 121.

[34]"Marijuana and Health," pp. 122 to 123.

"Cannabis psychosis refers to a chronic psychotic condition (out of contact with reality) reportedly seen in heavy marijuana users, but extending beyond the period of acute intoxication. Some authors have described a schizophrenia-like picture with delusions and hallucinations."[36]

"Although infrequent..psychiatric problems can emerge. Acute anxiety and panic states from use of the drug are known, especially in persons who have never used marijuana before. Acute paranoid states will occur at times in experienced smokers who have previously used the drug without untoward reaction."[37]

* * *

I hope this information is useful to you. If you would like excerpts from the articles cited in this memorandum, please contact our agency.

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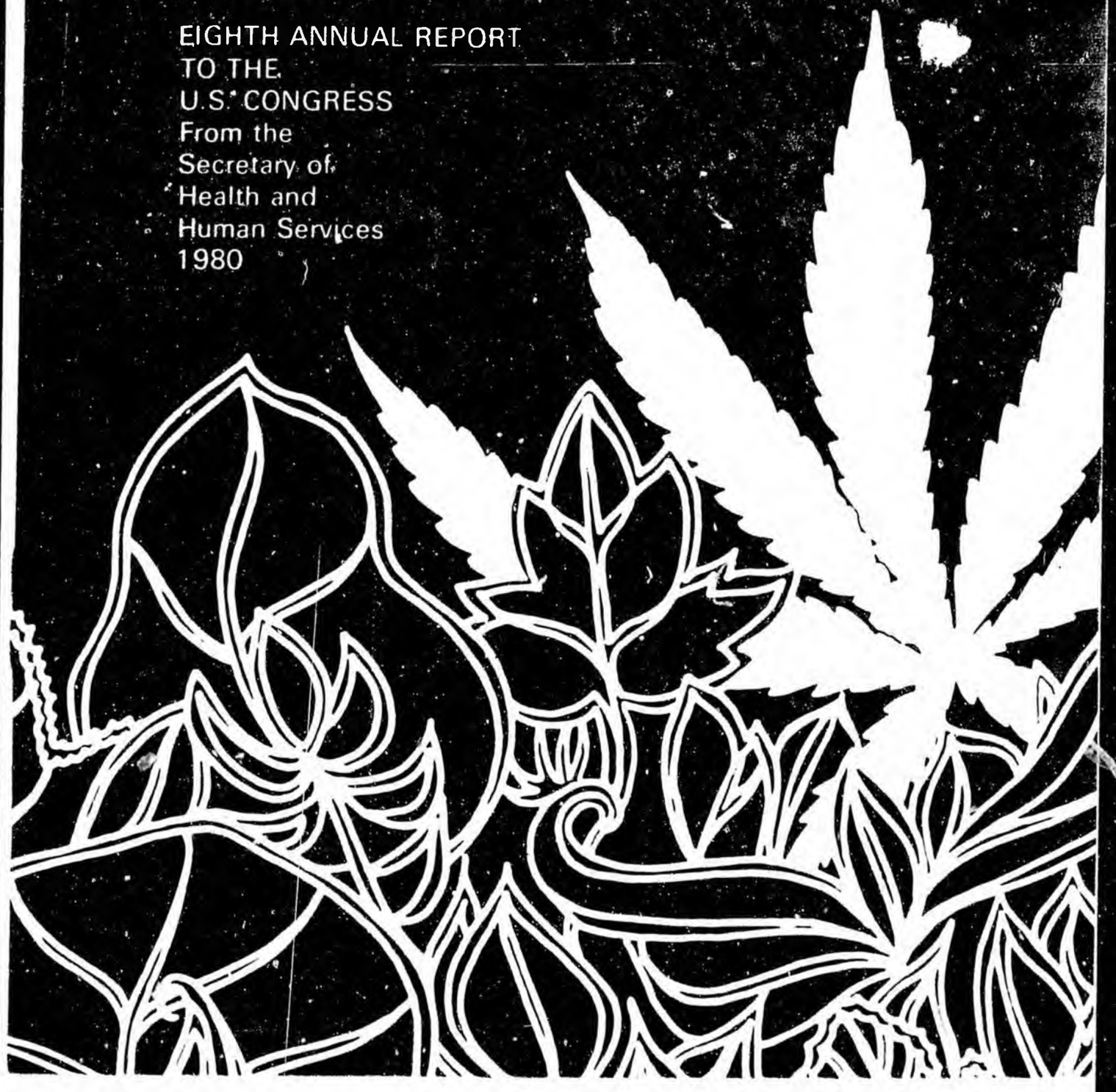
[36]"Marijuana and Health," p. 124.

[37]"Effects of Long Term Marijuana Use," p. 158.

THE PRECEDING PAGES WERE TREATED AS
A UNIT IN THE ORIGINAL FILE.

MARIJUANA AND HEALTH

EIGHTH ANNUAL REPORT
TO THE
U.S. CONGRESS
From the
Secretary of
Health and
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MARIJUANA AND HEALTH

Eighth Annual Report
to the U.S. Congress
From the Secretary of
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EXECUTIVE SUMMARY

In this eighth edition of the Marijuana and Health Report several areas of recent developments in marijuana research are highlighted together with a summary of the scientific research accumulated through the end of 1979 concerning the drug's possible hea th implications.

Nature and Extent of Use

By contrast with a decade ago, marijuana use now often begins at a much earlier age and is more likely to be frequent rather than experimental use. The most significant increases noted in the 1977 National Survey of drug use were in marijuana use by 12-to 17-year-olds. Other, more recent sources of data are generally consistent. Among high school seniors, for example, daily use nearly doubled from the Class of 1975 to those of 1978 and 1979 (from 5.8 percent to 10.7 and 10.3 percent for each of these classes). Moreover the percentage of each of these senior classes which began use in the ninth grade or earlier has also nearly doubled (from 16.9 percent of the Class of 1975 to 30.4 percent of the 1979 class). Despite these increases in use, most members of all age groups surveyed continue to disapprove of regular marijuana use and to advocate continued prohibition.

Chemistry

"Street" marijuana has increased markedly in potency over the past five years. Confiscated materials in 1975 rarely exceeded one percent THC content. By 1979 samples as high as five percent THC content were common. "Hash oil," a marijuana extract unavailable a decade ago, has been found to have a THC content as high as 28 percent, with more typical samples analyzed by University of Mississippi chemists ranging from fifteen to twenty percent THC.

Considerable progress has been made in developing simpler laboratory techniques for detecting marijuana use by examining body fluids. Methods are now being field tested which will probably be commercially available by mid 1980 which can be used for such purposes as detection of driving under the influence of marijuana.

Acute Effects

A review of marijuana's acute effects on intellectual functioning done for this year's report indicates the data is generally consistent: marijuana intoxication interferes with immediate memory

and a wide range of intellectual tasks in a manner that might be expected to impair classroom learning among student users. There is also good evidence that marijuana interferes with driving skills and is a significant factor in erratic driving.

Long Term Effects

While much remains to be learned about the chronic effects of marijuana, there are converging lines of evidence with respect to its pulmonary effects. Both animal and human experiments suggest that marijuana impairs lung function to a greater extent than tobacco cigarettes do. While there is as yet no direct evidence that it can play a causal role in lung cancer, it is known that, like tobacco smoke residuals, the "tar" from marijuana is tumor-producing when applied to the skin of test animals. One known cancer-producing chemical, benzopyrene, has been reported to be 70 percent more abundant in marijuana smoke than in tobacco smoke. Following exposure to marijuana smoke the lung's defense systems against bacterial invasion have been shown to be impaired.

Although the evidence is by no means definitive, several kinds of animal and human research have suggested that heavy marijuana use may impair reproductive functioning. Such impairment may include diminished sperm count and motility in males and possible interference with fertility in females. Such preliminary findings may have greater significance for the marginally fertile. Given the many unknowns concerning the effects of marijuana on fetal development, the use of marijuana during pregnancy should continue to be strongly discouraged.

Other questions of possible marijuana effects continue to be unresolved. Evidence concerning an effect on the body's principal defense against disease, the immune response, remains contradictory. While some human studies have found laboratory evidence of impairment, others have not, and the clinical significance of such findings is still in doubt. There have been no large-scale epidemiological studies to determine whether or not chronic marijuana users suffer from infections and other diseases to a greater extent than do nonusers of similar life style. Evidence concerning possible effects on chromosomes is also contradictory and its clinical significance questionable.

Psychopathological Effects

There have been few new developments in this area. An acute panic anxiety reaction is the most common adverse psychological reaction to use, especially when unexpectedly strong material is consumed. A number of clinicians have cautioned against use of marijuana by those with a history of serious psychological problems or who have previously had drug-precipitated emotional disturbances (so-called "bad trips"). While more serious psychiatric problems such as a cannabis-related psychosis have been reported in countries with a long tradition of use, such reactions

do not appear common here. Concern has been expressed that availability of much stronger varieties of cannabis may result in more serious problems than in the past.

While there have been a number of overseas studies of the impact of chronic marijuana use on intellectual functioning, most of which have reported some impairment, the quality of such studies is highly variable and the question also remains in doubt. Studies of American users have not generally reported such impairment, although the American experience has been limited to relatively highly motivated college populations using smaller amounts of cannabis for shorter periods of time. Since user populations in the United States are generally younger than those overseas, the question of possible impact on younger users is an important one which remains to be studied.

Therapeutic Uses

Overall, marijuana, THC and related drugs have shown definite promise in treating the nausea and vomiting which often accompany cancer chemotherapy. While thus far they have not proven to be invariably superior to other medication, they may be enduringly useful with patients for whom other drugs are relatively ineffective.

A second therapeutic application which has received wide publicity is the use of THC or marijuana in reducing the vision-destroying intraocular pressure in open-angle glaucoma. Initial trials with oral THC found the drug to be of variable success, although when used with other standard drugs better results were achieved. An eye drop preparation has been developed which in initial human trials produced eye irritation and was not consistently effective. Additional studies are in progress.

It should once again be emphasized that although marijuana, THC and related drugs have shown some therapeutic promise, much work remains to be done and that any pharmaceuticals developed will be chemically related but not identical to the constituents of the natural material. Such compounds would be chosen to minimize undesirable side effects and to provide a better-focused therapeutic effect. Like any other new medication, chemically related materials must be carefully tested for toxicity and for therapeutic effectiveness.

INTRODUCTION

This edition of Marijuana and Health represents the eighth in a series of annual reports from the Secretary of Health, Education, and Welfare to the Congress and the American people as required by Title V of Public Law 91-296. The seventh edition dated 1977, which included research findings available to the end of 1977, was released last year. This edition has been dated 1980 so as to reduce the confusion concerning the date of actual release. In order to make it as current as possible, research reports have been included virtually to the end of 1979. Although it is not yet possible to be definitive in our answers to many of the health questions that marijuana use raises, the report once again tries to answer the central question as it can best be answered at this time: "What are the health implications of marijuana use for Americans?"

While all of us would wish for greater certainty in this area, such certainty is not yet possible. The American marijuana experience has been of brief duration. It is comparatively recently that significant numbers of individuals have been using the more potent cannabis now available on a daily basis. As our experience with tobacco and alcohol demonstrates, it frequently requires many years of use by large numbers for long range effects of a drug to become apparent. While there are cultures in which cannabis use has been traditional for many years, the drug is often used differently, and traditional users rarely include women or the very young. Perhaps the most disquieting development in our society has been the rapid increase in younger users, under age eighteen. Use is beginning earlier and earlier and is often on a daily basis. Even those who regard occasional use by well integrated, healthy adults as unlikely to pose serious public health problems agree that use, especially frequent use, by children and adolescents can be seriously disruptive.

Research developments since issuance of the seventh report last year include additional information on the possible effects on reproduction and pulmonary function. Despite our increasing knowledge, much remains to be learned about the effects of chronic use. Unfortunately, our present limited knowledge is often interpreted as indicating that marijuana is "safe." More accurately, there are many areas in which we simply do not know the parameters of risk. We do know that even acute use poses hazards in driving and other complex behavior and definitely interferes with memory and intellectual functioning while "high." As use comes to involve both younger and older persons it becomes increasingly important that we be able to specify more precisely the kinds and degree of public health risk which present and anticipated levels of cannabis use pose. This report summarizing our present knowledge is another step in achieving a better understanding of marijuana's public health implications.

NATURE AND EXTENT OF MARIJUANA USE IN THE UNITED STATES

Although a comprehensive updated picture of national trends in marijuana use since the last 1977 National Survey on Drug Abuse will not be available until the 1979 Survey results have been tabulated and analyzed in mid-1980, a review of previous years and of more limited recent findings indicates a generally consistent upward trend in use.* There are indicators that the increase is greatest among younger users (under 18). For example, the most notable changes in the 1977 National Survey from its predecessor in 1976 were a 25 percent increase in the total of those between ages 12 and 17 who had ever used marijuana and a nearly 30 percent increase in the number of that age group who were currently using marijuana (i.e., who had used it in the month preceding the Survey). By contrast, current use in the over-18 population did not increase significantly. Nearly three out of ten (28.2 percent) of 12-to 17-year-olds in 1977 reported having tried marijuana at some point in their lives; nearly one in six (16.1 percent) were current users (1).

Young adulthood--from age 18 to 25--represents the peak period for marijuana use. Three out of five in that age group reported having ever used marijuana in the most recent National Survey; over one in four (27.7 percent) 18-to 25-year-olds was currently using in 1977. Use continues to be correlated with age. This is true whether we are talking about those who have ever used the drug or about current use. For example, among children between ages 12 and 13, eight percent have had some experience with marijuana, a figure which climbs to 29 percent for 14-and 15-year-olds and to 47 percent for those ages 16 and 17. The 22-to 25-year-old group reports the peak level of use--with 62 percent indicating ever having done so. The percentage who have used is 44 percent in the 26-34-year-old group and only 7 percent of those over 35 report any past use. Similar trends are to be found in current use (i.e., use in the month preceding the Survey). While 4 percent of the 12-and 13-year-olds report current use, the peak years for such use are between 18 and 21. Three out of ten (31 percent) of those between 18 and 21 were current users in the 1977 Survey (1).

Although the percentages of females who had either tried marijuana or were currently using it have generally increased in the course of the five national surveys to date, female use has tended to lag behind that of males. Interestingly enough, among 12-to 17-year-olds, the percentage of girls and boys who had ever used remained nearly equal in the three Surveys conducted in 1971, 1972, and 1974. However, by 1976 the percentage of males who had used in this age group was significantly greater than that of females (26 percent for males and 19 percent for females). In 1977, a still greater difference in cannabis use by the two sexes developed in the 12 to 17 age group (33 percent of males had used at some point compared with 23 percent for females). While boys' use in the 12 to 17 group increased significantly between 1976 and 1977, use by girls did not. Among those over 18, by contrast, prevalence of male use

*see ADDENDUM, pages 37-38

in all five survey years has been consistently higher, about twice that of females up until the 1977 survey in which the gap narrowed. This survey indicates 30 percent of males over 18 had ever used marijuana as compared with 19 percent of females. However, the percentage of females over 18 who had ever used increased statistically significantly between 1976 and 1977 while that of males did not. When one examines current use, generally similar trends are present--male use predominates by a ratio of about two to one among those over 18, while in the 12 to 17 age group the difference is smaller. Half again more boys than girls ages 12 to 17 were currently using in 1977, unchanged from the 1976 findings (1).

Racial differences are of some interest although the broad statistical breakdown into "white" and "other races" categories precludes more detailed analysis. Among the 12 to 17 age group, white use for most survey years has slightly exceeded that of other races whether we are talking about those who have ever used or about those currently using. In 1977, use by whites 12 to 17 significantly increased both in the "ever used" and "current use" categories (from 22 percent to 29 percent ever having used and from 12 percent to 17 percent for current use). Among those over 18 the percentages of whites and of other races who have ever tried marijuana were nearly equal in 1977 (24 percent of whites had used compared to 27 percent of other races) in contrast to previous years in which "other races" use by the over-18 group tended to be greater than that of whites. Among current users in the 12- to 17-year age group, whites consistently predominate over "other races" for all survey years. Among those over 18, current use by whites and other races was approximately equal for all survey years including that of 1977 (eight percent of each group in the current survey).

In earlier national surveys adults with college training were considerably more likely to have used marijuana than were adults who had not gone beyond high school graduation. These differences have narrowed in recent years. For example, the percentage of college graduates who had ever used marijuana at the time of the 1977 Survey was 28 percent, compared to 26 percent of the high school graduates.

In terms of the four geographical regions into which the National Survey results are divided (Northeast, Northcentral, South, and West), the only area to note a statistically significant increase in marijuana use between 1976 and 1977 was the Northeast. There a significant increase was found in the number of 12- to 17-year-olds who reported having used marijuana. By contrast with previous survey years, marijuana use in 1977 in the Northeast approximately equalled that in the West. This was true both for lifetime prevalence and for current use. Other areas of the country had lower levels of use.

If one takes the percentages of cannabis users noted in the 1977 Survey and extrapolates to the general population, 43 million

Americans had tried marijuana as of spring 1977, and about 16 million were currently using the drug (i.e., had smoked it in the month previous to the 1977 Survey).

Although more recent national statistics for the general population are not yet available, there are some additional data on the drug attitudes and behavior of American youth who are at a pivotal point of transition to adult life--their senior year in high school. Since 1975, a representative nationwide sample of high school seniors has been queried. Because of the large sample involved, this survey is a particularly reliable source of information on drug using trends, sensitive to even small changes. It is also a source of information on student attitudes and beliefs about drugs, which may be useful in anticipating future drug trends. While statistically significant increases (i.e., increases likely to reflect actual behavior changes rather than survey artifacts) in marijuana use were noted in each of the years through 1978, data for the senior class of 1979 indicate a leveling off of marijuana use, although at fairly high levels. The percentage of each of the five senior classes from 1975 to 1979 who had tried marijuana steadily increased from 47.3 percent in 1975 to 60.4 percent of the Class of 1979. Indeed, the percentage of 1979 high school seniors with marijuana experience is equal to that of the National Survey's peak-using group, the 18- to 25-year-olds. The increase in use between the classes of 1978 and 1979 was the smallest annual increment to date, less than one percent (2,3).

Daily use rates which rose from six percent in 1975 to 9.1 percent in 1977, reaching a peak level of 10.7 percent in the Class of 1978, were 10.3 percent in 1979. While use within the 30 days prior to each of the surveys rose from a little over a quarter of the seniors of the Class of 1975 to 37.1 percent of the Class of 1978, it leveled off at 36.5 percent in the 1979 senior class. Thus, this study suggests that the proportion of high school seniors using marijuana has remained stable the past two years (2,3).

A disturbing trend continues to be the tendency toward initial marijuana use at younger ages. For example, 16.9 percent of the Class of 1975 had used the drug prior to the tenth grade, but the corresponding percentages in the 1976, 1977, and 1978 classes were 22.3, 25.2, and 28.2 percent. In the most recent senior high school class studied, the 1979 group, 30.4 percent had used prior to the tenth grade. Thus, the percentage of seniors who first used in the ninth grade or earlier has nearly doubled over the past five years (2,3).

Although overall the use of alcohol and tobacco continues to exceed that of marijuana, daily use of marijuana among high school seniors in the Class of 1978, for example, (10.7 percent) was nearly double that for alcohol (5.7 percent daily use) and exceeded only by daily cigarette smoking (27.5 percent). Daily use of marijuana has been about twice as frequent among males as females. However, at less

frequent levels of marijuana use, the sexes do not differ markedly in the percentages using (2,3).

Nationwide statistics may obscure considerable local variation. For example, in Maryland and Maine, where drug surveys were conducted in 1978, higher levels of daily or nearly daily use of marijuana were found than among high school seniors nationwide (10.7 percent of seniors nationally). In Maryland, use "daily or several times a week" was reported by a quarter (25.3 percent) of the twelfth graders (4). In Maine, nearly one in six high school students reported daily marijuana use, four times as many as used alcohol daily (four percent) (5).

Summary--Nature and Extent of Marijuana Use

Although national data representative of the general population subsequent to 1977 are not available at this time, several trends are noteworthy. Among high school seniors use may be plateauing, although at fairly high levels--over a third of the seniors in recent years--report use in the month preceding the surveys. About one in ten reported daily use in the 1979 senior class. The percentages of seniors using marijuana prior to the tenth grade has steadily increased since 1975, nearly doubling in that five year period.

Current Attitudes and Beliefs About Marijuana

Both the National Survey and the high school senior survey include questions dealing with respondents' attitudes and beliefs about drugs in addition to asking about actual behavior. Such attitudes and beliefs are, of course, subject to change in response to new information and do not necessarily reflect objective reality. Nevertheless, they are of considerable interest in enabling us to better understand user assumptions and present behavior, and they may be to some extent predictive of future behavior.

Despite the general assumption of widespread acceptance of marijuana in our society it is noteworthy that youth (12-17), young adults (18-25), and older adult groups (26+) all contain substantial proportions advocating either that marijuana continue to be illegal or our present laws be made still stricter. Seventy-four percent of youth and 79 percent of older adults take this tack. Even among the peak-using 18-25 year-old group, 40 percent support in about equal proportions the position that marijuana continue to be illegal (20 percent) or that ideally the laws be made still stricter (also 20 percent of the group). Similarly two-thirds of high school seniors disapprove of regular use.

Respondents in the National Survey were also asked to indicate which of a list of drugs each regarded as "addictive," ("that is, anybody who uses it regularly becomes physically and psychologically dependent on it and can't get along without it"). Alcohol and heroin were classified as "addictive" by four out of five or more respondents

in the 12- to 17-, the 18- to 25-, and the over-26 age groups. Tobacco was also typically classified as "addictive," with the percentage so designating it increasing with age (youth: 62.4 percent; young adults: 78.6 percent, and older adults: 83.1 percent). Marijuana, by contrast, was seen as "addictive" by less than half of youth and young adults (47.3 percent and 43.7 percent respectively), but was so classified by over three out of five (63.6 percent) older (26+) adults.

The percentage of high school seniors who disapprove of regular marijuana use has remained fairly constant at just over two-thirds in senior classes from 1975 to 1978 (1975 = 71.9 percent; 1976 = 69.5 percent; 1977 = 65.5 percent; and 1978 = 67.5 percent). A similar percentage to those disapproving of regular marijuana use objects to taking one or two alcoholic drinks each day and to smoking one or more packs of cigarettes daily. A little less than half of the classes of 1976 to 1978 disapproved of occasional marijuana use; about a third objected to even trying it. Although nearly half (or more) of the seniors disapproved of even occasional marijuana use, they did not associate "great risk" with use. The percentage who believe there is great risk of some form of harm even from regular use of marijuana has steadily decreased. While 43.3 percent of the Class of 1975 placed regular use in the "great risk" category, the percentage of those in the 1978 Class who so described it had decreased to 34.9 percent. Only 15 percent in the Class of 1975 saw "great risk" in trying marijuana once or twice, and that has decreased to nearly half (8.1 percent) in the Class of 1978. While three out of five seniors in the Classes from 1975 to 1978 continued to feel people should be legally prohibited from smoking marijuana in public, the percentage who believe that use in private should be legally prohibited has steadily decreased (from a third of the Class of 1975 to a quarter of the Class of 1978). While two out of five 1977 and 1978 seniors believe that cigarette smoking should be legally prohibited in public, only a quarter believe that marijuana smoking should be illegal in private.

HUMAN EFFECTS

Chemistry and Metabolism of Cannabis

Although the chemistry and metabolism of marijuana (i.e., the ways in which the drug is broken down and chemically transformed in the body) are technical topics not easily translated into everyday language, they are important. For example, contrary to popular belief, the plant material is quite complex, containing at least 421 individual compounds. Sixty-one of the chemicals which have been identified in the plant--the cannabinoids--are specific to cannabis. Ten are now routinely quantified in identifying cannabis samples. When smoked, some of the chemicals contained are further transformed by burning (pyrolysis) into still other compounds (6).

Plant material differs widely in the amount of the principal psychoactive ingredient--delta-9-tetrahydrocannabinol (THC, for short)--contained, as well as in the proportions of other chemicals. Although the effects of cannabinoids other than delta-9-THC have been studied, much remains to be learned about their effects, both singly and in interaction with one another. While, for many practical purposes, the percentage of delta-9-THC is a useful guide to the psychoactivity of a drug sample, other chemical ingredients may ultimately prove to be important in modifying THC's effects as well as because of their own impact on the body. A good deal of valuable basic research has been done on THC, but it should be emphasized that it is only one ingredient of the natural material. Thus, some of the research on THC may be only partially relevant to the effects of the plant material itself. In addition, the ratios of the different cannabinoids found in cannabis change in response to the passage of time and storage conditions. Plants which have been specifically cultivated for their psychoactivity contain much more delta-9-THC than do those grown for fiber. Most of the cannabis growing wild in the United States derives from plants which were originally cultivated for their fiber, rather than drug content, so that they could be used in making rope and other nondrug products. Thus the THC content of this wild cannabis in the United States rarely exceeds one percent THC.

Although there has been no representative random sampling of illicit marijuana that can provide an accurate indication of changes over time, there is evidence that material now sold is significantly higher in THC content than was true only a few years ago. Chemists at the University of Mississippi who have been analyzing confiscated samples of cannabis for several years have found increases on the order of ten times in potency since 1974. Mexican "brick" (i.e., compressed kilogram quantities of marijuana) samples studied in 1974 averaged about a fifth of one percent delta-9-THC. Mexican samples analyzed thus far in 1979 have averaged nearly two percent. Other cannabis samples, probably of Colombian origin, which were analyzed in 1979 have averaged over four percent THC content. Hash oil, a concentrated liquid marijuana extract not available on the street up until a few years ago has been found to have THC levels

ranging from nearly eleven percent to twenty-eight percent. Such stronger materials are more likely to lead to higher levels of intoxication and to possibly adverse consequences.

As knowledge of cannabis chemistry and metabolism has increased and the role of various metabolites becomes more important, there has been a corresponding need to synthesize supplies of these substances. Research availability of these materials enables us to tease out their effects from those of other constituents. In the past year several improved methods for synthesizing metabolites have been developed. The ability to synthesize marijuana components and metabolites in research quantities has accelerated work on the detection of marijuana in body fluids, as well as permitted s ying the drug's metabolism. By radioactively labelling the subst involved, it is possible to trace their passage through the body.

The chemistry of marijuana smoke has commanded considerable attention in recent years. Some 150 compounds have been identified in the smoke itself (7). One of them, benzopyrene, known to be carcinogenic, is 70 percent more abundant in marijuana smoke than in tobacco smoke (7). There is also evidence that more "tar" is found in marijuana cigarettes than in high tar tobacco cigarettes (8).

The metabolism of marijuana is only partially understood. Over 35 metabolites of delta-9-THC have thus far been identified along with several dozen metabolites of other marijuana constituents. Ability to identify and trace the pathways of these chemicals in the body provides vital information concerning how they are stored and eventually eliminated. Such information is useful in helping determine the possible sites of action for long term effects of marijuana.

Detection and quantification of cannabinoids and their metabolites in body fluids continues to be an important problem. Sophisticated laboratory techniques are available for the precise measurement of cannabinoid levels in blood and other biological samples. More routine and simpler techniques have also been developed recently and are currently undergoing field testing. When this is completed and the techniques become generally available (probably by mid 1980), they will be useful for such purposes as the routine laboratory detection of marijuana-intoxicated automobile drivers, screening individuals for current marijuana use in treatment programs, etc. The earlier, more elaborate techniques have been important for research purposes as well as to provide the necessary standards by which the results of more rapid and convenient techniques can be evaluated.

A good beginning has been made in understanding marijuana chemistry and metabolism. It has enabled researchers to demonstrate that marijuana constituents cross the placental barrier and as a result may affect fetal development (9). The presence of cannabinoids in mother's milk also raises the question of possible impact on the

infant of the marijuana-using mother (10). Greater understanding of the chemistry of marijuana has also raised the possibility (cf., Therapeutic Aspects) that one or more of the synthesized components of cannabis in its original or chemically modified form may come to have therapeutic usefulness. Finally, our increased awareness of marijuana's chemical complexity and the ways in which components other than delta-9-THC modify the drug's effects may shed light on the common street belief that different types of marijuana have different effects not wholly related to their THC content.

Acute Effects of Marijuana

Although much recent interest has been focused on the possible long term, chronic effects of marijuana, it is important to recognize that some of the drug's acute effects on intellectual and psychomotor performance have definite practical significance. This includes the likelihood of impaired learning ability when marijuana is used by students during the school day, as well as adverse effects on driving and other complex psychomotor performance.

Effects of the marijuana "high" on various aspects of psychological performance were systematically observed as early as the 1930s and, of course, more subjective accounts of marijuana's effects exist that long antedate scientific description (11, 12). These earlier clinical descriptions have generally been verified by more systematic research investigation.

A wide range of impairment of intellectual performance was initially found. It included such tasks as digit symbol substitution (a timed task in which the individual substitutes a series of symbols for numbers) (13), choice-reaction time (a reaction-time task in which the response depends on rapidly discriminating between choices) (14), the ability to repeat in forward and backward order a succession of digits (15), and to mentally make a succession of repeated subtractions (16). Many other task performances, including concept formation (17), reading comprehension (18), and speech have also been found to be impaired to a greater or lesser extent (19).

Generally, such impairment has been found to be related to several kinds of variables, including the dose of drug, the level of motivation, the individual's tolerance to marijuana, and the complexity and familiarity of the task being performed. More familiar, less demanding tasks are less interfered with than those involving new material and more difficult task requirements. A common denominator to impairment of functioning is the effects of marijuana on short term memory. Marijuana appears to interfere with the transfer of material from immediate to longer term memory storage.(20)

When marijuana is smoked, the ability to recall material learned while "high" is typically impaired. This impairment occurs with a wide variety of verbal, as well as graphic, material. The body of research evidence accumulated to date indicates that marijuana intoxication has a detrimental effect on memory functioning, in that material learned while "high" is significantly less well recalled than that learned in a nondrugged state. This is especially true when the task involves recalling the learned material rather than simply its recognition.

There are now dozens of experimental studies which have been conducted, all of which are generally consistent. While marijuana's acute effects on memory and cognition vary with the task and amounts used, they are almost invariably detrimental.

Although there have been no studies directly assessing the impact of marijuana intoxication on classroom learning the similarities with laboratory experiments which have been done make it virtually certain that the drug interferes with classroom performance as well. Since there is now evidence that substantial numbers of high school students are using marijuana during the course of the school day, it is likely that its use is having a detrimental effect on their classroom functioning and knowledge acquisition.

Acute Marijuana Intoxication and Complex Psychomotor Performance in Driving and Flying

There is good evidence that marijuana use at typical social levels definitely impairs driving ability and related skills. Studies indicating impairment of driving skills include: laboratory assessment of driving-related skills (22), driver-simulator studies (23), test-course performance (24), actual street-driver performance (25) and, as previously reported, a study conducted for the National Highway Traffic Safety Administration of drivers involved in fatal accidents (26).

As use becomes increasingly common and socially acceptable and as the risk of arrest for simple possession decreases, more users are likely to risk driving while high. In limited surveys, from 60 percent to 80 percent of marijuana users questioned indicated that they sometimes drive while high.

Marijuana use in combination with alcohol is also quite common and the risk of the two drugs in combination may well be greater than that posed by either substance alone.

A study of drivers involved in fatal accidents in the greater Boston area was conducted by the Boston University Accident Investigation Team. They found that marijuana smokers were overrepresented in fatal highway accidents as compared to a control group of nonusers of similar age and sex (26).

A more recent study, conducted by the California State Department of Justice, found that of nearly 1,800 blood samples taken from drivers arrested for driving while intoxicated, sixteen percent were positive for marijuana. Where no alcohol was present in the blood sample (about ten percent of the samples) the incidence of marijuana detected rose to twenty-four percent (27). Additional studies of motorist impairment related to marijuana use are being conducted.

There are, therefore, several converging lines of evidence that driving performance is impaired when under the influence of marijuana, viz.: users' subjective assessments of their driving skills while high, measures of driving-related performance, a limited study of actual highway fatalities and a study of individuals arrested for driving while intoxicated.

The parameters of impairment for the average driver under various dosages of marijuana cannot yet be adequately specified. It is important to develop reliable standards for what constitutes driving under the influence of cannabis so as to discourage potentially dangerous driving. At present it is clearly desirable to discourage driving while "high" and to make drivers aware that it is a significant risk.

While there have been no recent studies, previous research findings indicate that experienced pilots undergo marked deterioration in performance under flight simulator test conditions while "high"(28). Thus, flying while marijuana-intoxicated is clearly dangerous.

A continuing danger common to both driving and flying is that some of the perceptual or other performance decrements resulting from marijuana use may persist for some time (possibly several hours) beyond the period of subjective intoxication. Under such circumstances, the individual may attempt to fly or drive without realizing that his or her ability to do so is still impaired although he or she no longer feels "high."

Pulmonary Effects

Because marijuana is typically smoked, its possible adverse effects on the lung and pulmonary function have long been of concern both here and abroad. It is noteworthy that one of the earliest attempts to assess the health and social implications of cannabis use, the Report of the Indian Hemp Drugs Commission of 1893-94, includes observations about its pulmonary effects that are surprisingly similar to more contemporary observations. For example, this report mentions a possible value in the treatment of asthma because of the drug's "pulmonary sedative" qualities. However, it goes on to say that "long continued smoking...doubtless results in the deposition of finely divided carbonaceous matter in the lung tissues, and the presence of other irritating substances in the smoke ultimately causes local irritation of the bronchial mucous membrane, leading to increased secretion, and resulting in the condition which is described as chronic bronchitis in ganja smokers." ("Ganja" is the Indian term for a type of smoked cannabis preparation intermediate in potency between that of marijuana and hashish.) The report makes still another observation strikingly descriptive of present day marijuana use, viz.: "In ganja smoking...the

inspiratory act is far greater and more prolonged, a larger volume of smoke entering the lungs than in cigarette smoking "(29). Such deep inhalation of marijuana may well offset the typically smaller amounts smoked as compared to cigarette smoking. One indication of this is to be found in a study comparing marijuana and cigarette smokers which found that smoking less than one "joint" per day decreases vital capacity--the amount of air the lungs can expel following a deep breath--as much as smoking sixteen cigarettes per day (30). Although the ratio found needs to be confirmed by more extensive research, it suggests that the mode of marijuana inhalation and the way in which it is consumed may result in disproportionately adverse pulmonary effects as compared to modern cigarettes. Part of this difference may be accounted for by the fact that present day cigarettes are filtered and have significantly lower levels of "tar" than was true in the past. Marijuana "joints" are unfiltered and virtually entirely consumed. Moreover, under conditions of ready availability there is some evidence that the number of "joints" consumed may approach that of tobacco cigarettes (as high as ten per day) (31).

Thus far there is no direct evidence that smoking marijuana is correlated with lung cancer. The American experience has been too brief for this to be a likely outcome. Nevertheless, there is good reason for concern about the possibility of pulmonary cancer resulting from extended use over several decades. Like tobacco smoke residuals--so-called "tar"--cannabis residuals when applied to the skin of experimental animals have been shown to be tumor-producing (32). Analysis of marijuana smoke has also found evidence that it contains larger amounts of cancer-producing hydrocarbons. For example, benzopyrene, a known cancer-producing chemical found in tobacco smoke, has been reported to be 70 percent more abundant in marijuana smoke (33).

Cilia which assist in moving inhaled dust and other small foreign particles from the lungs have been found to be adversely affected by marijuana smoke. Following exposure to marijuana smoke, anti-bacterial defense systems in the lung have been shown to be less effective against staphylococcus aureus, a bacterium causing a serious form of pneumonia (34).

While similar effects have not yet been demonstrated in humans, it would be surprising if they did not occur and they may be expected to be dose related. The greater the amount and frequency of use, the greater the likelihood of adverse pulmonary (and other) consequences.

Serious effects on the lungs have been found in rats exposed to marijuana smoke in quantities producing blood cannabinoid levels similar to those of human daily users. The animals were made to inhale smoke in a specially constructed apparatus at daily

intervals for periods corresponding to an eighth to one-half their normal life span. Extensive lung inflammation and degenerative changes were found, similar to but more severe than those produced by exposure to tobacco smoke. The authors conclude that in addition to the irritating effects of smoke, the cannabinoids, chemicals specific to marijuana, "may have a direct undesirable effect on pulmonary function "(35).

There have been several clinical studies of human users which have reported such symptoms as laryngitis, cough, hoarseness, bronchitis, and cellular change in chronic marijuana and hashish smokers which resemble those of heavy tobacco smokers (36,37,38). In one of these, a study of American soldiers stationed in Europe, these symptoms were serious enough for the chronic hashish users involved to seek medical treatment (38). While studies of small numbers of chronic cannabis users in Jamaica, Greece, and Costa Rica did not find evidence of lung pathology, this may have been because traditional users in those countries do not inhale cannabis smoke as deeply and retain it in their lungs as do American users (39,40,41).

From the total body of clinical and experimental evidence accumulated to date, it appears likely that daily use of marijuana leads to lung damage similar to that resulting from heavy cigarette smoking. Since marijuana users often smoke both tobacco and marijuana, the effects of the combination require additional study.

Reproductive Effects of Marijuana

Effects on reproduction have been attributed to marijuana as far back as the earliest cannabis commission's scientific report, that of the Indian Hemp Drugs Commission of 1894. While commenting on a sexual "stimulant" effect similar to that of alcohol, the Report also describes cannabis as "used by ascetics in this country (i.e., India) with the ostensible object of destroying sexual appetite " (42). Quite apart from the drug's psychologically related reproductive effects, there have been numerous experiments with animals detailing effects on organs, processes, and hormone levels related to reproduction. At doses generally much higher than those used by humans, the evidence is consistent--cannabis causes decreases in the weight of organs such as testes and ovaries, as well as altering various hormone levels that are involved in reproduction and lactation. Some more recent studies have examined the effects in animals of drug doses more clearly comparable to heavy use in humans. There have also been a few experiments in which researchers have attempted to study human reproductive effects directly.

With respect to human males, some have found a decrease in levels of serum testosterone correlated with heavy marijuana use, although several others have not. One explanation for this apparent discrepancy in experimental findings is that after smoking marijuana the temporarily depressed levels of testosterone may rapidly return to more usual levels. Depending on the time schedule in which sampling is done, the effect may be missed. Even when testosterone decreases have been found, the levels have been within normal limits. Whether more persistent chronic use of marijuana might result in permanently depressed levels of serum testosterone is not known at this time.

Two studies of the semen of male chronic users have found abnormalities in sperm count, motility and in the structural characteristics of the sperm examined (44,45). In one of these, the semen of 16 healthy young males smoking marijuana under controlled conditions was studied (44). The levels of use while "high"--eight to twenty "joints" per day--were comparable to those of other very heavy users in the general population. Decreases in sperm count and motility were found, together with evidences of structural abnormality in the user's sperm. A second study of Greek chronic users also found structural abnormalities in sperm that were associated with heavy use (45). While the clinical implications of these animal and human findings are by no means certain, decreased fertility might well result, especially in those of already marginal fertility. In the more controlled laboratory study there was an apparent gradual return to normal functioning when marijuana use was discontinued (44). To date (late 1979), there have been no published reports of abnormal offspring of fathers which have been related to their marijuana use. Whether or not alterations in reproductive function might have greater

significance for the developing child or adolescent is not known at this time, although this is a concern since the younger user is probably more vulnerable.

When we turn to the question of marijuana's effects on the female reproductive system, there is some recent animal experimentation with doses comparable to those in actual societal use that suggests possible adverse consequences. Results to date are, however, far from definitive. One study, using THC at levels which the authors describe as "equivalent to moderately heavy marijuana usage in the United States," found that the rate of "reproductive loss" in THC-treated female rhesus monkeys was about four times greater than that in drug-free controls. The majority of these losses represented deaths, abortions, or resorptions of the fetus. No clear pattern of fetal abnormality was evident. The authors conclude that their experimental results "raise the possibility that exposure of the human female to marijuana in amounts in relatively common use may be associated with an increased risk of reproductive loss " (46).

A study of female "street users"--women using marijuana on their own and of unknown potency--has also raised questions about the possible reproductive effects of cannabis on women. In this research 26 women in their twenties who used marijuana three times a week or more for six months or more were compared to a nonusing group of women of similar age. The experimental group had a significantly higher frequency of abnormal menstrual cycles in which they failed to ovulate (i.e., produce a ripened egg) or showed possible evidence of a shortened period of potential fertility--shortened luteal phase of the menstrual cycle. Lowered prolactin levels--a hormone important after childbirth in producing adequate mother's milk--were also found, suggesting that nursing might be impaired in marijuana-using women following childbirth (47). While such findings are of considerable interest, they must be regarded as preliminary. The drug-using women also used larger amounts of alcohol than did the controls, which may have contributed to the result, and there may have been other differences in lifestyle which contributed to the experimental outcome. Nevertheless, both animal and human data raise the distinct possibility that fertility may be impaired in heavy marijuana users as a result of their use. Studies which have been done in countries of more traditional cannabis use are of little value in clarifying this question since male use overwhelmingly predominates among traditional users.

Experiments with radioactively labelled THC (enabling its progress through the body to be traced) clearly indicate that the drug appears in the milk of nursing monkey mothers and in their offspring when the drug is administered to the mothers (48). There is also good evidence that THC and other cannabinoids pass through the placental barrier, reaching the fetus during uterine development where they tend to concentrate in the fetus' fatty tissue

(including the brain) (49). While pre- and postnatal changes related to maternal use have usually only been found with larger doses in animals and have not been reported in humans, the distinct possibility that marijuana use during pregnancy might result in abnormal fetal development makes its use during pregnancy very unwise.

While much remains to be learned about the possible effects of marijuana on reproduction, several points are reasonably clear. Marijuana at higher doses has a range of effects relevant to reproduction in animals. These appear to result from a variety of mechanisms, including the drug's effects on adrenal function and hormone production in testes and ovaries. More recently, at dose levels that might be encountered in the heavy, regular user, possible adverse consequences for fertility in both males and females have been identified. Such effects may be of greater importance for the marginally fertile or the developing adolescent than for the mature, healthy adult. Finally, given the many unknowns concerning possible effects on the human fetus, use of marijuana during pregnancy should be especially discouraged.

Cardiovascular Effects

Although cardiovascular effects of marijuana have been investigated extensively, such research in humans has been largely restricted to healthy young male volunteers in whom the effects appear to be limited in duration and generally benign. One such study examined the short range effects of smoking one to three marijuana cigarettes on 21 male experienced smokers participating in a 94-day in-hospital study of heavy marijuana smoking. They found, as have others, a significant increase in heart rate after smoking although not as clearly dose related as previous findings. They attribute the lack of a clear dose relation to tolerance that developed for the cardiovascular effects of the drug as a result of chronic use. The changes they found in heart functioning were secondary to temporarily increased heart rate and appeared to be free of adverse consequences (50). As previous editions of this report emphasize, however, there is evidence that in patients with already impaired heart function use of marijuana may precipitate chest pain (angina pectoris) more rapidly and following less effort than tobacco cigarettes (51). This possible difference in the response to marijuana in heart disease patients may prove to be of considerable practical significance if use expands to include older populations or if presently young adult users continue to use cannabis as they progress through middle life. Despite the limited evidence to date, a warning to heart patients and others who may have impaired cardiac function not to use marijuana, continues to be justified.

Marijuana and the Immune Response

Because of the importance of the body's natural defenses against illness, principally the immune response, in preserving the health of the individual, reports of impairment of this vital function must continue to be carefully considered. There have been contradictory reports of impairment of this response in humans (52, 53,54,55,56). The animal data, using generally higher doses, have consistently indicated a definite suppression of the test animals' immune responses (51,58). In humans, even when there have been indications of a diminished response, it has not been found in all users and the clinical implications are in doubt. As yet, there has been no epidemiological research undertaken to determine whether marijuana smokers suffer from infections and other diseases to a greater extent than others of similar lifestyle who do not use the drug. For the present, this important question must be regarded as unresolved and the evidence far from clear cut.

Chromosome Abnormalities

There is no new evidence in this area. While there were early reports of increases in chromosomal breaks and abnormalities in human cell cultures, more recent results have been inconclusive. The three positive studies in humans that have been reported have decided limitations (50,60,61). All were retrospective--i.e., studies of those already using marijuana who were compared to nonusers. Such variables as differences in lifestyle, exposure to viral infections and possible use of other drugs, all known to affect chromosome integrity, could not be reliably assessed. In two of the studies, the aberrations observed were found only in a minority of the users.

Three other studies done prospectively (i.e., before and after use) have been reported (62,63,64). All are negative, but the results could have been influenced by the fact that all the subjects had at least some prior experience with marijuana. It is possible that the baseline levels of chromosome deficits may have been elevated by earlier casual marijuana use, thus masking a drug-related effect.

A team investigating the effect of marijuana smoke on human lung cells in laboratory culture has found an increase in the number of cells containing an abnormal number of chromosomes (65). Another investigator who previously reported a high proportion of cells in marijuana smokers with reduced numbers of chromosomes has more recently reported that the addition of delta-9-THC (the principal psychoactive ingredient of marijuana) to human white blood cell cultures also resulted in an increased frequency of cells with abnormally low chromosome numbers (66). The implications of these findings continue to be uncertain.

Overall, there continues to be no convincing evidence that marijuana use causes clinically significant chromosome damage. However, it should be emphasized this year as last that the limitations of the research to date preclude definitive conclusions.

Alterations in Cell Metabolism

The implications of laboratory findings on the inhibition of DNA, RNA, and protein synthesis (all of which are basically related to cellular reproduction and metabolism) are still unknown. Adding delta-9-THC to various types of human and animal cell cultures has been found to inhibit DNA, RNA, and protein synthesis. No effect on DNA repair synthesis was found although the uptake of the chemical precursors within the cells was reduced by half (67).

The possibility that cannabis, or one or more of its chemical ingredients, differentially affects the cell metabolism and reproduction of cancer cells in animals was raised by earlier reported research. One aspect of the mechanism by which this may occur is an inhibition of DNA metabolism in abnormal cells but not in normal cells.

If this preferential inhibition of DNA synthesis in animal tumors also occurs in humans, marijuana might prove of value as an anticancer drug. It should, however, once again be stressed that there is no evidence to date that cannabis or any of its synthesized or naturally occurring constituents is of value in inhibiting human cancer growth. If animal findings of a depressed cell immunity response which is also related to cell metabolism are substantiated in humans, cannabis, its synthesized components or chemically related drugs might prove useful in preventing organ rejection in human organ transplant surgery.

Brain Damage Research

A British research report, which originally appeared in 1971, attributed brain atrophy to cannabis use in a group of young male users. In the original study, 10 patients, with histories of from 3-11 years of marijuana use, were examined by air encephalography, a neurological technique used to detect gross brain changes. The authors concluded that their findings suggested that regular use of cannabis may produce brain atrophy (68). This research was faulted on several grounds: all of the patients had used other drugs, making the causal connection with marijuana use questionable; and the appropriateness of the comparison group and diagnostic technique was questionable. The potential seriousness of the original observations justifies a brief review of several subsequent studies bearing on the original British observations.

In a study of chronic Greek users, a different technique (echoencephalography) was employed to determine whether brain atrophy

might be present in heavy users. The findings from the Greek study were negative; that is, users were not found to differ from nonusers in evidence of gross brain pathology (69).

Two studies were subsequently conducted in Missouri and Massachusetts (70,71). They examined two samples of young men with histories of heavy cannabis smoking using computerized transaxial tomography (CTT), a brain scanning technique for visualizing the anatomy of the brain. In both studies, the resulting brain scans were read by experienced neuroradiologists independent of the drug histories. In neither was there any evidence of cerebral atrophy. As was emphasized last year, however, several additional points should be stressed. Neither study rules out the possibility that more subtle and lasting changes of brain function may occur as a result of heavy and continued marijuana smoking. It is entirely possible to have impairment of brain function from toxic or other causes that is not apparent on gross examination of the brain in the living organism. Nevertheless, virtually all studies completed to date (late 1979) show no evidence of chronically impaired neuropsychologic test performance in humans at dose levels experimentally studied.

A researcher who used electrodes implanted deep within the brains of monkeys instead of more conventional scalp recording techniques has found persistent changes related to chronic use (72). This same investigator has reported that rhesus monkeys administered marijuana smoke from one joint daily for five days per week for six months show persistent microscopic changes in brain cellular structure following this treatment (73). While both these experiments demonstrate the possibility that more subtle changes in brain functioning or structure may occur as a result of marijuana smoking in animals, the implications of these changes for subsequent human or animal behavior are at present unknown. Other studies, using more conventional EEG techniques to measure brain electrical activity, have found changes temporarily associated with acute use, but no evidence of persistently abnormal EEG findings related to chronic cannabis use (74,75).

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Psychopathology

Although this has been discussed in previous editions of this report, and there is little new evidence since the seventh edition, a reiteration of what is known may be useful to those unfamiliar with the area. The most common adverse psychological reaction of marijuana use represents an exaggeration of the more usual marijuana response in which the individual loses perspective (i.e., the realization that what she or he is experiencing is a transient drug-induced distortion of reality) and becomes acutely anxious. This reaction appears to be more common in relatively inexperienced users although unexpectedly higher doses of the drug (e.g., a higher potency variety of marijuana) can cause such a response even in the more experienced user. The symptoms generally respond to authoritative assurance and diminish in a few hours as the immediate effects of acute intoxication recede.

Transient mild paranoid feelings are common in users and it has been suggested that those who are characterized by more paranoid defense mechanisms are less likely to experience other acute adverse reactions. It has been repeatedly emphasized that reactions of users are very much influenced by the set and setting of use. Set refers to the pre-existing expectations the individual has regarding use; by setting is meant the physical environment during use. It is generally conceded that anxiety and mild paranoid reactions are more likely if the user is initially anxious about the experience and/or the circumstances of use are anxiety producing. Additional research support for this clinical impression is found in a field survey which used a questionnaire to measure acute adverse drug reaction. Preliminary work has found that, in a college population, those who are more hypochondriacal, and who feel less in control of their own lives and more at the mercy of external events are more likely to have adverse reactions to marijuana and other psychoactive drugs (79).

An acute brain syndrome associated with cannabis intoxication including such features as clouding of mental processes, disorientation, confusion, and marked memory impairment has been reported (80). It is thought to be dose-related (much more likely at unusually high doses) and to be determined more by the size of the dose than by pre-existing personality. This set of acute symptoms has not been frequently reported in the United States, possibly because until recently very strong cannabis materials were less readily available here than in some overseas locations. Acute brain syndrome also diminishes as the toxic effects of the drug wear off.

Descriptions of a specific cannabis psychosis are to be found principally in the Eastern literature from cultures where use

is typically more frequent and at much higher doses than those generally consumed in the United States (81). It continues to be difficult to interpret such reports because the diagnosis of mental illness is partly dependent upon sociocultural factors. In addition, the diagnostic picture is frequently complicated by use of other drugs and earlier evidence of psychopathology not necessarily associated with drug use. While the overseas studies conducted under United States auspices in Jamaica, Greece, and Costa Rica did not find such adverse consequences, the small size of the user samples studied, together with the probable rarity of the disorder, would have made its detection unlikely.

One clinical study in India has contrasted the features of a paranoid psychosis arising in the course of long term cannabis use with that of paranoid schizophrenia. Twenty-five consecutive patients admitted with each diagnosis were compared. The cannabis users, reportedly, had used the drug for 5 or more years in amounts up to several grams per day in gradually increasing quantities. Those diagnosed as having a cannabis psychosis were characterized by the authors as showing more bizarre behavior, more violence and panic, an absence of schizophrenic thinking and greater insight into their illness. Patients with the cannabis-related disorder recovered rapidly upon being hospitalized and being treated with a major tranquilizer (82).

In this and other clinical studies, it is often difficult to distinguish the role of cannabis from that of pre-existing psychological problems or other environmental precipitants in marijuana-related psychological difficulties. Frequently, heavy marijuana users are also those who have had emotional problems prior to use.

Some further indication of this is to be found in a paper reporting on four cases of well documented schizophrenia in which the use of marijuana is believed to have led to an exacerbation of psychotic symptoms in patients whose psychoses were in at least partial remission prior to use. The author concludes that "While marijuana can perhaps be safely used by many persons, this is not so with the schizophrenic." He urges that schizophrenics be alerted to the special hazards he feels marijuana poses for them in the same way other patients would routinely be alerted to possible hazardous interactions between their illness and substances they might use (83).

In a detailed review of the relationship between cannabis and violence the author concludes that while marijuana probably does not precipitate violent behavior in the majority of users, nevertheless there may be some individuals with a prior history of poor impulse control or special circumstances of stress which combine with pre-existing personality may make use inadvisable.

It is not clear, however, he points out, whether it is specifically marijuana which might have the undesirable effect of releasing violence or any of a variety of other drugs including alcohol (84).

Based on his experience with some five thousand drug-related psychoses encountered while medical director of many youth festivals, one author has summarized his clinical experience including that with marijuana users. In his experience, serious adverse reactions to marijuana are rare, but he offers several sources of concern about its widespread and indiscriminate use. Specifically, he feels that the possibly unexpectedly high potency of some of the cannabis preparations may pose a hazard for those used to weaker materials. Although he believes it to be very rare, he thinks that it is possible to have a psychotic reaction to marijuana. He also believes that persistent psychiatric symptoms after psychotic drug experiences are more common than is generally believed, as many as 5 to 10 percent of those cases which he was able to follow up. While some patients reporting "flashbacks" had their initial "bad trip" on drugs other than marijuana, the flashback recreation of the disturbing aspects of the original experience frequently occurred following alcohol or marijuana use. He concludes by advising that "Those with a history of emotional disturbances and especially 'bad trips' (i.e., previous drug precipitated emotional disturbances) should avoid intoxicants including alcohol and marijuana." Finally, this author advises that present emergency room and psychiatric hospital procedures should be altered to make the situation less judgmental, less frightening and coercive, more compassionate and more acceptable to youth, with more homelike and reassuring surroundings (85).

Marijuana flashbacks--spontaneous recurrences of feelings and perceptions similar to those produced by the drug itself--have been reported. A survey of United States Army users found that flashbacks occurred in both frequent and infrequent users and were not necessarily related to a history of LSD use. Such occurrences may range from the quite vivid recreation of a drug-related experience to a mild evocation of a previous incident. The origin of such experiences is uncertain but those who have had them typically appear to require little or no treatment (86).

One source of information about possible adverse reaction to drugs, including marijuana, is the federally sponsored Drug Abuse Warning Network (DAWN). This is a nationwide reporting system which provides information about the frequency with which various drugs in common use are implicated in patient contacts with such facilities as hospital emergency rooms.

During a 1-year period beginning in May 1976 and ending in April 1977, marijuana ranked thirteenth among the drugs mentioned in drug-related emergency room contacts. But during the year 1978, the most recent year for which complete data are available, marijuana had risen to sixth place. While such figures are not always easy to interpret, they do suggest that marijuana is not an uncommon factor in causing individuals to seek help and that its importance may be rising, possibly because of an increase in the number using the drug or because of the increased availability of stronger materials more likely to precipitate adverse reactions.

Effects of Chronic Use on Intellectual Functioning

The question of whether or not enduring effects on memory and other aspects of intellectual functioning occur as a result of chronic use is a difficult one to answer. While three more carefully controlled studies of heavy users in Jamaica, Greece, and Costa Rica failed to find evidence of this, several caveats should be mentioned. The numbers studied were small, the testing procedures with the populations studied may have been insensitive to drug-induced decrements, if any, and even the mode of drug use may have differed from American use. Overall, the majority of studies have suggested impairment does occur. Unfortunately, the quality of studies in this area leaves much to be desired. Thus the issue still remains in significant doubt, especially with reference to American users.

A retrospective study of an Egyptian prison population of cannabis users compared 850 chronic users with 839 noncannabis-using controls, using a number of tests of psychological functioning. Users were reported to be slower in their psychomotor performance and to show impaired visual coordination and memory for designs. These performance deficiencies were found to be more common in younger, better educated users from urban backgrounds than in older, illiterate users from rural areas (87,88). This study has been sharply criticized for alleged sampling and psychometric deficiencies and equally sharply defended by its author (89,90). Despite the apparent disagreement on many points, there was agreement on the desirability of replicating the work and possibly doing further analysis of the original data. The large samples employed, despite some of the methodological deficiencies, might well make the original Egyptian study more sensitive to modest differences between smoker and nonsmoker groups which smaller studies may well have missed. At present the information available does not permit a conclusive judgment of the adequacy of the study's findings particularly if the data were subjected to more elaborate analysis designed to take some of the criticisms leveled against the study into account.

A study of chronic cannabis users in Northern India has been published based primarily on a comparison of 11 male users (out of a larger sample of 23, in turn chosen from 139 long term cannabis users) with 11 male nonusers who were matched in terms of age, occupation, and marital status. Users had all used cannabis equivalent to about 50 mg THC per day (about the equivalent of 5 to 10 "joints" of typical 1 to 2 percent THC content marijuana) for 5 years or more. They were given physical examinations including various laboratory tests of blood and urine as well as chest X-rays, electrocardiogram (EKG), and electroencephalogram (EEG). Subjects were also given a range of psychological tests of intelligence, memory, and other intellectual functions sometimes impaired in the brain-damaged.

The physical examinations including all but one of the laboratory tests (for uric acid blood levels which were found to be somewhat elevated in users) were normal for both users and controls. On the psychological tests, however, users did significantly less well than did nonusers on: two measures of intelligence (9 to 11 I.Q. points lower for users), a measure of memory, a task requiring reproduction from memory of geometric figures, a test of combined cognitive psychomotor speed, and a test of time perception (91).

Unfortunately, several questions of methodology which might have had an influence on these findings are not clear from the report. Twenty-three users more carefully examined were selected from a larger sample of 139 long-term heavy cannabis users and of these only 11 were then matched with 11 nonusers. It is not clear whether the basis for selection of the initial 23 was random or whether some non-random criteria were used such as ready availability, willingness to be further tested, need for possible inducements to participate, etc. The authors themselves raise the question whether the impairments found in user functioning were caused by drug use or if the impairments detected existed prior to such use. They argue for the desirability of doing a prospective study if the question of cannabis-related impairment of function is ultimately to be resolved. The possibility that other aspects of lifestyle such as inadequate diet might have played a role cannot be dismissed as a factor in the poorer performance of the users. Since users were from among the poorer groups in the society, the cost of their cannabis might well significantly reduce the amounts available for food purchases. At present, the results must be regarded as provocative and should be more carefully explored.

American studies comparing college student users with nonusers have found little in the way of evidence of intellectual performance decrement associated with cannabis use at least as such performance is measured by college grades. As was pointed out in previous reports, the higher levels of motivation of students

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Unfortunately, several questions of methodology which might have had an influence on these findings are not clear from the report. Twenty-three users more carefully examined were selected from a larger sample of 139 long-term heavy cannabis users and of these only 11 were then matched with 11 nonusers. It is not clear whether the basis for selection of the initial 23 was random or whether some non-random criteria were used such as ready availability, willingness to be further tested, need for possible inducements to participate, etc. The authors themselves raise the question whether the impairments found in user functioning were caused by drug use or if the impairments detected existed prior to such use. They argue for the desirability of doing a prospective study if the question of cannabis-related impairment of function is ultimately to be resolved. The possibility that other aspects of lifestyle such as inadequate diet might have played a role cannot be dismissed as a factor in the poorer performance of the users. Since users were from among the poorer groups in the society, the cost of their cannabis might well significantly reduce the amounts available for food purchases. At present, the results must be regarded as provocative and should be more carefully explored.

American studies comparing college student users with nonusers have found little in the way of evidence of intellectual performance decrement associated with cannabis use at least as such performance is measured by college grades. As was pointed out in previous reports, the higher levels of motivation of students

in the schools studied, the rather modest levels of use compared with that overseas and the possibility that those whose performance was impaired by marijuana use had dropped out earlier, all limit broader interpretation of these more limited findings.

Tolerance and Dependence

Tolerance to cannabis--i.e., a diminished response to a given repeated drug dose--is now well substantiated. Tolerance development was originally suspected because experienced overseas users were able to use large quantities of the drug that would have been toxic to United States users accustomed to smaller amounts of the drug. Carefully conducted studies with known doses of marijuana or THC leave little question that tolerance develops with prolonged use.

Several more detailed reviews of tolerance development to the behavioral and physiological effects of marijuana in both animals and humans have been published (92,93,94). A report detailing tolerance development of 30 young adult subjects in a 94-day closed experimental ward environment has also been published which stresses tolerance to both the effects on heart rate and the subjective "high "(95). The practical implications of this work are that experienced, frequent users of marijuana experience less pronounced physiological and psychological changes at a constant level of use than would less experienced users. This is in some contrast with the original impression that users had a "reverse tolerance"--i.e., a greater sensitivity to marijuana upon repeated use. The latter impression probably derived from the relatively low dose, infrequent use that characterized some of the earlier observations. Under those conditions neophyte users may have become more aware of marijuana's subjective effects with repeated use partly as a result of social learning of what was to be expected from the experience and thus subjectively believed that its effects were enhanced. Since marijuana's metabolites (the transformation products which result as marijuana is metabolized) are also persistent in body fat, it is also possible that repeated low dosage use released some of the previously stored material, enhancing the effects. Whatever the ultimate explanation of these earlier impressions, under conditions of heavier, more regular use, tolerance now appears to be well established.

When one turns to the question of "cannabis dependence" the term has often been used in an imprecise way with meanings ranging from a vague desire to continue use, if available, to the manifestation of physical withdrawal symptoms following its discontinuance. If "dependence" is defined as experiencing definite physical symptoms following withdrawal of the drug, there is now experimental evidence that such symptoms can occur at least under conditions of extremely heavy research ward administration that

are atypical of social marijuana use in the United States. The changes noted after drug withdrawal under these experimental conditions include one or more of the following symptoms: irritability, restlessness, decreased appetite, sleep disturbance, sweating, tremor, nausea, vomiting, and diarrhea (96,97). Some of these symptoms were experienced in a similar research study by users who selected their own smoked marijuana doses (98). Such a "withdrawal syndrome" has thus far been reported clinically in only one formal research report.

THERAPEUTIC ASPECTS

A "fringe benefit" of the past decade's marijuana research has been a renewed interest in its potential as a therapeutic agent. As earlier editions of these reports have indicated, cannabis has a very ancient history of use for the treatment of an unusually wide range of human ills. Almost from the dawn of history, cannabis has been used in many parts of the world as a pharmaceutical preparation. As recently as 1937, tinctures of cannabis were still listed in the United States Pharmacopoeia and presumably used therapeutically in the United States. One limitation of these earlier preparations was the extreme variability of drug potency--ranging from inert or nearly so to unexpectedly potent.

Renewed interest in the potential usefulness of cannabis or of some synthetically related drug has led to experimentation with these drugs for a wide range of symptoms and disorders. Although several of these applications have shown promise, much remains to be learned about even the most promising applications.

Control of Nausea in Cancer Chemotherapy

Use of marijuana, THC, or related drugs for the treatment of the extreme nausea and vomiting which often accompany cancer chemotherapy is probably the single most promising application of these drugs. While by no means invariably effective, they are sometimes valuable when other standard antinausea drugs are not. One of the earlier studies done in 1970 found that THC-treated cancer chemotherapy patients showed improved appetite and diminished weight loss (99). A subsequent study done in Boston found that when compared with a placebo--that is, an inert substance--in a double-blind study in which neither patients nor physicians knew which drug was being administered, THC had an antiemetic effect in seven out of ten patients. The placebo-treated patients showed no improvement (100). In one recent study of 15 patients receiving methotrexate for their bone cancer, THC or placebo was randomly assigned. Fourteen of the 15 patients showed improvement following the use of THC. The amount of reduction in nausea and vomiting was closely related to the dose of THC given. At the highest THC dose employed, in 6 percent of the treatment sessions, patients experienced nausea and/or vomiting, compared to 44 percent when half the dosage was used. Such adverse symptoms were found in 72 percent of the sessions in which the pharmacologically inert placebo was employed. In a second phase of the same experiment, four patients who had shown excellent therapeutic response in the first phase were again treated with THC, but this time much less favorable results were achieved. The reasons for this are unclear, although the authors suggest the possibility that these patients developed a tolerance to the effect during the first phase of the experiment (101). Other studies have attempted to compare marijuana-related drugs to other standard antinausea medication to determine their relative effectiveness. Nabilone, a drug chemically related to marijuana constituents, was compared to

prochlorperazine, a standard antinausea drug, in a series of 113 patients receiving cancer chemotherapy. Eighty percent responded to nabilone, compared to 32 percent who responded to prochlorperazine (102). Use of this experimental drug has, however, since been suspended because of toxic effects observed in dogs.

A partial analysis of the response of the first 66 patients of a series of 200 receiving prochlorperazine and THC in an experimental design in which each patient received trials of both found that equal numbers--25--preferred each, 12 had no preference, and four patients did not respond to the question. Sleepiness was the most common side effect of both drugs (103).

Overall, marijuana, THC, and related drugs show promise for treating the nausea and vomiting which are common side effects of chemotherapy. Although thus far, THC and marijuana do not appear to be invariably superior to other medication, they may be useful with patients for whom other drugs are relatively ineffective.

Glaucoma

A second treatment application which has received wide publicity in the mass media is to reduce the vision-destroying intraocular pressure which occurs in open-angle glaucoma. This use is based on the original observation, both in normal young men and in test animals, that such pressure reductions occur (104). Initial trials with oral THC alone found the drug to be of variable success. When used as a supplemental drug with other standard intraocular-pressure-reducing drugs, greater success was achieved. Because of the desirability of developing a more convenient dosage form with fewer side effects, an eye-drop preparation has been tried. Although it showed initial promise in reducing intraocular pressure in rabbits, it produced eye irritation and was ineffective in humans in one trial. Additional human testing is planned.

A recent study employing smoked marijuana with 16 glaucoma patients, eight of whom were hypertensive and eight of whom were not, found that the hypertensive patients showed a significantly greater drop in eye pressure than did those with normal blood pressure (105).

At present, marijuana-related drugs have been shown capable of reducing intraocular pressure in people with glaucoma, alone and in combination with more conventional anti-glaucoma medications. However, the long-term safety and efficacy of marijuana-related drugs administered chronically to glaucoma patients has not been established, nor is there any data from long-term controlled studies to demonstrate whether these preparations can actually preserve visual function in such individuals.

As with other clinical applications, a synthesized drug with fewer of the side effects found with the natural material may ultimately be more useful. Continued clinical trials to determine the most useful combinations with other drugs could be desirable.

Other Therapeutic Uses

A variety of other clinical uses of marijuana have been suggested or experimentally employed. While marijuana's ability to dilate the lung's air passages (bronchodilation) has been thought to have promise in treating asthmatics, the drug's lung-irritating properties seem to have offset this potential benefit. Aerosol preparations for inhalation have shown some promise, but have produced lung irritation and may not be commercially feasible (106). Despite these problems, a marijuana-related drug may still prove to be of limited usefulness since its different mechanism of action from that of conventional drugs may make it useful with some patients with whom other drugs are ineffective.

The paradox that THC and marijuana have both convulsant and anticonvulsant properties has led both to concern about the implications of marijuana use by epileptics and to speculation about its possible value in controlling seizures. In animal experimentation, these drugs have reduced as well as increased seizure activity, depending on how the experiment was conducted. As in the treatment of glaucoma, the possibility that one or more of marijuana's constituents may be useful in combination with other standard antiseizure medication exists, although its usefulness, if any, appears limited at this time. Although a small survey of youthful epileptics did not disclose any particular effect of cannabis use upon their seizure patterns, our present limited knowledge and the possibility that marijuana might adversely affect these patients suggests that caution be exercised in use (107).

While there have been some clinical reports of marijuana reducing muscular spasticity in paraplegics and patients with multiple sclerosis, such work is still in an early stage, and a definite usefulness has not yet been found on a more systematic basis (108).

Still other applications of marijuana in the treatment of depression, pain, and of alcoholism and drug dependence have been variously considered. Although these applications have not been adequately explored, there is little evidence that they are likely to prove useful at this time.

While marijuana and/or its synthesized constituents have shown some promise as therapeutic agents, it should again be emphasized that additional work is necessary before such agents become generally approved as standard medications, even for limited purposes.

If consistently useful medical applications for marijuana are found, it is quite likely that the product or products resulting will be chemically related to but not identical to the natural material's constituents.

Whether or not cannabis, one of its synthesized constituents, or a chemically related compound once again finds a place in modern medicine depends on several considerations. One problem is that pharmaceutically desirable effects may not be persistently useful for the chronic disorders. Tolerance undoubtedly develops for a number of the effects of the natural material. This may also be true for new chemically related compounds. Like any other new medication, chemically related materials must be carefully tested for toxicity and for therapeutic effectiveness. This process is time-consuming and many new pharmaceuticals showing initial promise are ultimately discarded as unanticipated drawbacks and limitations to their use arise.

EFFECTS OF MARIJUANA IN COMBINATION WITH ALCOHOL AND OTHER DRUGS

Since marijuana is so commonly used in combination with alcohol and other drugs, the combined effects of these drugs has potentially important implications. Given the extremely wide range of possible doses and interactions, it is not surprising that our present knowledge is still quite limited. This is true even of the most commonly used combination, alcohol and marijuana.

A related issue is the extent to which marijuana use might displace alcohol use were both drugs equally available. Although some marijuana users in the 1960s were ideologically opposed to alcohol, it now appears that use of both has generally increased. While it is not possible to be certain what would occur under conditions of equal availability, there is no indication that increased marijuana use among teenagers and young adults has resulted in a decrease in alcohol use. In fact, several researchers have noted a positive correlation between heavy marijuana use and that of alcohol; that is, those using marijuana heavily were more likely to use alcohol than those who either did not use it or used it less frequently. One large scale longitudinal study of children from elementary school to high school age has found that the early use of alcohol (and tobacco) is more common in those who also begin marijuana use early or use it more regularly and heavily (109). In one study of marijuana use in young men conducted in a closed experimental ward setting, marijuana smoking increased regardless of the availability of alcohol, although, conversely, alcohol use decreased when marijuana was available (110). Thus the larger question of what would happen in American culture were marijuana more freely available cannot readily be answered. It might well depend on the kinds of informal social attitudes and controls which developed among users.

Animal studies of the behavioral effects of the alcohol-cannabis (or THC-alcohol) combination have generally found that the combined effect is greater than that of either alone (111). For example, the duration of alcohol-induced sleep increased as much as three-fold when rats or mice also received a marijuana extract or THC prior to being given alcohol (112, 113, 114, 116). Animals receiving THC in doses that ordinarily did not interfere with their ability to remain on a moving belt showed increased alcohol-related impairment of their performance (117). When animals have been simultaneously administered both drugs, conditioned avoidance (i.e., a learned avoidance of a noxious stimulus), general activity level, heart rate, and body temperature have been more affected than when either was used alone (118).

The limited human research to date is generally consistent with the results of animal research. Experiments at alcohol levels within the range commonly used socially showed that performance reductions from combined use are greater than those from the use

of either alone. Such decrements have been detected in reasoning, manual dexterity, and standing steadiness (119,120). Although the effects after 40 minutes were greater than either drug separately, 2 hours and 40 minutes later some of the changes were less than those of THC alone. This apparently antagonistic action under some circumstances may result from the different rate at which the two drugs are metabolized. In more recent experiments, when alcohol was given one hour after THC, the effects of the drugs were clearly additive. Combined use reduced reaction time, cognitive performance, standing steadiness, and psychomotor coordination more than that of either alone (121).

In measuring glare recovery--the time it takes for light adaptation after exposure to bright light--it was only slightly greater for the combination than for either alone (122).

The authors of a research paper dealing with the side effects of alcohol and marijuana caution that the use of the two simultaneously may be dangerous for those with cardiac disorders. In a study of seven healthy male volunteers aged 20 to 29, they found that four of the seven developed intense nausea and vomiting when they smoked a marijuana cigarette after drinking a moderate amount of alcohol. The doses of alcohol involved (1 gm ethanol/kg. of body weight or about 57 cc. of pure alcohol for an average man weighing 154 lbs.) represented about the equivalent of three drinks containing one and a half ounces each of 90 proof liquor. All four men were markedly incapacitated during the height of the adverse effects, although they recovered in three to four hours. The fact that not all seven subjects were equally affected illustrates large individual differences in response. One subject, for example, experienced a marked drop in heart rate under the influence of the drugs--from 150 to 36 beats per minute. When the experiment was repeated with half the amount of alcohol originally used, no adverse effects occurred. The volunteers acknowledged that similar adverse consequences had sometimes occurred when they had used the drug recreationally (123).

Taking the total of animal and human research simultaneous use of both alcohol and marijuana typically has more profound effects than the use of either alone. However, the magnitude and duration of the effect may vary depending on the dosages of the two drugs involved, the type of effect measured, and the time intervals involved in administering the drugs. As with either drug alone, there are also undoubtedly individual differences in response to the drugs in combination.

Animal research has raised the question of a possible cross tolerance between alcohol and marijuana. By this is meant regular administration of one drug may result in a decreased response to another drug, even though the other has not been given. A recent experiment has found that when both alcohol and THC were administered to rats, they developed tolerance to alcohol much more quickly than when

they received only alcohol (124). In humans the question of cross tolerance has not yet been resolved. While there is some evidence that the performance of male heavy marijuana users is less affected by drinking four to five ounces of 100 proof alcohol than is that of nonusers, a later study of performance under similar conditions found the trend to be statistically insignificant (that is, the difference found may well have been the result of chance rather than due to prior marijuana use) (125).

There have been few human studies of the interactive effects of marijuana with drugs other than alcohol. However, limited evidence suggests that such interactions may be significant. A study in which high doses of THC were given to young adult males indicates that chronic marijuana use may affect the persistence of barbiturates in the body as well as their rate of absorption (126). Only limited studies of combined use of amphetamines and marijuana in humans have thus far been done. One study found that simultaneous use resulted in an increase in the intensity and duration of the subjective "high" greater than use of either alone produced (127).

The possibility that absorption, distribution, and the metabolism of therapeutic drugs might be modified by marijuana use has been raised. In rats, aspirin has been found to decrease the rate of disappearance of THC in their blood as well as to increase the THC brain levels (128). Since there are many therapeutic drugs in widespread use which are used in many different forms and dosages, much work remains to be done.

THE HAZARDS OF MARIJUANA VERSUS OTHER RECREATIONAL DRUGS

A question that frequently arises is how hazardous is marijuana as compared to alcohol and tobacco. As appealing as such a comparison is, it is also misleading on several grounds. Any comparison of alcohol and tobacco use and that of marijuana compares drugs with great differences in social acceptability, period of use, and degree of availability. The hazards of alcohol and tobacco are reasonably well known and the social and public health costs quite high. For example, fully 10 percent of alcohol users have been described as having an alcohol problem, and alcohol has been implicated in half the automotive fatalities in the United States. The health costs of alcohol in terms of cirrhosis, mental illness, crime, and industrial accidents can also be documented. A similar analysis can be done for tobacco. By contrast, marijuana has only recently become a popular substance; it remains illegal and most use is not habitual at present. Moreover, unlike cigarettes and alcohol, for which the health hazards can be reasonably well specified, much less is known about the implications of marijuana use.

Any consideration of the hazard a drug poses must take into account not only its present use, but also use that might be reasonably expected in the future. At present, this involves many imponderables such as the parameters of risk for various groups in our society at different levels of use, the likely circumstances of use, effects on user functioning and motivation of heavier use patterns, degree of use restriction possible, combined use with other drugs--to name but a few. As the history of the introduction of alcohol demonstrates, it is very difficult to anticipate the problems which will arise in a given society in advance. Thus, any attempt to compare the health impact of marijuana with that of alcohol and tobacco at current levels of use is certain to minimize the hazards of marijuana. But any comparison at levels of anticipated use involves many assumptions that are at best dubious and at worst may be dangerouly misleading. Such a comparison seems, therefore, useless and undesirable until such time as the parameters of risk are better specified than they can be at present.

FUTURE DIRECTIONS

The past decade's priority emphasis on Federal marijuana research has brought about an impressive increase in our knowledge concerning cannabis and its effects. Our understanding of the basic chemistry of marijuana, its mode of action in the body, and some of the acute and chronic effects of the drug have all expanded rapidly. Nevertheless, there are still many areas in which our knowledge continues to be modest. For example, we know little about the implications of use by girls and women both for their own health and for possible offspring. Since nearly half of the

American users are females of childbearing age, this is an important area for further research.

As marijuana use has come to include much younger ages--a decade ago use was largely restricted to young adults, now significant numbers use it in their early teens--the need to understand the implications of use by this group has also become imperative. Unfortunately, teasing out the effects of marijuana from that of both other drugs and other aspects of lifestyle is not always easy. Heavier users of marijuana at any age are more likely than nonusers or light users to take other drugs as well. As we have seen, "street" marijuana can also vary in potency from inert or nearly so to material with high THC content, which is very psychoactive.

While carefully controlled animal experimentation in which factors as disparate as genetic and learning history can be specified is very useful, there are important differences between animals and humans. While marijuana, for example, slows heart action in most animals, in humans it accelerates it. And, while significant progress has been made through special apparatus to induce animals to smoke the material, it is not easy to replicate typical conditions of human use.

The National Institute on Drug Abuse (NIDA), the agency within the Department of Health, Education and Welfare* which has principal responsibility for marijuana research, makes repeated use of non-government scientists serving as consultants to assist in determining new directions for research. One of the central questions that has been considered is the desirability of conducting large-scale, long-term epidemiological studies analogous to those which were done to determine the effects of cigarette smoking. Because the level of marijuana use for most of the population has been modest and because the potency of the material has been so variable, this approach is unlikely to produce results in proportion to its high cost. Instead, the Institute has elected to support a large variety of smaller studies focusing on some of the already identified specific effects as well as exploring implications of use in high risk groups.

Following the recommendations of its consultants, NIDA is particularly concerned with studying the implications of use during periods of likely maximum sensitivity. These include childhood, adolescence, and prenatal development. The study of groups receiving standardized health care is being investigated to determine cost-effective means of doing larger scale studies likely to detect effects in children, adolescents, and young adults. Development of standardized data collection methods which will enable researchers to effectively pool data from several sources is also being pursued. This enables us to detect use implications employing samples larger than are available in any single study. Such standardized methods also make it possible to compare data from different sources.

* Now the Department of Health and Human Services (1980)

Because of the increasing importance of multiple drug use patterns, the implications of that type of use are also being studied. While simultaneous use of alcohol and marijuana is the most common pattern, many users use the drug with other licit and illicit drugs. Such patterns of use and their implications must be explored.

It is unlikely that any single approach will be sufficient. Methods as diversified as the study of the impact of marijuana's constituents on cell membrane metabolism to psychosocial research on changing patterns of use are all essential to developing a well-rounded picture of the implications of marijuana use. It is also unlikely that any single piece of research will provide the definitive answers to our concerns about marijuana's effects. As with other drugs, it is probable that our understanding will increase gradually and that the effects of the drug will not be uniform, but will vary significantly depending upon the age, mental and physical health of the user, and the individual differences in vulnerability to the drug's effects.

Finally, given the marked increase in use by children and adolescents, it is important that we develop more effective means of discouraging use. While some progress has been made in this area, much more needs to be learned about individuals and groups at high risk of becoming seriously involved with marijuana use. Through an improved understanding of the factors which play a role in individual vulnerability we may ultimately be better able to "target" prevention efforts toward those most likely to suffer serious adverse consequences rather than at a more general population.

An important step in the ongoing process of exploring the implications of cannabis use and the best ways of coping with it is an independent review of the marijuana area being sponsored by the Department to be conducted in 1980. This review will provide a fresh look at our present knowledge and possible future directions of effort. It will encompass research into the physiological effects of marijuana use as well as behavioral research into such use-related problems as intervention strategies to help adolescents resist peer pressure. A report is expected to be produced in about one year.

ADDENDUM

The 1979 National Survey--A Marijuana Use Update

At the time of completion of the Eighth Marijuana and Health Report (late 1979), the 1979 National Household Survey had not yet been completed. The following addendum is a brief summary of this most recent National Survey, which was released on June 20, 1980.

As has been consistently true since the National Survey was first conducted in 1972, marijuana use is highly correlated with age. This past year (1979), 8 percent of 12- and 13-year-olds reported some experience with the drug, but by ages 14 and 15 the percentage who had used it increased to 32 percent A simple majority--51 percent--had used it by ages 16 and 17. Peak use was found among 18- to 25-year-olds, a group in which over two-thirds (68 percent) had tried the drug at some time in their lives. Taking the 12- to 17-year-old group as a whole, the percentage that had ever used marijuana had more than doubled since 1972--from 14 percent to 31 percent. Among young adults (18- to 25-year-olds) the increase was smaller--from 48 percent in 1972 to 68 percent in 1979 (a significant increase from 60 percent in 1977).

Current use--defined as use within the month preceding the survey--is also markedly age related. For youth (12 to 17) and young adults (18 to 25), about half as many currently use marijuana as have ever used. Thus 16.7 percent of youth currently use marijuana, figure unchanged from the 1977 survey, but also more than double the 7 percent of this age group that reported current use in 1972. Thirty-five percent of young adults are currently using by late 1979, a figure nearly a third larger than that of 1977. Until this past year's survey, current use was consistently between 25 and 28 percent for all survey years from 1972 to 1977.

For older age groups, that is, those over 26, both lifetime prevalence and current use are markedly lower than for younger persons. Nearly 20 percent (19.6 percent) of older adults had ever used marijuana by 1979, compared to the 7.4 percent who had had marijuana experience in 1972. Current use by this age group has risen from 2.5 percent in 1972 to 6.0 percent this past year (1979). The percentage of older adults reporting current use has nearly doubled since 1977 (from 3.3 to 6 percent).

As the figures indicate, while there have been marked changes in all age groups since 1972, statistically significant changes (i.e., changes not likely to be the result of chance) between 1977 and 1979 were confined to the young adult and older age groups. Youthful use was unchanged from 1977.

This year's survey, for the first time, included questions about perceived hazards of marijuana use. It is noteworthy that only 5 percent of the peak-using 18- to 25-year-old group saw the drug as having "no bad effects." Perceived adverse consequences range from performance and health impairment to possible psychological effects and the increased likelihood of using stronger drugs. Nearly three quarters (72.2 percent) of young adults believed that being high causes impaired driving performance. One in eight young adults felt it would not. These observations on perceived hazards should serve as a useful baseline for future comparisons.

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MARIJUANA: THE MYTH OF HARMLESSNESS GOES UP IN SMOKE

by Peggy Mann

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MARIJUANA: THE MYTH OF HARMLESSNESS GOES UP IN SMOKE

New medical research puts a match to the myth that smoking marijuana is not harmful. The real dope is that the daily habit is damaging to the body as well as the mind.

by Peggy Mann

Is marijuana just the "innocent high" some have made it out to be? New medical research into the effects of this widespread drug points to heretofore unknown risks, as this exclusive two-part Post *series will show.*

"It's unreal," the school guidance counselor told me. "The kid looks you straight in the eye and says—full of conviction—'Well, pot doesn't hurt *me*!' His grades have slid from As and Bs to Cs and Ds. He's been put off the basketball team because of poor performance. He's irritable, hostile, always tired, feels depressed. He cares less about everything. He has a cough, chest pains. He's really going down the tubes. But blowing grass every day, he insists, has no relation to any of this.

"To my mind, the scariest thing about marijuana is that the user can't see what the drug is doing to him. Or, if he does admit to a symptom, he shrugs it off. Yesterday a seventh grader told me, 'I know pot's done bad things to my memory. But I don't really need my memory because I decided I'm not going to college.' "

The guidance counselor is Rick Gibson from Goddard, a small town in Kansas. I met him at lunch in another small Kansas town, Wellington. We were both attending a two-day "Grass Roots Conference on Grass." Wellington's population is 8,500. The school auditorium has 1,000 seats. And both days there was standing room only. Physicians, teachers, school administrators, guidance counselors, psychologists and parents came from all over Kansas and from nearby states to attend.

The Wellington conference was part of a burgeoning new movement throughout America. Schools and parents' groups are waking up to the fact that: (1) marijuana abuse has reached pandemic proportions among our youth; (2) something must be done about it; and (3) they are the ones who must do it. They realize that a vital first step is to educate themselves about the rising tide of medical evidence showing that pot can have serious psychological and physical effects. It can cause cellular damage and impair lung function, the reproductive system and the brain. Furthermore, the younger the user, the more deleterious the effects.

The roster of speakers at Wellington was an impressive one. The first speaker after lunch was Dr. Harold Voth, senior psychiatrist and psychoanalyst at the famed Menninger Foundation in Topeka, Kansas. He has studied the psychopathology of marijuana in depth for the past eight years. Coincidentally, his first point carried on from the one the guidance counselor had just made to me.

"Marijuana produces a wide spectrum of symptoms," said Dr. Voth. "Some affect some people; some affect others. And there are those who seem to 'get away with it' reasonably well, for a while. But there is one truly pernicious symptom—specifically related to marijuana—which seems to be evident in *every* chronic pot user, youngster or adult. This is the extraordinary refusal to accept the hard scientific evidence about the harmful effects of marijuana. The user will scoff at the evidence, twist it, pervert it, call it 'reefer madness'—anything except look it straight in the face.

"This may be one reason much of the media have, until recently, done shockingly little to relay the medical findings about the harmful effects of marijuana to the American public.

"In my opinion, marijuana use in the United States today constitutes a national crisis, and all-out efforts from all segments of our society are essential in view of the enormous harm being done to millions of Americans, particularly our youth."

Statistics on youth drug abuse clearly show why Dr. Voth's prescription for "all-out efforts" must be heeded on a national scale. For example:

- According to a report published by the House of Representatives Select Committee on Narcotics Abuse and Control, "The United States is the most pervasive drug-abusing nation in history and marijuana is our most pervasive illegal drug of abuse." Says Congressman Lester Wolff (D-NY), chairman of that committee: "Our young people are the first in all history to have used marijuana on a mass scale. Neither this nation—nor any other nation—has ever before faced a problem that is so insidious and so dangerous."
- Last year, according to the federal government's drug abuse network, marijuana accounted for the second largest number of admissions to our federally funded drug treatment facilities, and 33 percent of these had started their pot use before age 14.
- According to a recent national



drug abuse survey covering ages 12 and up (1976-1977), use of marijuana is twice as high for youngsters as for adults, and use by youngsters ages 12 to 17 increased by nearly a third in one year. (A new national survey has just been carried out by the National Institute on Drug Abuse and, according to Dr. Robert Peterson, assistant director of research, "We would be very surprised if this did not show an increase in use, especially among young users.")

- According to the High School Senior Survey, the only national drug abuse survey taken every year since 1975 (representing every state except Alaska and Hawaii):
  - In 1979, one out of ten high school seniors smoked pot daily, or almost daily—an 80 percent increase since 1975. Of these, daily users averaged 3½ joints (marijuana cigarettes) a day; 13 percent smoked more than seven joints daily.
  - Of the 50 percent of seniors who smoked pot at all during 1979, 37 percent said they "usually stay high three-to-six hours." (Add to this the fact that marijuana is up to ten times more potent than that smoked a decade ago.)
  - Forty-nine percent of all seniors who used pot "during the past 12 months" also used one or more additional illegal drugs during that period.

Popular drug-culture magazines teach how to grow your own, how to smuggle dope into the U.S., how to dress for pot parties, how to get around the law. Their advertisers reach a market of young people with money to spend, and the drug paraphernalia in their pages is available by mail—portable head shops, accessible to young residents of even the smallest, most remote communities. (Paraphernalia shops have been outlawed in Indiana.)

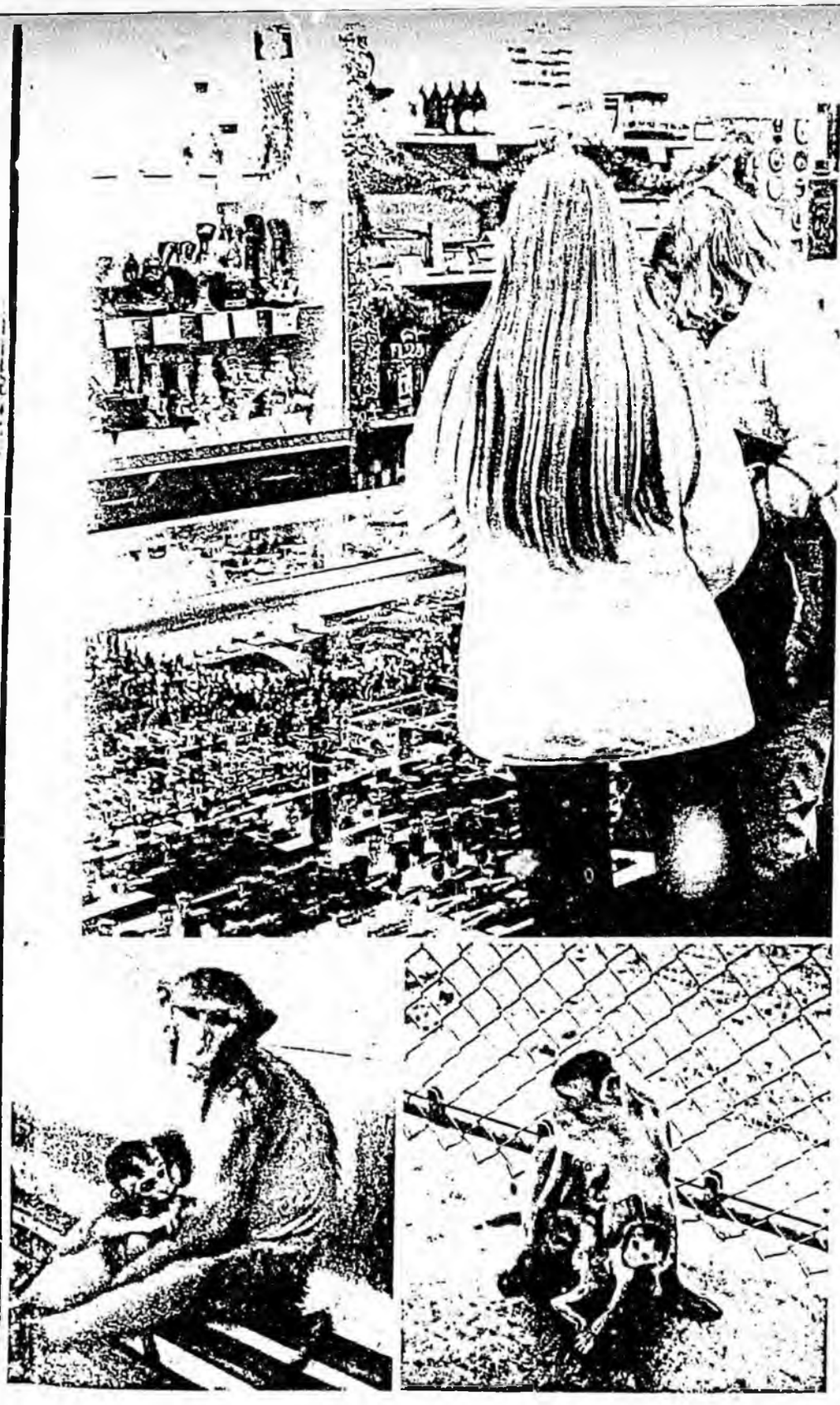


It is worth noting that this study surveys only those students who have made it to the end of their senior year. Drug use among dropouts is notably higher than among those who finish high school. (In some areas, for example, grocery store delivery boys no longer take coffee breaks, but "pot breaks.") Also not included are those who were not in school the day the survey was taken. Truancy is another "symptom" of regular pot use.

All recent state, city, suburban and rural surveys show that pot use has increased rapidly among youngsters of all income levels and all grade levels. with the highest increase at junior high school age. Throughout the country, surveys show that junior and senior high school kids are getting stoned on the way to school, during school, after school and at home—where they often "smoke out the window" or burn incense to cover the smell. One local newspaper series on the subject started: "For many middle school students, marijuana has replaced Wheaties as the morning 'meal.'"

In some areas, pot use starts as early as the fourth and fifth grade. If the saying is true, "as Maine goes, so goes the nation," it is worth noting that a 1979 two-county survey in rural Maine showed that in the fourth grade, 6 percent had tried marijuana at least once and one percent had used it "many times." ("And," says Mel Tremper of Maine's Office of Alcohol and Drug Abuse Prevention, "as drug use goes, we in Maine are kind of behind the times.")

California is a state "ahead of



Rhesus monkeys exposed to the human equivalency dose of one to two joints per day for three years exhibited a loss of drive, motivation and interest in the care of their offspring. A picture of a control, or non-drugged, rhesus shows a rhesus mother nicely nursing her baby. But the THC-treated mother (right) has been exposed to the human equivalency dose of one to three joints a day. Typically, these mothers didn't nurse their babies, groom them, retrieve them or cuddle them as the control mothers did. Dr. Ethel Sassenrath at the Primate Research Center of the University of California, who conducted the experiments, also noted that the THC-exposed babies showed deficits in attention and over-concentration on different stimuli in the environment—the types of deficits of behavior which indicate that the central nervous system had been affected in early development.

"The target for drug paraphernalia in the 1980s is ages 6 to 16," the operator of one of Florida's largest head shop chains recently admitted, claiming it was "an industry decision." Organized campaigns of this sort, added to tremendous peer pressure, are misleading young people into believing that pot smoking is a normal part of growing up.

the times" in this area. Dr. Richard Blum, one of the country's foremost authorities on drug abuse, studied 3,200 school children in California and found that some started pot use in third grade. Said Dr. Blum: "The phenomena that appear in California generally appear in the rest of the country several years later." Dr. Blum's survey was conducted in 1976.

For the past two years, pediatrician Dr. Ingrid Lantner has been speaking on the subject of marijuana at schools in the suburbs of Cleveland, Ohio. She speaks two or three times a week, often to fifth and sixth graders. She always asks them: "How old is the youngest child you know who has smoked marijuana?"

Dr. Lantner told me: "I have never asked this question without hearing about a two- or three-year-old who has been given marijuana by older siblings or parents—and not only once. I know several youngsters who have been smoking daily since they were six years old. In all these cases, the parents are users. I have never known of a grown-up who would give a child that age a tobacco cigarette or any other drug."

Dr. Lantner also asks for written questions from her young audiences. Every time she speaks she receives one or two questions which indicate that parents give pot to their young children. Two typical questions:

"I am ten. My parents let me smoke pot since I was six. Will my eggs be damaged?"

"My brother smoked M.J. since age seven but not every day. Will he have his growth affected? He is now 11. He gets the M.J. from my mother."

Another question Dr. Lantner often receives from fifth and sixth graders is: "What shall I do if someone physically forces me to

smoke pot?"

"School principals tell me," says Dr. Lantner, "that after a ball game, a group of potheads—older students—often come around to sell drugs, and they're very aggressive with the little ones, insisting they buy and smoke on the spot. This happens in a nice, upper-middle-class area in the suburbs of Cleveland."

Nor are the suburbs of Cleveland, Ohio, the only area in the country where parents are giving pot to very young children. Take Missouri, for example. Ed Moses, drug information officer of the state of Missouri, works full time lecturing and teaching about drug abuse. "Every year drug abuse is affecting younger age groups," he told me. "They commonly start feeling the pressure to turn on as early as the fifth and sixth grades. Also, every year the marijuana is getting stronger and more easily available in larger quantities.

"I think the most disturbing thing I've found is many parents' attitude that marijuana is so harmless that it's okay to reward their three- and four-year-old child with getting high.

"For example, at parties, the parent will let the three- to five-year-old child carry the joint around to the toking [pot-smoking] guests. And, as a reward, the child is allowed 'to take a hit' and get stoned. This is becoming more and more common among young parents who are heavy users.

"The youngest I have seen in a home was with a couple in their early 20s who got their nine-month-old baby high by 'shotgunning' the child [turning the cigarette backwards with the lit part in the mouth so that a concentrated rush of smoke can be blown into someone else's mouth or face]. The father told me, 'We like to get Annie high so she won't be afraid to walk.' I pointed out that she was so stoned she couldn't even crawl. The father said, 'Well, that's cool. At least she's not afraid to try.' 'She boogies around when she gets high,' the mother said, laughing. This meant that the baby bounced around a little while. Then she sat—spaced out."

A kindergarten teacher in a South Texas town told me, "My

THC-Injected Mice Produce Abnormal Eggs

Current research indicates that THC (the active agent in marijuan may induce genetic mutation. One recent experiment involved mou ova (female reproduction cells; commonly called "eggs"). Two grou of 26-day-old female mice were used in the experiment. The contr group was allowed to proceed with a normal routine while the te group was injected with daily doses of THC. The animals were th allowed to mate with non-treated young adult mice. Forty-eight hou after mating, the animals were sacrificed and the fertilized eggs we recovered from the oviducts. Abnormal cells occurred in 37.5 perce of ova recovered from the THC-treated mice, compared with 10 pe cent in those obtained from the controls.



A normal ovum (left) shows the chromatin (that part of the cell nucleus that is composed of DNA and is the carrier of the genes) to be finely granular and evenly dispersed throughout and responsive to fertilization and normal cell division.

In stark contrast is the abnormal ovum (above), taken from the THC-treated mice, where the chromatin has clumped together. The fact that it has coagulated is an indication that it is damaged and probably is a nonviable chronosomal substance, in which case there would be no pregnancy at all.



A normal fertilized ovum demonstrates predictable cell division.

Irregular shapes and sizes of fertilized cells appear in the mice ovum the THC-treated group 48 hours after mating.

It was the conclusion of this research that THC does act as a mitotic (dividing cell) poison and therefore is considered a chromosomal mutagen. It is also important to note that unlike male sperm, which is replenished during the entire life of the male, the number of female eggs is determined at birth and, once they are damaged or destroyed, they can never be replaced—the damage is permanent.

children don't smoke pot. But the first grade teachers tell me that some of *their* children come in stoned—always the ones with older brothers and sisters."

Maryland is so "typical" that it is often referred to as "America in miniature." Certainly the 1978 Maryland statewide survey reflects what is being found in local surveys throughout the country: "Students began using one or more illegal drugs at about one year earlier than the same grade level use in the last Maryland survey (1975)." And the "one" drug is invariably marijuana. Most local surveys show that, each year, initial marijuana use drops one year lower.

Older siblings are the chief source of supply for very young users. Because the myth of marijuana's "harmlessness" has so permeated our society, youngsters often feel they are doing their smaller brothers and sisters a favor by getting them high. There is also another motive. If the younger child gets involved, he or she won't "narc" (tell Mom and Dad).

It is quite possible for Mom and Dad to be unaware of the fact that their children are stoned. With marijuana use it's easy to "hide the high" or to "come down" by dinner time. The clearest tell-tale symptom—red eyes—is handled by kids via eye drops. (The eye drop industry reports a boom in sales.) Youngsters who use a local swimming pool have an easy excuse—"chlorine in the water"—even though the closest they may have been to the water was hanging out in the locker room blowing grass.

There are, of course, discernable symptoms of the youngster who is a heavy pot user. Unfortunately, most of them are so much like the "blow up" symptoms of normal adolescence that many parents tend to disregard such as merely something their child will "grow out of." But this is not likely to happen unless the child gets some firm, supportive help from parents and from the school.

Parents should realize that even the "straight" kids (non-drug users)—who represent about 50 percent of most surveys of junior high and high school classes—are under constant peer pressure to "Try it: It's great." And this pressure to start pot use comes not only from peers. All kids are affected by aspects of adult industries which make drug use in general—and pot use in particular—seem like a normal part of growing up in America today.

For example, a recent survey in Atlanta, Georgia, showed that while one third of non-drug-using kids listen to rock music on the radio three hours or more a day, virtually *all* drug-using youngsters listen three or more hours a day. Some reported: "I listen all the time when I'm home." In addition, they have favorite records and cassettes that they put on when they're high and "float with them."

The same Atlanta researcher, Dr. Fred Crawford, studied the contents of rock lyrics to determine what messages they contained suggesting or supporting drug use. He found that more than half of the current rock songs had messages condoning or suggesting the use of drugs, and that many students start listening to rock music at about the time of first use.

And what do they hear when they listen? There are countless songs with "do drug" messages such as this from Eric Clapton:

Cocaine, cocaine
She's all right.

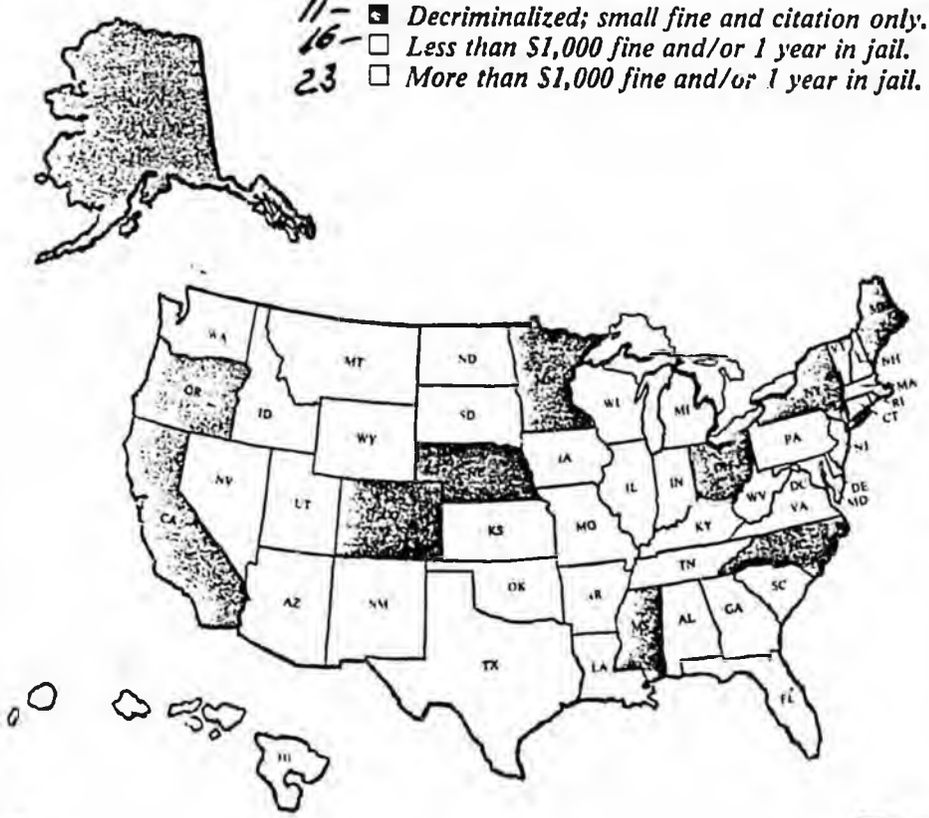
And this from Dr. Hook's Medicine Show the *Sloppy Seconds* album ("killer weed" is marijuana):

Some men need some killer weed
And some men need cocaine
And some men need some cactus juice
To purify their brains.
Blow your whistle,
Bang your gong,
Roll up something to take along
Feels so good it must be wrong
Freakin' at the freakers' ball.

Another example of the "mes-

First-time marijuana-possession penalities for 1 ounce or less:

11– ■ *Decriminalized; small fine and citation only.*
16– □ *Less than $1,000 fine and/or 1 year in jail.*
23 □ *More than $1,000 fine and/or 1 year in jail.*



In most areas, laws for possession of an ounce or less of marijuana (30 to 60 joints) for personal use are not enforced. Some say this is reason to relax the laws (decriminalization) or to eliminate them (legalization). However, in states which have decriminalized pot, law enforcement officials point out that marijuana use among youths has escalated greatly, and traffic accidents and drug-related crimes have increased dramatically.

sages" youngsters receive from the adult community comes from the drug paraphernalia industry—now a $3 billion business. A highly profitable line is the "kiddie" drug paraphernalia, which includes such items as baby bottles and "Catch-a-Buzz" flying discs which double as pot-smoking devices, skateboards and kiddie belt buckles for "hiding your stash" (your supply of pot), comic books which show how to cut and snort cocaine and *McGrussey's Reader*, an easy-to-read, 20-page primer which includes clear directions on how to roll a joint, a pot vocabulary, advice on what to wear to your first pot party, plus a packet of alfalfa "practice grass." For more advanced readers there is *The Whole Drug Manufacturers' Catalog*, one-third of which is devoted to "Kitchen Chemistry and Bathtub Dope: How to Produce Drugs from Non-Prescription Items and Household Chemicals in Your Kitchen Without Prior Chemical Knowledge."

In most states such items are legal and can be found in various varieties of stores, including posh gift shops, boutiques, record stores, flower shops and stores which specialize in magic, Oriental gifts, leather goods, smoking goods, etc., as well as in the "head shops." And some head shops advertise openly in school newspapers as "novelty shops." The kids know what they are, but (presumably) the teachers don't. One of the biggest head shop chain operators in Florida recently told Florida state legislator Mary Ellen Hawkins: "The target for drug paraphenalia in the 1980s is ages 6 to 16." He said this was an industry decision.



A. Non-marijuana smokers have more white cells with 46 chromosomes.



B. Marijuana smokers have an increased percentage of cells with fewer chromosomes.

While a normal cell has the typical complement of 46 chromosomes within its nucleus (left), recent experiments indicate that heavy-marijuana smokers have marked increases in the number of cells with micronuclei (nuclei with less than 46 chromosomes, as pictured right). The experiments were performed to determine the effects of marijuana on human lymphocytes (white blood cells, which are a major part of our bodies' defense systems). Five volunteers with histories of chronic marijuana smoking were used. They ranged in age from 22 to 32 and had histories of smoking at least ten marijuana cigarettes per week for six years or more. Seven healthy students who had no history of smoking marijuana served as the control group. After repeated periods of smoking followed by deprivation, blood samples were obtained from all subjects in the test group. Similar samples were obtained from control subjects on the same day. The cells from the non-marijuana smokers showed a 15 percent incidence of micronuclei, while the cells from the marijuana smokers showed a 36 percent incidence of micronuclei. Dr. Akira Miroshima of Columbia University noted that the marijuana smoker might run a greater risk of disease, since THC lowers our resistance to infection.

What does all this mean in terms of our youngsters' health? And what can parents look for as possible signs or symptoms of chronic pot use among youngsters?

The psychological symptoms are often the first to manifest themselves. These include decreasing school performance; increased irritability ("stop *hassling* me" flared out for no justifiable reason); a general apathy; depression; drastic, inexplicable mood changes; feelings of isolation; a cutting off of communication between parent and child and a general loss of interest in everything except pot smoking and the accompanying "kiddie drug culture."

There are two very common physical symptoms: a chronic cough—a bothersome, constant hacking—and chest pains. Says Dr. Ingrid Lantner, "I have yet to see a teen-age tobacco smoker complain of chest pains, but it's quite common among pot smokers. School nurses tell me this, too."

However, it is the nonvisible physical symptoms which may be the most damaging. And this is the information which is finally crossing the chasm between the scientific community on one shore, which has been putting forth these findings at ever-increasing rates, and the general public on the other shore. For years this chasm has not remained empty. It has been industriously filled with misinformation, distortion and perversion of the facts and, at times, even outright lies emanating from pro-pot organizations and individuals whose purpose seems to be to discredit the findings which prove that pot is harmful and to make it seem an essential and harmless ingredient of the "now" way of life.

Because of this constant surge of misinformation, which is still heard loud and clear throughout the land, pot smokers often have pat answers when confronted with the warning signals now coming loudly and clearly from the scientific community.

One common "turnoff" of these findings is the shoulder-shrug comment, "For every study showing that pot is harmful, there's another showing it's harmless."

This is simply not true.

One of the world's most knowl-

edgeable experts in the field of marijuana is Dr. Carlton Turner, director of the Federal Marijuana Project funded by the National Institute on Drug Abuse (NIDA). Dr. Turner and his associate, Dr. Coy Waller, have just completed a hefty two-volume work: *Marijuana: An Annotated Bibliography*. The first volume has already been published by Macmillan; the second will be published this summer. In preparing these works, Dr. Turner abstracted more than 5,000 scientific publications on cannabis (the plant from which marijuana, hashish and hash oil are prepared). He says: "As a scientist, I have to be objective. I am not a crusader for or against any drug. I am for evaluating any drug on its merit, which I base on all scientific publications about that drug. There is not a single paper on the crude drug marijuana which gives it a clean bill of health, not a single paper to support it as an innocuous drug.

"A widely quoted study of 30 Jamaican cane workers was never published by a scientific journal. It could not stand the scientific review process.

"There *are* some reports on *individual* cannabinoids indicating possible therapeutic use." (Cannabis contains 61 known cannabinoids—substances unique in nature, found only in the cannabis plant.) "However, it must be remembered that any drug has some side effects, and with the broad biological action of the cannabinoids at the cellular level, the side effects may outweigh the benefits in long-term use. This is the reason that marijuana has no place in modern medicine. Using marijuana would be like giving people molded bread to eat to get penicillin.

"Media, with some exceptions, have not taken the time to understand the nature of the crude drug marijuana. If you attend a conference and there are 15 scientific papers cautioning against the use of marijuana, and *one* saying that a single extracted cannabinoid might be useful in a therapeutic area, the media headline this by saying that *marijuana* has been found to be useful. The findings are reported in such a way that the public is led to believe joints of street pot are being smoked by people with glaucoma or by cancer patients to control nausea after chemotherapy treatments, when the research is actually being done with a synthesized THC capsule. And by the time this 'news' sifts down to the school yard, you have kids saying that pot cures cancer, pot cures nearsightedness and pot cleans out your lungs after you smoke tobacco cigarettes." (The latter comes from early findings which indicated that marijuana might be helpful in cases of asthma. Further research clearly showed just the opposite is true.)

"Incidentally, why the media have generally been so 'up' about publicizing the possible medical benefits of marijuana and so 'down' on relaying the consistently emerging evidence concerning the harmful effects of marijuana is a matter to be comtemplated."

Another common argument of pot-smoking youngsters is this: "You have your martini, so why can't I have my pot?"

Dr. Nicholas Pace has a solid answer for this question, and he is well qualified to give it. Dr. Pace is the co-founder and past president of the New York City Affiliate of the National Council on Alcoholism. He is also one of the founding directors of the American Council on Marijuana and Other Psychoactive Drugs.

Dr. Pace points out: "There are two important differences between alcohol and marijuana. First, alcohol has a single chemical, and it is water soluble. One ounce is metabolized and is completely excreted from the body within 12 hours.

"What about pot? Youngsters like to consider it a 'natural weed.' Some even believe it to have health-giving properties. In reality, however, cannabis is an extremely complex crude drug containing 421 known chemicals. When you smoke a joint you are combusting these chemicals into hundreds of other different compounds. And we don't know how they are affecting the body.

"We do know, however, that among the 420 basic chemicals are



The only long-term (20-year) study of the effects of THC on the male reproductive cell (sperm) was conducted in the small laboring village of Piraeus, Greece, by Dr. Marietta Issidorides and Dr. Costas Stefanis of the University of Athens, Greece. Spermatozoa from nonsmokers and from chronic hashish smokers (hashish has a high concentration of THC) were photomicrographed. Normal spermatozoa from a non-hashish-smoking male show a proper density, indicating that it is rich in protein and other essential chemical substances. In the center and right panels, sperm taken from a hashish-smoking male shows a definite breakdown of protein substances and a clumping together of chromosomal material. The research team also noted changes in the ultrastructure of the spermatozoa of chronic hashish-smoking males which could result in genetic disturbances or prevent fertilization.

61 known cannabinoids (new ones are being discovered all the time), and so far scientists have studied only a few of them. We know that at least four of the cannabinoids are psychoactive, or mind-altering. But a few of the nonpsychoactive cannabinoids which have been studied thus far appear to be even more harmful to certain organ systems than the psychoactive ones.

"Therefore," says Dr. Pace, "the first important point to be kept in mind is that even the so-called 'NIDA marijuana' used by scientists is, in fact, a Pandora's box of unknowns."

"NIDA marijuana" is grown on a well-guarded five-acre "pot farm" on the outskirts of the University of Mississippi. This project, funded by the National Institute on Drug Abuse and directed by Dr. Carlton Turner, supplies to researchers marijuana which has a relatively stable Delta-9-THC content of about 2 percent. (This is the chief psychoactive cannabinoid in marijuana.)

Dr. Pace points out that so-called "good street pot" has a four, five or even six percent THC content. Therefore, sobering as the research findings are, they gain an even greater impact when we realize that they represent work with THC half as potent as that which many of our youngsters are smoking regularly today.

"The second important point regarding marijuana," says Dr. Pace, "is the fact that it is fat soluble, like DDT. And we have, of course, banned the use of DDT because it accumulates in body cells and organs.

"The cannabinoids are not only fat soluble. They are, in fact, lipophilic—fat loving. The fatty sections of cells and membranes and the fatty organs of the body act like magnets attracting the cannabinoids. The cell membrane—the coating surrounding the cell—is at least 60 percent fat. When the fat-soluble cannabinoids dissolve in the cell membrane, they make it difficult for the most important constituents of the cell, the proteins, to enter. And cannabinoid clogging of the cell has additional deleterious effects.

"What about the fatty *organs*? It should be remembered that the chief fatty organs of the body are the gonads (sex glands) and the brain. Indeed, the three-pound human brain is composed chiefly of fat. As one prominent researcher once noted: 'We're all fatheads, from that point of view.' "

Dr. Pace and every other marijuana researcher I have interviewed agree that the fat solubility of marijuana is the most important—and ominous—single factor about this drug.

Why? Dr. Pace puts it this way: "The most studied cannabinoid, the popular 'Delta-9,' has been traced radioactively in the body in human and animal studies. All the studies show that it takes three days to a week for the body to rid itself of *half* the THC in a single joint and much longer (some studies show up to 30 days) to get rid of all of it. This means that even if a youngster smokes only one joint a weekend, about half the THC and other cannabinoids *remain* in the body. Half the cannabinoids in next Saturday night's joint are added to the first. And so on, for a smoke-filled series of Saturday nights."

Dr. Robert C. Gilkeson, who has spent 15 years in neurophysiologic research, puts it this way: "No drug or chemical improves the normal cell. Marijuana is a known intoxicant. Toxic means poison. Anyone who smokes or ingests more than the equivalent of one marijuana cigarette every 30 days will accumulate an acute neurotoxic substance in his or her body."

What are the results of "cannabinoid accumulation?"

A single article can only touch the iceberg's tip. This becomes clear when picking up a 777-page volume, *Marijuana: Biological Effects*, published by Pergamon Press. This contains 50 scientific papers given at the two-day Reims Conference held in France in July 1978. The conference was limited to marijuana's effects on four areas: the lungs, the reproductive system, the brain and the cells.

The September issue of the *Post* will discuss these four areas in depth, as well as give some useful pointers for parents and other interested adults who wish to combat this "grass fire" of marijuana use among our young people. ★

PUTTING A MATCH TO THE MARIJUANA MYTH

Most kids are fully convinced that the use of marijuana is not harmful. But new medical research proves them dead wrong.

by Peggy Mann

We have found that students in the lower grades will look their counselors straight in the eye and say—with full conviction—"Pot doesn't hurt me!" But the latest medical research has determined that marijuana can cause cellular damage and impair lung function, the reproductive system and the brain. In the conclusion of this article, we take a closer look at these four areas of abuse—and offer suggestions to parents and other adults interested in combating this "grass fire" now raging through our schools.



Although one in every ten high school seniors admits smoking pot daily, and in some areas pot usage now starts as early as the 4th and 5th grades, the highest usage of all is in the 18- to 25-year age group.

Marijuana and Cellular Damage

Many scientists, including pioneer "pot researcher" Dr. Gabriel Nahas, consider the reports on marijuana's impairing effects on body cells to be the most alarming because, as Dr. Nahas says, "they are the underlying cause of all the other deleterious effects that have been reported."

Not only do cannabinoids clog the cells, inhibiting their functions to some degree, but many studies have shown that heavy pot smokers have an abnormally large number of abnormal cells.

Dr. Akira Morishima, of the Columbia University College of Physicians and Surgeons, has done studies on the increased incidence of cells in marijuana smokers which have less than the normal number of chromosomes and which tend to revert back to the normal level after the individual has stopped smoking pot. In more recent studies, published in June 1980, Dr. Morishima found that THC disturbs the *movement* of chromosomes which, he says, "probably accounts for the production of cells with an abnormal number of chromosomes." A similar finding has just been published by Dr. Arthur Zimmerman in Canada, using an entirely different methodological technique.

Pot advocates are swift to "discredit" chromosome studies by saying that "aspirin and coffee also cause chromosome breaks." Dr. Morishima points out that his studies did not relate to chromosome *breaks*. Furthermore, in the 1980 studies he used the same technique to test the effects of aspirin, caffeine and alcohol on chromosome movement. He also used "comparable doses," except that in the case of alcohol, "we went up to 100 times the equivalency dose." The result? Neither aspirin, caffeine nor alcohol produced abnormal movement of the chromosomes.

As early as 1973, Dr. Nahas found that THC lowered the rate of cell division by diminishing the cell's ability to make DNA, RNA and essential proteins. DNA is the all-important genetic material of the cell. RNA controls gene "expression." These findings have since been replicated by scientists in 12 important research centers in the U.S. and abroad.

Said Dr. Nahas: "These findings indicate that the pot smoker may not only be damaging his own mind and body, but may be playing genetic roulette with his or her unborn children."

Marijuana, Sex and Reproduction

There are other ways in which pot smokers may be damaging their unborn children.

As noted, cannabinoids collect in the fatty gonads *and* in the brain. In the brain, THC seems to affect the hypothalamus which, in turn, affects the pituitary, a pea-like structure at the base of the brain which is a control center for sex and reproductive hormones.

It is not surprising that this double-barreled influence on the reproductive system should result in some dysfunction and abnormalities.

A sexual performance study of 500 pot-smoking men was made by Dr. Robert Kolodny of the Reproductive Biology Research Foundation in St. Louis. He summed up: "The general trend was that with increasing use,

there were lower rates of sexual activity and a lower frequency of orgasm." A study of 1,238 male users in India showed similar results.

Other researchers have shown that marijuana smoked in moderate to heavy doses results in an abnormally large number of abnormal sperm. And this is dose-related. The more joints smoked, the more abnormal sperm there are.

Dr. Carol Grace Smith did a recent study on male rhesus monkeys. Both males and females of this breed have a reproductive system close to humans. "In fact," says Dr. Smith, "under the microscope, rhesus sperm are almost indistinguishable from human sperm." She gave male monkeys the "rhesus THC equivalent" of one to two joints a day. She summed up: "THC profoundly inhibits testosterone and hormones which stimulate the sex organs, bringing them down to the level of a castrated animal. One dose 'shuts down production' for as long as 24 hours."

Testosterone is the all-important male sex hormone. A number of other human and animal studies have also shown that THC lowers the testosterone level in males.

There has been only one study made on long-term (20-year) human male cannabis smokers. The researcher, Dr. Mariette Issidorides, of Greece, summed up: "Cannabis interfered with protein substances essential for the normal development of the sperm, and it altered the metabolism of the sperm cell, thus possibly affecting expression of the genetic material."

Since males produce so many millions of sperm, all indications are that, if the pot smoker ceases and desists, sperm return to normal. Females, however, may be another matter. An infant girl is born with her lifetime supply of eggs. If these are damaged, there's no replacement. And cannabinoids collect in the ovaries, a fact proved by radioactively tagged THC. What effect might this have on the eggs? Thus far, the only researcher to have delved into this question is Dr. Akira Morishima. He worked with "teen-aged" female mice. He gave them miniscule mouse-size doses of THC. Scientists figure in "human equivalency doses," which can be "checked out" by testing THC in blood levels. If a mouse has a percent of THC in its blood which is equal to the percent of THC a human adult has in his or her blood after smoking—for example, one joint at 2 percent THC—then this is the "human equivalency dose." According to human equivalency charts just published by another "pioneer pot researcher," Dr. Harris Rosenkrantz, Dr. Morishima's female mice received the THC "equivalent" of an adult woman smoking two joints a day. In his report, published in July 1979, he revealed that in the control group, very few of the mice had abnormal eggs. But in the THC-exposed group, about half the eggs were dying or had died. "And," said Dr. Morishima, "of those that lived, 20



Magazines extolling the joys of drug taking are found on newsstands throughout the U.S. As some fold, others are born. The slick High Times *boasts 4 million readers. Such publications make illicit drugs seem as "normal" as popcorn and apple pie.*

...30 percent looked unhealthy."

Dr. Ethel Sassenrath at the Primate Research ...ter of the University of California has done other ...es of investigation into pot's effects on the female ...productive system. She works with female rhesus ...keys, whose reproductive system is very close to ...human female's, including a 28-day menstrual cy... Every day for three years—she even came in on ...ristmas—Dr. Sassenrath fed her monkeys the THC ...man equivalency dose of one to two joints. (She gave ...m on raisin cookies.)

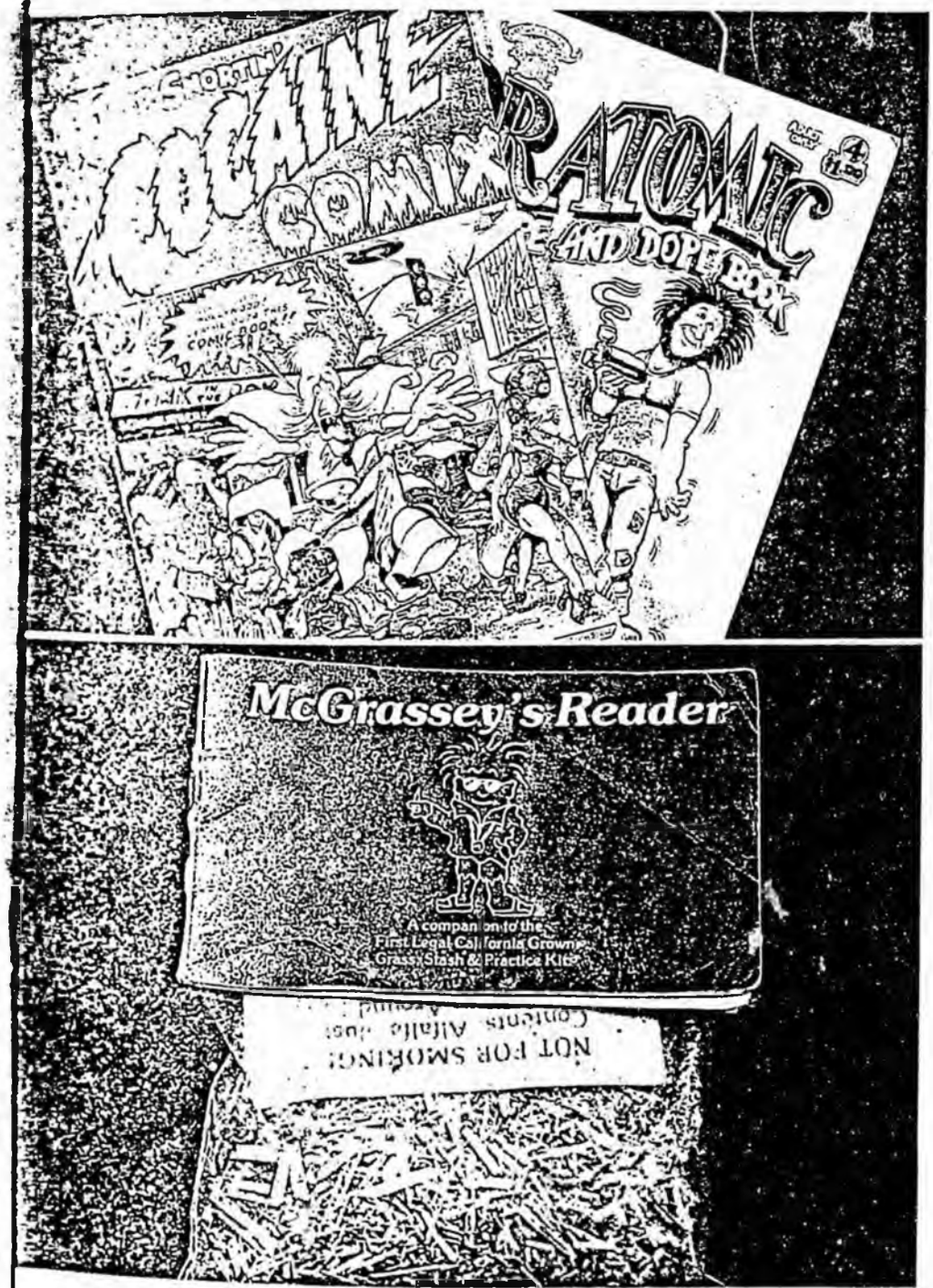
Result: Forty-four percent of the pregnancies of the THC-treated mothers did not result in living offspring. The losses occurred as abortions, reabsorptions, *in utero* death, stillbirth or death just after birth. The control mothers had a 12 percent birth loss—which is normal for a monkey colony.

Of even greater concern were the results obtained when the pathologist did microscopic evaluations of tissues and organs from the dead fetuses and infants. This was a double blind study. He did not know whether tissues came from the THC-exposed offspring or the offspring of undrugged mothers. Result: Although the dead THC-exposed offspring appeared to be normal, in each case he found subtle developmental abnormalities in various organ systems and tissues which were not found in the offspring of the undrugged mothers.

"Furthermore," said Dr. Sassenrath, "the THC-exposed babies that survived acted differently than the others. They over-responded. They didn't seem to have normal 'brakes' on such behavior as active playing without stopping or clasping cagemates who struggled to get away. They all showed deficits in attention and over-concentration on different stimuli in the environment. They had the type of deficits in behavior which indicate that the central nervous system has been affected. This kind of subtle behavioral difference can be characteristic of marginal brain damage in early development."

It has been well established that THC easily passes through the placenta. But how does it affect the placenta itself? In March 1979, Dr. Paige Besch of Baylor College of Medicine in Houston, Texas, completed a four-year study on the subject. He found that the more THC was added to the human placenta, the less estrogen was produced. Says Dr. Besch: "Decreased estrogen results in decreased blood flow to the placenta, which means decreased nutrition to the developing baby."

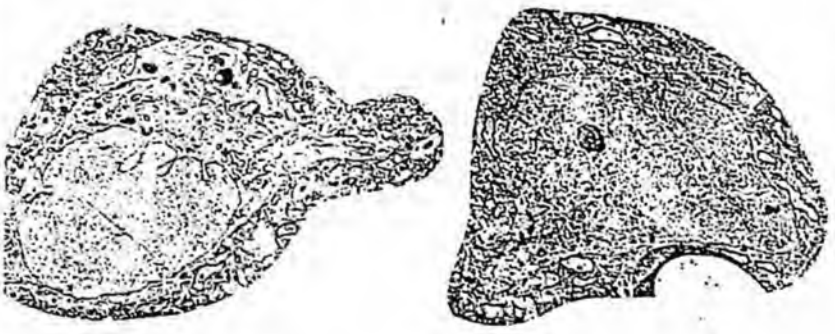
Other scientists working with rhesus monkeys and with human females have found that THC appears to interfere with the hormonal system and with the menstrual cycle. For example, Dr. Joan Bauman and Dr. Robert Kolodny found that 38.8 percent of pot smokers they studied had defective



A profitable branch of the drug publications industry is aimed at children. Comic books show how to "smoke dope," how to cut and snort cocaine. McGrassey's Reader, an easy-to-read primer, explains how to roll a joint and comes with "practice grass" (alfalfa), rolling papers and a "roach clip."

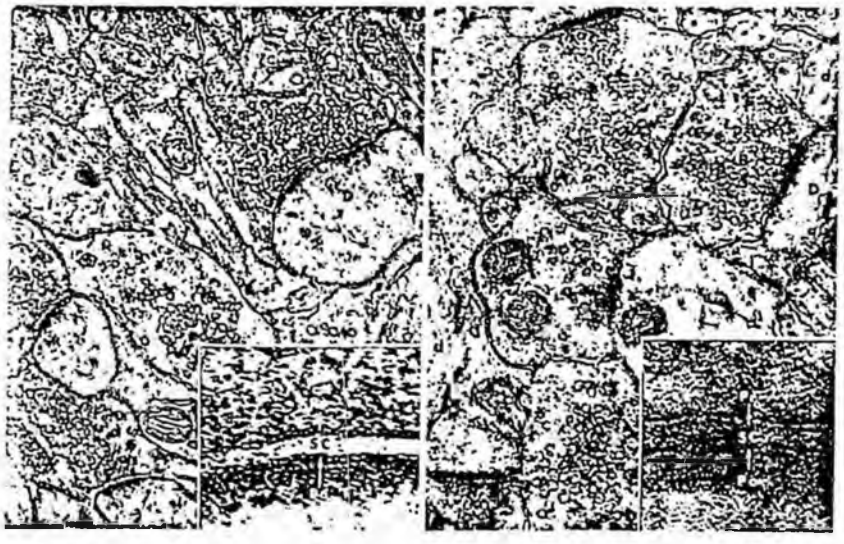
Marijuana and Brain Damage

To determine the effects of marijuana on the brain, Dr. Robert Heath of Tulane University gave rhesus monkeys 2 to 3 "monkey-sized" joints per day (inducing blood levels equal to those of human subjects smoking 3 joints per day) for six months. A control group was given an equal number of marijuana cigarettes with the active ingredient THC removed. Heath reported significant damage.



Normal Brain Cell *Damaged Brain Cell*

While no changes were noted in cells taken from the "control" group, cells from the THC-exposed brains show a marked increase in the number of inclusion bodies that appear in the nuclei, and the rough endoplasmic reticulum is disrupted. These changes in the cell structure may be interpreted as a sign of injury in most cells, including brain cells. These injured cells have a reduced capacity for normal function.



Normal Synapse *Damaged Synapse*

Vital to survival, the synaptic membrane serves as the body's communications network, transmitting messages to the brain. While a normal synapse (left) allows for free flow of messages, the THC-exposed synapse (with widening of the synaptic cleft, electron opaque materials in the cleft and some clumping in the synaptic vesicle) will not properly transmit these necessary messages.

In the light of recent experiments, little doubt can remain as to the gradual, yet significant, consequences of smoking marijuana. Perception, motor activity, sensation, emotional response, motivation, memory and states of awareness can all be affected.

menstrual cycles, compared to 12 percent of the non-pot smokers. Sex hormones were also affected.

Dr. Bauman pointed out: "Researchers are forbidden by FDA regulations to administer marijuana to teen-agers in the course of controlled experiments. But we are particularly worried about what the drug may be doing to pre-teen and teen-aged girls. Any of the effects we found could be even stronger before the body's endocrine-regulated systems have matured."

It should also be remembered that in our country, for the first time in the history of any country, pre-teen and teen-aged girls are smoking cannabis on a mass scale. Our pot-smoking teen-aged girls, therefore, are unwittingly turning themselves into guinea pigs.

Many animal experiments have shown that the mother's THC exposure affects the "next generation," to whom no additional THC has been given. One particularly strange result was found by Dr. Susan Dalterio of the University of Texas Medical School at San Antonio. She gave nursing mice mothers a tiny drop of sesame oil containing THC—the human equivalent of two joints a day. Aside from one equally small dose the day before they gave birth, none of the mother mice had ever before received any THC. The offspring were fed no THC at all. Yet when the males reached young adulthood, they all became very fat and half were "grossly overweight": 50 grams. (The normal male mice of their breed weigh 10 grams.) These fat fellows were also sexually inept, "showing," said Dr. Dalterio primly, "deficient copulatory behavior." When autopsies were performed, there were globs of fat throughout the bodies of all the male mice—whose only exposure to the drug had been as infants, through their mothers' milk.

Other researchers working with mice, rats, dogs, rabbits and rhesus monkeys have shown that the mother's exposure to THC—or to other cannabinoids—causes smaller-than-normal litters and smaller-than-normal babies.

Research on animals has proven that marijuana is not teratogenic

[producing deformed babies]. It is, however, embryocidal [having a fetus-killing effect].

Marijuana and the Brain

Pot is smoked to get a "high"—to "alter" the mind. But no smoker wants his brain cells affected, structurally changed. Yet this may be what is happening.

Dr. Robert Heath, chairman of the department of neurology and psychiatry of Tulane University, has pioneered in the study of the limbic area of the brain, working with humans and with rhesus monkeys. This particular brain area is very similar in both species. This so-called "old mammalian brain" is the site of such specifics as time sense, sexual activity, appetite and emotions—both pleasurable and painful.

In July 1978, Heath showed some startling slides to more than 100 marijuana researchers at the Reims Conference. These were magnified pictures of brain cells from rhesus monkeys that had been exposed to the smoke of two to three "monkey-sized" joints a day (one-fourth the size of an average human joint) at 3 percent THC for six months. The monkeys had received *no* THC for the following six months (equivalent to a much longer time in human terms). Then they were sacrificed and the pictures taken.

Dr. Heath, a distinguished-looking, white-haired man, stood by the large screen. Using a pointer, he illustrated what were, perhaps, the most sobering slides shown during the entire two-day conference. He identified the following structural brain cell changes which were glaringly evident when the cells of the THC-exposed monkeys were compared to the cells taken from the same brain area of the control monkeys.

"Here," said Dr. Heath, "we see an accumulation of granular material in—and a definite widening of—the synaptic cleft between nerve cells [where the flow of messages jumps from one cell to the next]. This," he said, "causes a slowing down in the movement of the messages and may impair some brain processes."

The pointer moved on to another spot. "Here we see a clumping of the synaptic vesicles [small sacs in the endings of nerve cells, containing the essential nerve transmitters: chemical activators of the brain]. We find the identical conditions in cases of early brain damage in humans.

"And here," said Dr. Heath, "note the significant increase in inclusion bodies. These foreign substances are seen in degenerating brain cells of very old animals and humans, but not to the degree that we see them here in very young pot-exposed rhesus monkeys."

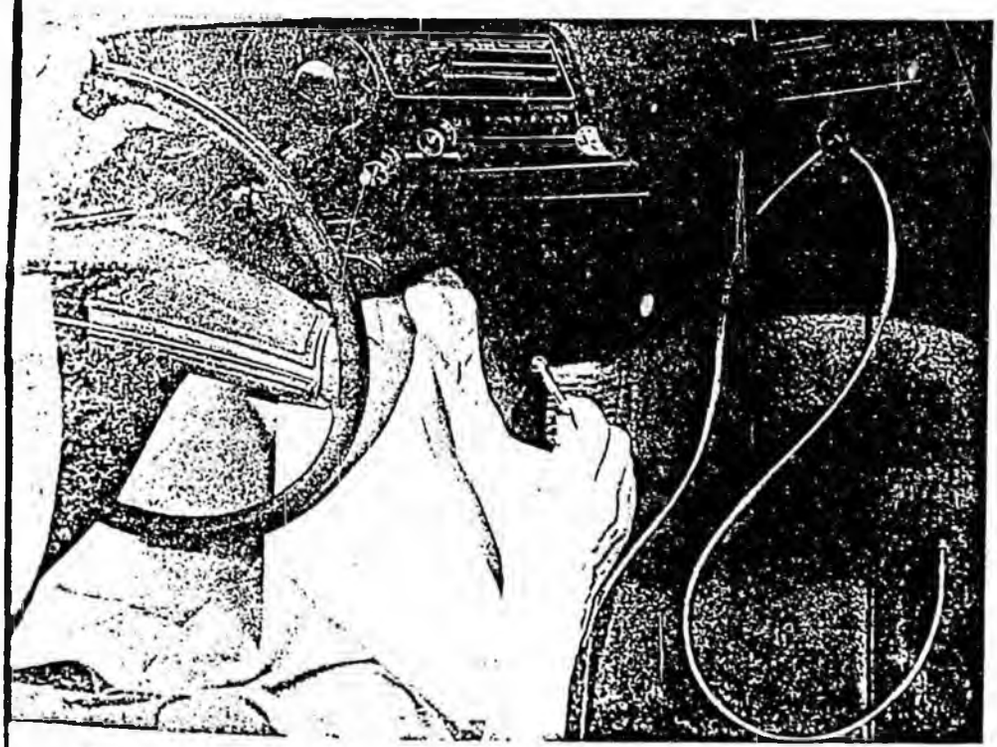
Dr. Heath summed up: "Since the monkeys had received no pot smoke for six months prior to being sacrificed, it is clear that, at least in the limbic area, structural brain changes caused by marijuana are not readily reversible."

Dr. Robert Gilkeson of Cleveland, Ohio, is completing a study of pot-smoking teen-agers which concentrates on EEG readings of the highly developed, cognitive cerebral cortex, or "new brain." Gilkeson specializes in neurophysiologic research and electroencephalography in learning disabilities. In addition to the standard hour-long EEGs, he developed another half-hour of techniques to pinpoint learning disabilities. In a unique on-going study, he has applied this technique to more than 50 youngsters, ages 13 to 18. All come from the affluent suburbs of Cleveland. All said they did not "do" other drugs. All had met the "criteria" of being high on pot at least two or three times a week for the four months preceding the EEG. But all were forbidden to smoke pot for at least 24 hours prior to the test.

Results: *All* EEGs were "markedly immature for age." They also had an abnormal amount of slow theta rhythms, "sufficient," said Gilkeson, "to be diagnostic of diffuse brain impairment. In the EEG section of academic tasks, none of these youngsters could speed up when challenged. Their brain waves failed to respond to these stimuli in the usual way, according to the standardized norms."

Reading the encephalographer's report shocked many youngsters into "getting off the pot." Those who stayed off for three months had normal EEGs when they took the test again. "Of even greater significance," said Gilkeson, "are those who progressed from abnormal to normal with abstinence—and a return to abnormal again when the youngster returned to chronic pot use."

Gilkeson's findings are con-



Dashboard pot pipes enable the smoker to "drive high." More than 50 research studies show that one or two joints seriously impair driving performance, even after the high has gone. Despite this, surveys reveal "60 to 80 percent of users say they sometimes drive while "intoxicated on marijuana."

firmed by a number of other scientists. Dr. Turin Itel, one of the foremost investigators of the effects of drugs on human EEGs, sums up: "Acute or chronic use of marijuana produces an EEG shift toward slow. This is definitely associated with impairment of cognitive functions."

Marijuana and the Lungs

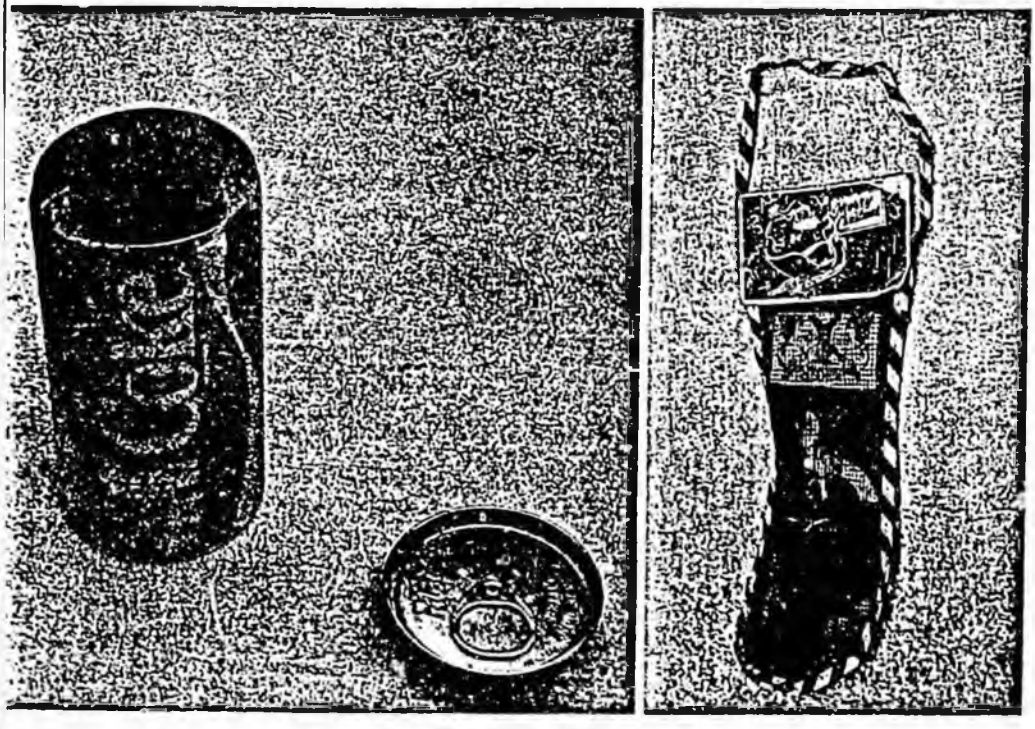
Since pot smoke enters the body through the lungs, it obviously reaches its highest concentration in these organs. A 1975 study compared the compounds in a "weak" marijuana cigarette (.8 percent THC) with a high-tar standard tobacco cigarette. Aside from the fact that tobacco smoke contains nicotine and pot smoke contains cannabinoids, the two types of "smokes" have roughly the same compounds, including lung irritants and carcinogens (cancer-producing agents), co-carcinogens and carcinogen activators. Furthermore, a number of these are present in pot smoke in amounts 50 to 100 percent greater than in tobacco smoke—for example, the carcinogens benzanthracene and benzopyrene, with the latter also being a strong cancer initiator.

In addition to the carcinogens, there are elements in both types of cigarettes which irritate and inflame the lungs. Here, too, marijuana smoke comes out with an even "darker" picture than tobacco smoke. And, whereas tobacco smokers avail themselves of filters, low-tar cigarettes, etc., pot smokers consider "good pot" to be the strongest they can get. In addition, an entire "line" of the drug paraphernalia industry—the "power hitter"—blasts the smoke deep into the lungs. Some power hitters are produced in such kiddie-appealing shapes as red plastic space guns and miniature footballs. Many pot smokers use "bongs" in the belief that drawing the smoke through water or ice lessens the harshness of the smoke by cooling it down. The bong, however, concentrates all the smoke inside a chamber so that none is diffused into the air. As one manufacturer advertises: "The only thing wasted is you."

Pot advocates claim that comparisons between marijuana and tobacco do not hold up, since the tobacco smoker generally puffs on a pack a day or more, whereas the chronic pot smoker may use only one or two joints a day, or less. The noted researcher Dr. Sidney Cohen, who has done one of the three major human studies with marijuana, points out: "There are two factors which equalize the risks involved. First: People—especially young people—are, in fact, smoking more joints per day than ever before [this despite the ever-increasing potency of marijuana available on the streets today]. And it is the younger age groups who seem to be smoking the most.

"Second: Typical tobacco cigarette smokers either do not inhale the smoke into the bronchial passages or, if they do, it is for short periods of time. In contrast, the usual method of smoking marijuana is to inhale the material as deeply as possible, keep it in the lower airways for as long as possible and exhale only when another breath must be taken. At times the inhalation is so complete that no smoke is detectable in the exhaled air.

"This means that not only are the irritants and carcinogens in contact with the actual lung tissue for a longer time, but more of the toxic elements may be absorbed into the bloodstream than is the case with cigarettes. These elements are then delivered to other tissues. New studies show that heavy tobacco smokers are more prone than nonsmokers to cancer of the bladder, the esophagus and other nonpulmonary organs. Presumably, therefore, the carcinogens in both tobacco and marijuana smoke do 'carry.' "



Stash cans for pot come in many guises—and disguises. A popular item: Christmas stockings with candy-flavored rolling papers and pot pipes. Drug paraphernalia has been banned in ten states so far, and the Drug Enforcement Administration's new "model" anti-paraphernalia law is available to all states.

Pot advocates like to point out that "there are no dead bodies from marijuana." With the notable exception of highway accidents caused by stoned drivers, this is true. "However," says Dr. Cohen, "we should not forget that it takes 20 to 30 years of consistent heavy use of tobacco to produce a lung cancer. We have been smoking marijuana heavily in the U.S. for a decade or less. Also, with all our medical sophistication, it was not until the 1950s that we noted any relationship between cigarette smoking and lung cancer.

"In those countries where cannabis has been smoked by adult males for centuries, there have been no long-term longitudinal studies regarding cancer and can-

nabis. Studies have been done, however, which show a high incidence of bronchitis, pharyngitis, etc., among cannabis smokers, especially those who used the stronger varieties."

(In this context, it is interesting to note that in the oft-quoted "Ganja in Jamaica" study of 30 cane workers, lung cells were not analyzed. Furthermore, only healthy people were accepted for the study, thereby excluding those with chronic lung disease. In the words of Dr. John Hall, chairman of the department of medicine in Kingston, "Omitted were all cannabis smokers who showed pathological symptoms such as we see in our clinic." Among other "pathological symptoms" evidenced by long-term "ganja" smokers, Dr. Hall listed emphysema, an irreversible lung disease.)

The 1979 surgeon general's report on tobacco cigarette smoking contained some 30,000 research papers all bearing out the slogan: "The surgeon general warns that cigarette smoking is dangerous to your health." And, based on past statistics, the surgeon general said that "this year alone, cigarettes will kill 346,000 Americans."

Research on marijuana and the lungs is in its infancy compared to that on tobacco and the lungs. But, thus far, the findings are hardly reassuring. For example: Dr. Donald Tashkin, a specialist in pulmonary medicine at UCLA, found a 25 percent increased airflow resistance among pot smokers compared to non-pot smokers. (Airflow determines how well we can get oxygen into our bodies and how well we can get carbon dioxide out.) This was an abnormality which did *not* occur in heavy tobacco smokers.

In studies published in February 1980, Dr. Gary Huber, director of the Smoking and Health Research Program of Harvard University, showed that marijuana activates—by some 200 percent—enzymes which contribute to the "eating" or digesting of the lung itself.

In animal studies where marijuana and tobacco smoke condensates are painted on mouse skin, both produce cancers.

A further gloomy point is that many pot smokers also smoke tobacco cigarettes, and the harmful effects may be additive. Dr. Cohen sums up: "There is real reason for concern that marijuana alone, or marijuana smoked with tobacco, will bring forth a new wave of lung cancer in another 10 to 20 years."

Many people who once believed marijuana to be harmless have now concluded that it may be the most dangerous drug in America today, for many reasons. One such person is Dr. Robert DuPont, chairman of the Drug Dependence Section of the World Psychiatric Association and former federal director of the National Institute on Drug Abuse.

Dr. DuPont says: "I believe it to be our most dangerous drug because of widespread frequent use, especially by our youth, and because the psychological as well as the physical effects are insidious and ultimately devastating. Furthermore, for millions of our youth, marijuana is the gateway to the use of many other illegal drugs, including angel dust, LSD and heroin.

"One of the most disturbing aspects of marijuana use is that the user's judgment about the effects of the drug is clouded by his or her own use of marijuana. If an enemy nation were to plan to undermine America's future, they could not think of a more effective strategy than poisoning our youth. Marijuana is such a poison. The tragedy is more painful because the poison is not being administered by an enemy, but by ourselves. Not only the marijuana-using youth, but all of us as well, must share the responsibility for this tragedy, and we must all participate in combating and overcoming this marijuana plague.

"The one hopeful sign on the horizon is the mobilization of concerned parents. They are distraught—sometimes terrified—by the effects of marijuana on their children. And they are angry at the "professionals" who make them feel that *they* are the problem, rather than the drug. These parents throughout the country are discovering one another and are forming action groups which are beginning to have a positive impact on their own children as well as on our local and national leadership. But parents can't do the job alone. Government, business, educators, media—all segments of our society—must join in a massive endeavor to stop our kids from going to pot."

What Parents Can Do

Three national organizations have spearheaded the movement for "combating" the marijuana plague. The pioneer group in this effort is the American Council on Marijuana, founded in 1977 by the Myrin Institute. On its board were the leading scientists in the field at that time. They developed the first accurate resource materials: scientific information on marijuana for the lay public. Their publication, *Marijuana Today*, by Dr. George Russell, was the first such compilation of medical findings and is now in its fourth updated edition, having sold more than 100,000 copies.

In addition, ACM has held three major conferences at New York University Medical Center and at Columbia University. The second of these, which focused on "Marijuana: Biological Effects and Social Implications," a two-day conference, was the largest gathering of scientists, drug-abuse specialists and educators ever to be held in this country. It was also the first lecture series on marijuana to be accredited by the AMA.

The second organization, also founded in 1977, was PRIDE—Parent Resources and Information on Drug Education—which now has active parent groups in more than 19 states. PRIDE has two main functions: One is to disseminate reliable medical information on the health hazards of marijuana (a "PRIDE Packet" is available to individuals and organizations); the second is to stimulate the organization of new parent groups, using a concept originated by PRIDE—that of developing parent peer pressure groups comprised of the parents of the children's friends (not the parents' friends—these parents may not even know one another) in order to combat teen peer pressure and the "do drug" messages of the "kiddie-youth drug culture." In addition, PRIDE sponsors drug education and prevention conferences for schools, educators and parents to encour-

age them to work together to establish ongoing programs.

The third national organization, Citizens for Informed Choices on Marijuana (CICOM), whose staff helped plan Wellington's "Grass Roots Conference on Grass," has organized similar conferences from Connecticut to Washington.

Lee Dogoloff, White House drug policy advisor, supports the efforts of these groups, saying:

"I truly believe that our brightest hope for the future of hundreds of thousands of young people in the U.S. today is the burgeoning movement of parent/citizen groups now organizing in virtually every state of the nation. There are at this time thousands of adults all working toward the same goal—to see that our children grow up drug-free." ★

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Additional References:

American Council on Drug Education, 6193 Executive Boulevard, Rockville, MD 20852. *Marijuana Today,* by George Russell, Ph.D. Medical findings for the layman. $3.00. *Keep Off the Grass,* by Gabriel Nahas, M.D., Ph.D. The marijuana story from 1969 to 1980. $9.50. *Twelve Is Too Old,* by Peggy Mann. The first novel on the pot scene for teens and pre-teens. $7.95.

Committees of Correspondence, Inc., Box 232, Topsfield, MA 01983. (617) 774-2641. *Quarterly Drug Abuse Newsletter* covering an important issue, plus suggestions on what you can do to effect a change. Encourages letter writing. $10 per year. Resource list, pamphlets, etc.

Drug Enforcement Administration: Preventive Programs, Washington, D.C. 20537. (Or GPO, Washington, D.C. 20402.) Excellent 44-page magazine with articles and pictures on health hazards and articles on drug paraphernalia. Single copies free.

Essex County Grand Jury Presentment, Prosecutors' Office, New Courts Building, Newark, NJ 07102. Startling 60-page report on drug abuse in schools, plus Grand Jury's 31 practical mandates (to schools, courts, PTAs, etc.) which can be adopted or adapted by any community. $5.00.

Executive Information Resources, Box 611, Wellington, Kansas 67152. Unedited cassette tapes of the general sessions of the "Grass Roots Conference on Grass" held in Washington. Tapes are priced at $6.40 each or $35.00 for a complete set of seven tapes. Prices include shipping.

Families in Action, 3845 N. Druid Hills Road, Suite 300, Decatur, GA 30033. 164-page book *How to Organize Your Community.* $10.00. Plus quarterly newsletter which includes latest information on the drug scene at state, national and international levels. $10.00.

Logical Communications, Inc., 16 Thorndal Circle, Darien, CT 06820. *How to Help Your Child Resist the Marijuana Culture.* $3.00.

Mini-Courses, 4290 Raintree Lane NW, Atlanta, GA 30327. Six-unit teaching manual, "Drug Abuse and the Growing Child," for third through eighth grades (for schools, homes and agencies). $10.00. Cassette with narration, plus 80 color slides showing youth drug subculture, plus prevention methods. $46.75.

National Federation of Parents for Drug-Free Youth, 1820 Franwall Ave., Suite 16, Silver Spring, MD 20902. (301) 649-7100 or 1-800-554-5437. *Parent/Community Task Force Manual,* $5.00. *Education Kit/Public Speaking Manual,* $5.00. *Press/Media Guidelines,* $4.00. *Organizing a Parent Group,* $2.00. Membership $10.00.

Narcotics Education, Inc., 6830 Laurel St. NW, Washington, D.C. 20012. Six Q & A booklets on marijuana and P.C.P. $2.00. *Listen* (magazine for teens) issue on marijuana. $1.00.

Phoenix House, 164 West 74th St., New York, NY 10023. Free information on drugs, plus advice on school programs.

Prevention Materials Institute, P.O. Box 152, Lafayette, CA 94549. *Communicating About Drugs,* for parents and teachers. $1.75.

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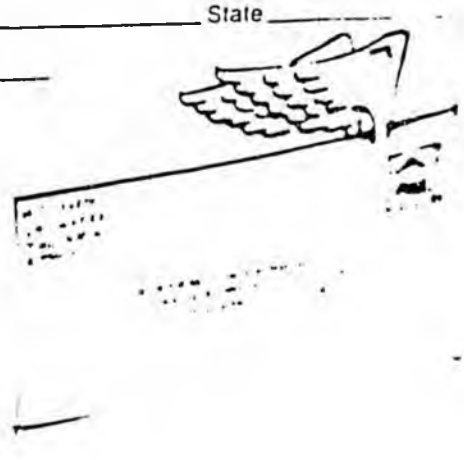
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Marijuana and Health



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Marijuana and Health

Report of a Study
by a Committee of the
INSTITUTE OF MEDICINE
Division of Health Sciences Policy

NATIONAL ACADEMY PRESS
Washington, D.C. 1982

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PREFACE

This report is the work of the many people identified in the preceding pages, and to all of them I am very grateful. I particularly wish to thank my distinguished colleagues on the study committee, upon whose expert knowledge and critical judgment this report rests. They responded conscientiously to all the demands placed on them, and they did so with a promptness and grace that made my task easy.

No study of this kind can be carried out without the help of a skilled staff. We were fortunate to have had the assistance of a devoted and highly capable staff team led by Enriqueta C. Bond and Linda S. Dujack. They coordinated the efforts of the committee, the panel, the consultants, and the Institute of Medicine staff, and they played the key role in keeping everything on schedule. Moreover, they carried out this formidable task with tact and common sense. On behalf of the committee, I wish publicly to acknowledge our indebtedness to the IOM staff, and I also wish to express my personal thanks to Drs. Bond and Dujack for their unfailing support and cooperation.

Finally, I wish to acknowledge my appreciation of the editorial assistance of Wallace K. Waterfall, whose expert touch is evident throughout this document. Our aim was to write a report in "a clear and incisive form for the general public." Any success that we may have achieved is due in no small measure to his efforts.

Arnold S. Relman

Arnold S. Relman, M.D.
Chairman

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Marijuana and Health

SUMMARY

The Institute of Medicine (IOM) of the National Academy of Sciences has conducted a 15-month study of the health-related effects of marijuana, at the request of the Secretary of Health and Human Services and the Director of the National Institutes of Health. The IOM appointed a 22-member committee to:

- analyze existing scientific evidence bearing on the possible hazards to the health and safety of users of marijuana;
- analyze data concerning the possible therapeutic value and health benefits of marijuana;
- assess federal research programs in marijuana;
- identify promising new research directions, and make sugggestions to improve the quality and usefulness of future research; and
- draw conclusions from this review that would accurately assess the limits of present knowledge and thereby provide a factual, scientific basis for the development of future government policy.

This assessment of knowledge of the health-related effects of marijuana is important and timely because marijuana is now the most widely used of all the illicit drugs available in the United States. In 1979, more than 50 million persons had tried it at least once. There has been a steep rise in its use during the past decade, particularly among adolescents and young adults, although there has been a leveling-off in its overall use among high school seniors in the past 2 or 3 years and a small decline in the percentage of seniors who use it frequently. Although substantially more high school students have used alcohol than have ever used marijuana, more high school seniors use marijuana on a daily or near-daily basis (9 percent) than alcohol (6 percent). Much of the heavy use of marijuana, unlike alcohol, takes place in school, where effects on behavior, cognition, and psychomotor performance can be particularly disturbing. Unlike alcohol, which is rapidly metabolized and eliminated from the body, the psychoactive components of marijuana persist in the body for a long time. Similar to alcohol, continued use of marijuana may cause tolerance and dependence. For all these reasons, it is imperative that we have reliable and detailed

information about the effects of marijuana use on health, both in the long and short term.

What, then, did we learn from our review of the published scientific literature? Numerous acute effects have been described in animals, in isolated cells and tissues, and in studies of human volunteers; clinical and epidemiological observations also have been reported. This information is briefly summarized in the following paragraphs.

EFFECTS ON THE NERVOUS SYSTEM AND ON BEHAVIOR

We can say with confidence that marijuana produces acute effects on the brain, including chemical and electrophysiological changes. Its most clearly established acute effects are on mental functions and behavior. With a severity directly related to dose, marijuana impairs motor coordination and affects tracking ability and sensory and perceptual functions important for safe driving and the operation of other machines; it also impairs short-term memory and slows learning. Other acute effects include feelings of euphoria and other mood changes, but there also are disturbing mental phenomena, such as brief periods of anxiety, confusion, or psychosis.

There is not yet any conclusive evidence as to whether prolonged use of marijuana causes permanent changes in the nervous system or sustained impairment of brain function and behavior in human beings. In a few unconfirmed studies in experimental animals, impairment of learning and changes in electrical brain-wave recordings have been observed several months after the cessation of chronic administration of marijuana. In the judgment of the committee, widely cited studies purporting to demonstrate that marijuana affects the gross and microscopic structure of the human or monkey brain are not convincing; much more work is needed to settle this important point.

Chronic relatively heavy use of marijuana is associated with behavioral dysfunction and mental disorders in human beings, but available evidence does not establish if marijuana use under these circumstances is a cause or a result of the mental condition. There are similar problems in interpreting the evidence linking the use of marijuana to subsequent use of other illicit drugs, such as heroin or cocaine. Association does not prove a causal relation, and the use of marijuana may merely be symptomatic of an underlying disposition to use psychoactive drugs rather than a "stepping stone" to involvement with more dangerous substances. It is also difficult to sort out the relationship between use of marijuana and the complex symptoms known as the amotivational syndrome. Self-selection and effects of the drug are probably both contributing to the motivational problems seen in some chronic users of marijuana.

Thus, the long-term effects of marijuana on the human brain and on human behavior remain to be defined. Although we have no convincing evidence thus far of any effects persisting in human beings after cessation of drug use, there may well be subtle but important physical and psychological consequences that have not been recognized.

EFFECTS ON THE CARDIOVASCULAR AND RESPIRATORY SYSTEMS

There is good evidence that the smoking of marijuana usually causes acute changes in the heart and circulation that are characteristic of stress, but there is no evidence to indicate that a permanently deleterious effect on the normal cardiovascular system occurs. There is good evidence to show that marijuana increases the work of the heart, usually by raising heart rate and, in some persons, by raising blood pressure. This rise in workload poses a threat to patients with hypertension, cerebrovascular disease, and coronary atherosclerosis.

Acute exposure to marijuana smoke generally elicits bronchodilation; chronic heavy smoking of marijuana causes inflammation and pre-neoplastic changes in the airways, similar to those produced by smoking of tobacco. Marijuana smoke is a complex mixture that not only has many chemical components (including carbon monoxide and "tar") and biological effects similar to those of tobacco smoke, but also some unique ingredients. This suggests the strong possibility that prolonged heavy smoking of marijuana, like tobacco, will lead to cancer of the respiratory tract and to serious impairment of lung function. Although there is evidence of impaired lung function in chronic smokers, no direct confirmation of the likelihood of cancer has yet been provided, possibly because marijuana has been widely smoked in this country for only about 20 years, and data have not been collected systematically in other countries with a much longer history of heavy marijuana use.

EFFECTS ON THE REPRODUCTIVE SYSTEM AND ON CHROMOSOMES

Although studies in animals have shown that Δ-9-THC (the major psychoactive constituent of marijuana) lowers the concentration in blood serum of pituitary hormones (gonadotropins) that control reproductive functions, it is not known if there is a direct effect on reproductive tissues. Delta-9-THC appears to have a modest reversible suppressive effect on sperm production in men, but there is no proof that it has a deleterious effect on male fertility. Effects on human female hormonal function have been reported, but the evidence is not convincing. However, there is convincing evidence that marijuana interferes with ovulation in female monkeys. No satisfactory studies of the relation between use of marijuana and female fertility and child-bearing have been carried out. Although Δ-9-THC is known to cross the placenta readily and to cause birth defects when administered in large doses to experimental animals, no adequate clinical studies have been carried out to determine if marijuana use can harm the human fetus. There is no conclusive evidence of teratogenicity in human offspring, but a slowly developing or low-level effect might be undetected by the studies done so far. The effects of marijuana on reproductive function and on the fetus are unclear; they may prove to be negligible, but further research to establish or rule out such effects would be of great importance.

Extracts from marijuana smoke particulates ("tar") have been found to produce dose-related mutations in bacteria; however, Δ-9-THC, by itself, is not mutagenic. Marijuana and Δ-9-THC do not appear to break chromosomes, but marijuana may affect chromosome segregation during cell division, resulting in an abnormal number of chromosomes in daughter cells. Although these results are of concern, their clinical significance is unknown.

THE IMMUNE SYSTEM

Similar limitations exist in our understanding of the effects of marijuana on other body systems. For example, some studies of the immune system demonstrate a mild, immunosuppressant effect on human beings, but other studies show no effect.

THERAPEUTIC POTENTIAL

The committee also has examined the evidence on the therapeutic effects of marijuana in a variety of medical disorders. Preliminary studies suggest that marijuana and its derivatives or analogues might be useful in the treatment of the raised intraocular pressure of glaucoma, in the control of the severe nausea and vomiting caused by cancer chemotherapy, and in the treatment of asthma. There also is some preliminary evidence that a marijuana constituent (cannabidiol) might be helpful in the treatment of certain types of epileptic seizures, as well as for spastic disorders and other nervous system diseases. But, in these and all other conditions, much more work is needed. Because marijuana and Δ-9-THC often produce troublesome psychotropic or cardiovascular side-effects that limit their therapeutic usefulness, particularly in older patients, the greatest therapeutic potential probably lies in the use of synthetic analogues of marijuana derivatives with higher ratios of therapeutic to undesirable effects.

THE NEED FOR MORE RESEARCH ON MARIJUANA

The explanation for all of these unanswered questions is insufficient research. We need to know much more about the metabolism of the various marijuana chemical compounds and their biologic effects. This will require many more studies in animals, with particular emphasis on subhuman primates. Basic pharmacologic information obtained in animal experiments will ultimately have to be tested in clinical studies on human beings.

Until 10 or 15 years ago, there was virtually no systematic, rigorously controlled research on the human health-related effects of marijuana and its major constituents. Even now, when standardized marijuana and pure synthetic cannabinoids are available for experimental studies, and good qualitative methods exist for the

measurement of Δ-9-THC and its metabolites in body fluids, well-designed studies on human beings are relatively few. There are difficulties in studying the clinical effects of marijuana in human beings, particularly the effects of long-term use. And yet, without such studies the debate about the safety or hazard of marijuana will remain unresolved. Prospective cohort studies, as well as retrospective case-control studies, would be useful in identifying long-term behavioral and biological consequences of marijuana use.

The federal investment in research on the health-related effects of marijuana has been small, both in relation to the expenditure on other illicit drugs and in absolute terms. The committee considers the research particularly inadequate when viewed in light of the extent of marijuana use in this country, especially by young people. We believe there should be a greater investment in research on marijuana, and that investigator-initiated research grants should be the primary vehicle of support.

The committee considers all of the areas of research on marijuana that are supported by the National Institute on Drug Abuse to be important, but we did not judge the appropriateness of the allocation of resources among those areas, other than to conclude that there should be increased emphasis on studies in human beings and other primates. Recommendations for future research are presented at the end of Chapters 3-7 of this report.

CONCLUSIONS

The scientific evidence published to date indicates that marijuana has a broad range of psychological and biological effects, some of which, at least under certain conditions, are harmful to human health. Unfortunately, the available information does not tell us how serious this risk may be.

Our major conclusion is that what little we know for certain about the effects of marijuana on human health--and all that we have reason to suspect--justifies serious national concern. Of no less concern is the extent of our ignorance about many of the most basic and important questions about the drug. Our major recommendation is that there be a greatly intensified and more comprehensive program of research into the effects of marijuana on the health of the American people.

INTRODUCTION

The Institute of Medicine (IOM) of the National Academy of Sciences has undertaken this review and analysis of the health-related effects of marijuana* at the request of the Secretary of the Department of Health and Human Services (DHHS) and the Director of the National Institutes of Health (NIH).

Scientific controversy and public confusion about marijuana continue unabated and perhaps even are expanding, notwithstanding numerous reports on the topic from authoritative agencies and organizations (Fifth, Sixth, Seventh, and Eighth Annual Reports from the Secretary of Health, Education and Welfare to the Congress on Marijuana and Health; Fehr, et al., Cannabis: Adverse Effects on Health, 1980a; Tinklenberg, Marijuana and Health Hazards and Marijuana in the '80s, a report of the Council on Scientific Affairs, the American Medical Association, 1980). Increasing use of this substance and growing concern about its possible long- and short-term consequences for human health have added some urgency to the need for reassessment of the available data. Interest has been further heightened by recent suggestions that marijuana may also have some medical therapeutic value, which only intensifies the debate about what our public policy towards marijuana ought to be.

With this as background, the Secretary of Health, Education, Welfare, Joseph A. Califano, Jr., in a press statement on April [illegible] 1979, announced the intention of his department to undertake a review that would ". . . assess the information and scientific work now available on the effects of marijuana." He followed that with a memorandum on May 16, 1979, to Donald S. Fredrickson, Director of NIH in which he further stated:

> This review must be undertaken by an independent scientific body that has not staked out a position in this highly controversial field. This review should be conducted by a

*The terms marijuana and cannabis will be used interchangeably in this report. Strictly speaking, they are not synonymous; cannabis is the more general term. (See Glossary, page 9.)

> group of distinguished biomedical and clinical scientists and should involve thorough, systematic review and analysis of the research literature. . . . The report should identify the most urgently needed and promising lines of inquiry to build a firmer base for decision-making in years to come. The information should be available in a clear and incisive form for the general public.
>
> While the Alcohol, Drug Abuse, and Mental Health Administration (ADAMHA) and its National Institute on Drug Abuse (NIDA) have provided leadership in research related to biological and health effects of marijuana, it is most important that we have a review by an independent nongovernmental body, such as the Institute of Medicine. In order to avoid even the appearance of a conflict of interest, inasmuch as this review will cover part of the research plan of ADAMHA-NIDA, I believe it is important that the National Institutes of Health serve as the responsible DHHS agency for seeing that such a review is conducted.

Following Mr. Califano's resignation, subsequent secretaries have confirmed to the Director of the NIH their desire to see this review carried forward. Accordingly, a contract between the NIH and the IOM was executed to provide for a study to commence September 30, 1980, and be completed by December 29, 1981.

THE COMMITTEE'S TASK

Under this contract, the IOM agreed to appoint a committee to:

1. analyze existing scientific evidence bearing on the possible hazards to the health and safety of users of marijuana;
2. analyze data concerning the possible therapeutic value and health benefits of marijuana;
3. assess federal research programs in this area;
4. identify promising new research directions, and make suggestions to improve the quality and usefulness of future research;
5. draw conclusions from this review that would accurately assess the limits of present knowledge and thereby provide a factual, scientific basis for the development of future government policy. Such an assessment also should be helpful to private citizens who want to make their own informed decisions about this subject.

The committee's charge specifically excluded the analysis or formulation of public policy.

PROCEDURE FOR THE STUDY

Primary responsibility for the conduct of the study was vested in a steering committee of 22 biologists, behavioral scientists, and

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clinicians. Although they all were experts in relevant disciplines, only a few had previously been involved in the study of marijuana or had taken public positions on the subject. The committee was divided into six panels, each concerned with major scientific areas: cardiovascular and respiratory system effects; neurobiological effects; epidemiological, behavioral, and psychosocial effects; reproductive biology and effects on the fetus; pharmacology, cell biology, and immunology; and genetic and oncogenic effects. Each panel was chaired by a member of the committee and usually had one or more additional committee members and several expert consultants, whose names appear in the front of this report. The committee also consulted with many other experts in the course of its work and received valuable help from many persons and organizations.

The full committee met five times to coordinate and assess its progress. In the intervals between these meetings, the panels held their own independent sessions and various ad hoc working groups met as necessary. The chairman and members of the committee staff were invited observers at the Conference on Adverse Health and Behavioral Consequences of Cannabis Use, which was sponsored by the Addiction Research Foundation (ARF) of Ontario and the World Health Organization (WHO) and held in Toronto, Canada, from March 30 to April 3, 1981. Other members of our committee served as working members of that conference. We were also fortunate in being able to work closely with members of the ARF/WHO conference staff and having access to all the documents prepared for the Canadian meeting as well as the revised draft of the summary report of the conference (1981).

The committee began by systematically reviewing all the literature published since 1975 on marijuana and related subjects, which had been collected by our staff through a Medline computer search. Earlier literature was selectively examined, as were a variety of other documents, reviews, and monographs on the subject. Our objective was not merely to compile and summarize, but also to evaluate the evidence critically and, with the aid of our consultants, form some judgment of the quality and reliability of the work. Our report is an assessment of what is and is not known, based on our best interpretations of the scientific literature. We confined our attention to published scientific articles as the primary sources of information, relying heavily on experts in each field to select the relevant papers and help us interpret the data.

To obtain additional information and opinions from the public and from professional groups on the health-related effects of marijuana, we solicited written responses in a notice in the Federal Register of February 24, 1981. Responses were received and incorporated into the records of the committee. (See Appendix A for a complete description.) The responses fell into three categories:

1. The dangers of marijuana. Letters in this category came from mothers whose children were using or had used marijuana. These parents believed that drug use by their children led to a lack of motivation and loss of interest in school and other activities. Letters about the harmfulness of the use of marijuana were also received from physicians and scientists.

2. The therapeutic potential of marijuana. Half of the responses were from people who used marijuana illegally for various medical problems and who urged that it be made easily available to patients. Several letters submitted by legislators and doctors described problems in obtaining marijuana for therapeutic use (see Appendix B). A group interested in the legitimate medical use of cannabis emphasized the need for continuing investigation into the numerous constituents of the marijuana plant for therapeutic uses.

3. Support of general use and legalization of marijuana. Letters were received from individuals and groups favoring the use of marijuana and actively promoting its legalization.

This report covers most of the concerns expressed by the public, except the question of legalization. The various statements included many opinions and much anecdotal evidence from laymen and scientists. The committee took note of this material, but has not cited any of it in this report unless it was supported by published data in the scientific literature.

THE ORGANIZATION OF THE REPORT

This report is divided into eight chapters and a summary. The summary includes the principal findings and conclusions of the study, together with suggestions for future research.

The first chapter reviews what is known about the chemistry and pharmacology of marijuana. Chapter 2 deals with the epidemiology and demography of the use of marijuana in the United States. The next three chapters discuss the effects of marijuana on cells, tissues, organs, and biological systems. Chapter 6 deals with behavioral and psychosocial effects. Chapter 7 discusses the present status of marijuana as a therapeutic agent. Chapter 8 describes and analyzes the federal research program on marijuana.

This report is intended to be intelligible to readers who are not expert on the subjects at hand. We have tried to use technical language only where accuracy would be compromised by less precise terms, and to keep the discussions as brief and as clearly stated as is consistent with our obligation to present a valid critique of the state of knowledge in this field. Although we have surveyed the literature as thoroughly as possible, our citations are selective rather than exhaustive, because they are intended to illustrate or document only the key points in the discussion. For comprehensive bibliographies, see Waller et al., 1976; Abel, 1979; and Kalant et al., 1980.

GLOSSARY OF TERMS FOR MARIJUANA-RELATED PRODUCTS

CANNABIDIOL (CBD) and CANNABINOL (CBN) are major cannabinoids generally present in cannabis (see CANNABIS and CANNABINOIDS).

CANNABINOIDS are a class of 21-carbon compounds present in Cannabis sativa. The basic structure contains a six-membered hydroaromatic ring and a benzene ring joined by a pyran moiety (see Figure 1-1 in Chapter 1). Derivatives include a number of carboxylic acids, their analogues, and transformation products.

CANNABIS is a general term for any of the various preparations of the plant Cannabis sativa and the cannabinoids obtained from it. "Cannabinoid" is a generic term for a class of compounds. Cannabis sativa, also called hemp, is an herbaceous annual plant that readily grows in temperate climates. Depending on the geographic region, and other considerations, the various natural preparations of cannabis possess different physical characteristics and concentrations of cannabinoids. Cannabis preparations may contain over 420 different compounds; of these, 61 have been identified as cannabinoids, many of which possess some biological activity. Marijuana, hashish, and tetrahydrocannabinol are examples of different forms or components of cannabis.

HASHISH is a resin, generally more potent than marijuana, which is obtained from Cannabis sativa by shaking, pressing, or scraping the leaves and flowers of the plant and usually contains some of the latter.

MARIJUANA is a general term for crude preparations obtained from the plant Cannabis sativa and is a mixture of crushed leaves, twigs, seeds, and sometimes the flowers of this plant. In the United States, the term "marijuana" has often been used interchangeably with cannabis to refer to any part of the plant or extract therefrom or any of the synthetic cannabinoids that induce somatic and psychic changes in man.

SINSEMILLA is a seedless variety of high-potency marijuana, originally grown in California.

TETRAHYDROCANNABINOL (THC) is one of the major groups of cannabinoids. Delta-9-THC is the principal active constituent in natural cannabis preparations. Delta-9-THC is also known as Δ-1-THC, by a different system of nomenclature. (In the United States, the Δ-9-THC content of marijuana ranges from unmeasurable amounts to about 6 percent.) Another active isomer, Δ-8-THC, is less often present in marijuana and typically occurs in minute amounts. Many derivatives of Δ-9-THC have been synthesized.

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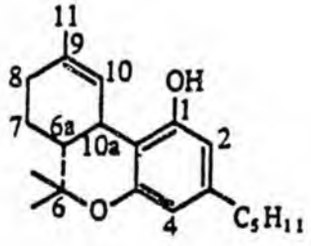
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CHEMISTRY AND PHARMACOLOGY OF MARIJUANA

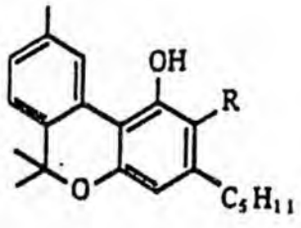
The cannabis plant (Cannabis sativa) thrives under a variety of growing conditions. It has been cultivated for centuries, mainly for hemp fiber, but also for its psychoactive and putative medicinal properties (Abel, 1980; Turner et al., 1980). Although the behavioral and psychological effects were well described in literature of the nineteenth century (Kalant and Kalant, 1968), the complex chemistry and pharmacology of the cannabis plant discouraged extensive investigation until about 15 years ago.

The most prominent effects of cannabis are on psychological phenomena and behavior. Psychopharmacology and behavioral pharmacology have developed as divisions of scientific inquiry only over the past 25 years; therefore, the older cannabis literature, no matter how valuable for observations on other matters, does not provide a basis for quantitative pharmacological analysis and evaluation.

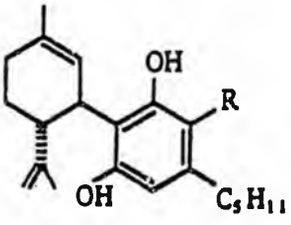
Early pharmacologists could work only with crude extracts of the plant. Although the general structure of the cannabinoids (Figure 1) was known by the turn of the century, the particular cannabinoids that were identified early and were available as pure substances were largely devoid of the characteristic psychoactive and other pharmacological effects of cannabis. Synthetic cannabinoids with cannabislike activity became available in the 1930s. It was not until 1964 that an active ingredient of cannabis was identified as Δ-9-tetrahydrocannabinol (THC) and synthesized (Figure 1) (Gaoni and Mechoulam, 1964; Mechoulam and Gaoni, 1965, 1967). In the mid-1960s, the isolation and synthesis of the main psychoactive component of cannabis and related cannabinoids, together with a rapid increase in the use of marijuana by middle class North American students, stimulated scientific activity (Waller et al., 1976; Waller et al., in press). This chapter, an overview of cannabis chemistry and pharmacology, emphasizes difficulties in the study of this drug (explored further in subsequent chapters) and in evaluating the literature.



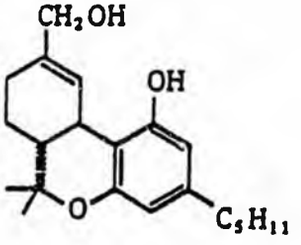
Δ-9-THC



Cannabinol



Cannabidiol



11-hydroxy-Δ-9-THC

FIGURE 1 Cannabinoid structures.

CANNABIS CHEMISTRY

Chemistry of the Plant

Cannabis, the crude material from the plant Cannabis sativa, contains hundreds of chemicals. Most of these are found in other plants, but 61, termed cannabinoids, are unique to the cannabis plant (Table 1). Natural and most synthetic cannabinoids are relatively insoluble in water, but dissolve in fats and fat solvents and are therefore called lipid soluble.

A single cannabinoid, Δ-9-THC, produces almost all the characteristic specific pharmacological effects of the complex, crude cannabis mixtures. A number of synthetic cannabinoids have pharmacological effects similar to Δ-9-THC. Other cannabinoids in the plant, for example, cannabinol (Figure 1), are almost inactive pharmacologically or may interact with Δ-9-THC to modify its actions. One cannabinoid, cannabidiol (CBD), can influence the metabolism of another, Δ-9-THC (Siemens et al., 1976). A few cannabinoids have effects quite different from Δ-9-THC. For example, cannabidiol (Figure 1) has relatively little psychoactive and cardiovascular effect but is an active anticonvulsant (Karler and Turkanis, 1981).

Investigators have chemically altered the Δ-9-THC molecule in an attempt to determine which of its structural elements are required to produce behavioral or other effects (Mechoulam et al., 1980). Studies of structure-activity relationships indicate that, to produce

TABLE 1 Chemical Constituents of Cannabis Preparations

1. Cannabinoids: 61 known
   a. Cannabigerol (CBG) type: 6 known
   b. Cannabichromene (CBC) type: 4 known
   c. Cannabidiol (CBD) type: 7 known
   d. Δ-9-Tetrahydrocannabinol (Δ-9-THC) type: 9 known
   e. Δ-8-Tetrahydrocannabinol (Δ-8-THC) type: 2 known
   f. Cannabicyclol (CBL) type: 3 known
   g. Cannabielsoin (CBE) type: 3 known
   h. Cannabinol (CBN) type: 6 known
   i Cannabinodiol (CBND) type: 2 known
   j. Cannabitriol (CBT) type: 6 known
   k. Miscellaneous types: 9 known
   l. Other cannabinoids: 4 known
2. Nitrogenous compounds: 20 known
3. Amino acids: 18 known
4. Proteins, glycoproteins, and enzymes: 9 known
5. Sugars and related compounds: 34 known
6. Hydrocarbons: 50 known
7. Simple alcohols: 7 known
8. Simple aldehydes: 12 known
9. Simple ketones: 13 known
10. Simple acids: 20 known
11. Fatty acids: 12 known
12. Simple esters and lactones: 13 known
13. Steroids: 11 known
14. Terpenes: 103 known
15. Noncannabinoid phenols: 16 known
16. Flavanoid glycosides: 19 known
17. Vitamins: 1 known
18. Pigments: 2 known

SOURCE: Adapted from Turner, 1980.

effects on behavior, a pyran ring must be part of the three-ring system, a free phenolic hydroxyl on the aromatic ring at C-1, and a lipophilic side chain (C_5H_{11}) at C-3 (Figure 1). Understanding chemical structure-effect relationships is important to guide the synthesis of cannabinoids with differing pharmacological effects. Different effects of Δ-9-THC activity by chemical design will require further syntheses and pharmacological study of a large number of cannabinoids.

Chemistry of the Smoke

It is impossible to understand the effects of cannabis without quantitative control of the composition and the amount of the active substances, that is, control over the dose. Systematic pharmacology must therefore be performed using pure compounds. In the United States, cannabis usually is smoked, which complicates the pharmacology.

The smoke from any burning plant contains hundreds of chemicals that may have biological effects. This poses a dilemma for researchers, because consequences of smoking cannabis cannot be fully determined by studies only of the pure cannabinoids. Studies also are needed with doses of Δ-9-THC delivered, however imperfectly, by smoking.

The dose of Δ-9-THC obtained from smoking cannabis varies greatly, depending on many factors (Table 2). First, the content of Δ-9-THC depends on the genetic background or phenotype of the plant, the sex of the plant, conditions of growth and storage, and the plant preparation smoked. Second, much of the Δ-9-THC in fresh leaves that can be detected by gas-liquid chromatography (GLC) is in inactive carboxylated form. Decarboxylation to the active Δ-9-THC occurs slowly during storage and rapidly during heating, such as occurs in smoking or GLC analysis. Third, the way in which a cigarette is smoked can greatly affect how much of the Δ-9-THC content is absorbed by the smoker.

Cannabis smoke is similar to tobacco smoke in that it is a mixture of very small particles and a gas-vapor phase. Both the particulate and vapor phases contain many identified and probably some still unidentified constituents that, based on clinical experience with tobacco smoke, must be assumed to be potentially harmful (Leuchtenberger and Leuchtenberger, 1976). The amounts of some materials in tobacco cigarette and marijuana cigarette smoke are compared in Table 3. Toxic substances, such as carbon monoxide, hydrogen cyanide, and nitrosamines occur in similar concentrations in tobacco and marijuana smoke; so do the amounts of the particulate material known collectively as "tars."

It is not easy to compare the toxicity of a given number of marijuana cigarettes to a given number of tobacco cigarettes. There are general similarities in the composition of the smoke, but the variations in composition of both tobacco and marijuana cigarettes and differences in smoking techniques make simple extrapolations of risks of tobacco versus marijuana smoking not valid.

TABLE 2 Concentrations of Δ-9-THC in Different Varieties of Marijuana

Type	Percent Δ-9-THC (Percent by Weight)	Normalized Averages[e]
Nepal[c]	2.81	
Mexico[c]	1.68	1.00
Pakistan[c]	1.30	
Colombia[e]		3.00-3.50
India[f]	0.46 (grown above 2000 m)	
	1.39 (grown below 2000 m)	
Jamaica (Ganja)[h]	2.80 (mean)	
United States[c]	0.35	
Sinsemilla (fiber)[d]	0.21	
Sinsemilla (intermediate)[d]	3.58	
Sinsemilla (drug)[d]	6.28	3.00-11.00
Hashish (U.N. standard)[d]	2.22 (7.40)[b]	1.90
NIDA (cigarette 1)[d]	0.84	
NIDA (cigarette 2)[d]	1.86 (2.8)[g]	
Crude marijuana extract[g]	20.00	
Illicit hashish oil[g]	10.00-30.00 (up to 60)[a]	20.00
Research harvest[g]	0.90-2.80	

SOURCES: (a) Jones, 1980; (b) Braenden, 1972; (c) Turner, 1974; (d) Turner, 1980; (e) Turner, 1981; (f) Turner et al., 1979; (g) Rosenkrantz, 1981; (h) Marshman et al., 1976.

TABLE 3 Marijuana and Tobacco Reference Cigarette Analysis of Mainstream Smoke

	Marijuana Cigarette (85 mm)	Tobacco Cigarette (85 mm)
A. Cigarettes		
Average weight, mg	1115	1110
Moisture, percent	10.3	11.1
Pressure drop, cm	14.7	7.2
Static burning rate, mg/s	0.88	0.80
Puff number	10.7	11.1
B. Mainstream smoke		
I. Gas phase		
Carbon monoxide, vol. percent	3.99	4.58
mg	17.6	20.2
Carbon dioxide, vol. percent	8.27	9.38
mg	57.3	65.0
Ammonia, µg	228	199
HCN, µg	532	498
Cyanogen $(CN)_2$, µg	19	20
Isoprene, µg	83	310
Acetaldehyde, µg	1200	980
Acetone, µg	443	578
Acrolein, µg	92	85
Acetonitrile, µg	132	123
Benzene, µg	76	67
Toluene, µg	112	108
Vinyl chloride, ng[a]	5.4	12.4
Dimethylnitrosamine, ng[a]	75	84
Methylethylnitrosamine, ng[a]	27	30
pH, third puff	6.56	6.14
fifth puff	6.57	6.15
seventh puff	6.58	6.14
ninth puff	6.56	6.10
tenth puff	6.58	6.02
II. Particulate phase		
Total particulate matter, dry, mg	22.7	39.0
Phenol, µg	76.8	138.5
o-Cresol, µg	17.9	24
m- and p-Cresol, µg	54.4	65
Dimethylphenol, µg	6.8	14.4
Catechol, µg	188	328
Cannabidiol, µg	190	-
Δ^9-Tetrahydrocannabinol, µg	820	-
Cannabinol, µg	400	-
Nicotine, µg	-	2850
N-Nitrosonornicotine, ng[a]	-	390
Naphthalene, µg	3.0	1.2
1-Methylnaphthalene, µg	6.1	3.65
2-Methylnaphthalene	3.6	1.4
Benz(a)anthracene, ng[a]	75	43
Benzo(a)pyrene, ng[a]	31	21.1

[a]Indicates known carcinogens.
SOURCES: Hoffmann et al., 1975, 1976; Brunnemann et al., 1976, 1977.

Other Preparations

Besides the crude plant leaf material for smoking, usually called marijuana, resinous material from the plant, called hashish, and solvent extracts of the plant, termed hashish oil, sometimes appear on the illicit market. In many parts of the world, hashish is more commonly used than marijuana. As with all cannabis preparations, the Δ-9-THC content of hashish varies enormously, but the upper limits of Δ-9-THC content are usually much higher than for marijuana: 7 percent or higher and even higher for hashish oil (Table 2). However, even these generally more potent forms of cannabis may occasionally contain much less Δ-9-THC.

The mere designation of the nature of a cannabis preparation is an unreliable predictor of its Δ-9-THC content. The practical consequence of this for the clinical researcher is that the exposure to cannabis users is not known.

What Potency of Marijuana Is Available From Street Samples?

Because of the many confounding variables mentioned above, it is difficult to know what potency of psychoactive drug is in marijuana sold illicitly. The concentration of Δ-9-THC in a given sample will vary (Ritzlin et al., 1979). The content of Δ-9-THC from various street samples has been assayed. Marijuana from Drug Enforcement Administration confiscated samples; samples received through psychiatrists, police departments; and state crime laboratories, and fugitive* samples were quantitatively analyzed for Δ-9-THC and other cannabinoids. A physical description of the sample was made--e.g., buds, sinsemilla. The plants were also categorized by origin--where they were cultivated. The analysis showed that tremendous variability exists in the potency of Δ-9-THC on the street; normalized samples ranged from zero to 11 percent Δ-9-THC (Turner, 1981).

Analytic Methods

Detection and measurement of cannabinoids and their metabolites in body fluids is far more difficult than with such drugs as alcohol. The blood and tissue levels resulting from use of ordinary cannabis are very low--nanograms† per milliliter or lower. In addition, compounds like steroids, occurring normally in body fluids interfere with the measurement of cannabinoids in blood and can make the test much less sensitive than if pure cannabinoids in an uncontaminated

*Samples received, when no arrests were made.
†one billionth of a gram.

solution are being analyzed (Harvey et al., 1980; Harvey and Paton, 1980).

A combination of gas-liquid chromatography and mass spectrometry is the most sensitive direct method of measuring cannabinoids. That, however, requires skilled technicians and expensive equipment not readily available. Using modifications of this experimental technique, one can measure as little as 5 picograms* of Δ-9-THC in a milliliter of plasma (Harvey et al., 1980; Harvey and Paton, 1980). Radioimmunoassay and enzyme immunoassay techniques also are available, the lower limits of sensitivity of these methods now are not adequate for reliable measurements of Δ-9-THC in human blood more than a few hours after drug administration. A readily available enzyme immunoassay will detect cannabis metabolites in the urine for as long as a week after the smoking of a single marijuana cigarette. Thus, a positive urine test by this method is not necessarily indicative of use within the previous few hours and does not provide evidence of recent intoxication as a breath test does for alcohol. Assays for cannabinoids are likely to remain far more complicated than for alcohol and many other drugs.

PHARMACOLOGY OF CANNABIS

Implicit in a discussion of the effects of any drug is some determination of dose. The intensity and duration of effects in relation to drug dose must be determined or inferred from adequate pharmacologic study. The intensity and duration of a drug effect depends on at least three major factors:

1. The concentration of the drug at the sites of action in the body. This is determined by the dose, what the drug is dissolved in or mixed with, the route of administration, and the pharmacokinetics of the drug.
2. The sensitivity of the cells the drug acts upon.
3. The physiological state of the bodily systems being affected. This, in turn, depends on interactions with other systems and, especially for drugs with behavioral and psychological effects, as well as environmental and experiential factors, including the presence of other drugs.

With cannabis, many or even most of these factors are not always measurable or under the control of an investigator.

*1 pg = 10^{-12} grams.

Potency and Pharmacokinetic Considerations

Pharmacokinetic studies of the absorption, distribution, metabolism, and elimination of Δ-9-THC determine how long Δ-9-THC and its metabolites remain in the body. Pharmacokinetics vary with the route of drug administration and such factors as lipid solubility; Δ-9-THC tends to remain for long periods of time in fatty tissue.

When smoked, Δ-9-THC is rapidly absorbed by the blood in the lung. If taken orally, Δ-9-THC is not absorbed into the blood as rapidly. The rate of disappearance of Δ-9-THC from the blood varies with time (Lemberger et al., 1971a,b, 1972; Ohlsson et al., 1980). High blood levels fall rapidly for the first 30 minutes, as the Δ-9-THC distributes to tissues with high blood flow. After the initial distribution, the blood level falls much more slowly with a half-life* of 19 hours or more (Hunt and Jones, 1980). Metabolites† of Δ-9-THC have their own independent rates of elimination. Typically, metabolites are eliminated more slowly, having a half-life of approximately 50 hours (Hunt and Jones, 1980).

After an injection of a single dose of Δ-9-THC, approximately 25-30 percent of the compound and its metabolites remain in the body at 1 week (Lemberger et al., 1971b; Hunt and Jones, 1980). Essentially complete elimination of a single dose may take 30 days or longer (Jones, 1980). Thus, repeated administration of even small doses may lead to an accumulation of drug higher than levels reached at any time after a single dose.

Absorption

Inhaling smoke from a cannabis cigarette or pipe is pharmacokinetically different from ingesting cannabis. Smoking is a far more efficient way of delivering cannabinoids to the brain than ingestion because of the large surface area of the lungs. Inhaled, the cannabinoids in the smoke go rapidly from the lungs into the blood to the left side of the heart and are carried in seconds to the brain and other organs before passing through the liver. When smoked, a drug reaches the brain with relatively little time for metabolism or dilution. Many substances with high lipid solubility such as cannabinoids go quickly from blood into tissues, including brain tissues. Psychological and cardiovascular effects of cannabis are

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*The half-life is a measure of how rapidly a drug is eliminated. It is the time required for the level of a drug to be reduced by one-half. If starting levels are ten units and the half-life is 24 hours, then 1 day after administration, the level will be 5 units, 2 days after administration 2.5 units, etc.

†There are more than 45 metabolites of major cannabinoids identified in different species, at least one of which, 11-OH-Δ-9-THC, is psychoactive.

evident within a few seconds of inhalation. Peak effects occur about the time smoking is completed.

When taken by mouth, cannabinoids usually are in solutions or suspensions. The material they are mixed with affects the rate of absorption. For example, blood levels of Δ-9-THC were higher and lasted longer when given in an oily solution than in an ethyl alcohol solution (Perez-Reyes et al., 1973). This suggests that cannabis eaten in food mixtures containing fat is better absorbed.

An important difference between smoking and ingestion is that when cannabinoids are absorbed from the gut, the blood containing them first goes directly through the liver. The liver rapidly clears the Δ-9-THC from the blood and enzymatically changes much of the Δ-9-THC to other metabolites before it reaches the brain (Hunt and Jones, 1980). A large amount is metabolized to 11-hydroxy-Δ-9-THC (Figure 1). It is unknown if the spectrum of effects of this metabolite is identical to that of Δ-9-THC. When taken by mouth, in contrast to when smoked, two or three times more Δ-9-THC is required to obtain equivalent acute psychological and physiological effects. After oral doses the effects develop more slowly, last longer, are more variable, and cannot be controlled by the recipient once the cannabis has been swallowed. In contrast, the smoker feels the effects quickly and can modify inhalation at any time, although overdosage is still possible. Unpleasant reactions to overdose are more common following ingestion than inhalation.

A variety of other routes of administration have been used experimentally in humans and in animals, including intravenous, intraperitoneal, subcutaneous, intramuscular, topical (on the skin), and into the conjunctival sac (eye). These various routes influence the time to onset of effect, duration and peak intensity, and the rate with which the effect disappears. Direct comparison of findings in studies using differing administration routes is difficult and must take these factors into consideration.

Human users of cannabis vary in their preferred routes of use. In some countries and cultures cannabis is mainly taken by ingestion (for example, India) and in others by inhalation (for example, the United States). Because of the effects of route of administration on pharmacology, it is reasonable to expect different health consequences of the different routes of administration; therefore, comparisons of health statistics among countries must be made with care.

Although smoking avoids many of the absorption problems discussed above, a host of other variables affecting dose are introduced, such as the size and packing of the cannabis cigarettes, the way the smoke is inhaled, the number of puffs and the interval between puffs, the temperature produced in the burning cigarette, and whether a cigarette is shared. Because of the progressive concentration of cannabis constituents in the cigarette butt, the last few puffs yield considerably more Δ-9-THC and particulate matter than do the earlier puffs. All these and other factors affect the dose received, and only rarely have they been measured. Only some of these factors are under the conscious control of the cannabis smoker. About half of the Δ-9-THC originally in a cannabis cigarette is lost by

combustion, by butt entrapment, in smoke not inhaled, and in smoke exhaled (Fehr and Kalant, 1972; Rosenkrantz, 1981).

It has been reported that, like nonsmokers of tobacco, individuals in a poorly ventilated room where cannabis is smoked may passively inhale active components (Zeidenberg et al., 1977). Because only trace amounts of cannabinoid metabolites are present in urine of these passive inhalers, it is unlikely that the low levels of the absorbed cannabinoids from the ambient air account for the so-called "contact high." Experiencing subjective cannabis effects in the presence of cannabis smokers could be explained by psychologic factors in addition to any pharmacologic ones. But, because studies have shown that children of parents who smoke tobacco are more likely to have respiratory infections during the first year of life--which may be due to their being exposed to cigarette smoke in the atmosphere (U.S. Department of Health, Education, and Welfare, 1979)--the issue of passive inhalation of marijuana smoke is worth further study.

Distribution

The lipid solubility of Δ-9-THC and other cannabinoids, including those with highest pharmacologic activity, facilitates distribution readily into tissues and cells throughout the body so blood levels drop rapidly. Initially, cannabinoid concentrations are highest in such tissues as lung, liver, and kidney that have a high blood flow (Agurell et al., 1969, 1970; Klausner and Dingell, 1971). Delta-9-THC crosses the placenta and enters the fetus of experimental animals (Kennedy and Waddell, 1972). Cannabinoid levels in the human fetus have not been studied. Small amounts are also found in the milk of experimental animals and can be transferred to progeny (Jakubovic et al., 1973; Chao et al., 1976). After initial distribution, concentrations of cannabinoids in tissues, cells, and subcellular compartments are highly nonuniform, determined no doubt by solubility and other physicochemical characteristics. Therefore, blood concentrations do not reflect concentrations at pharmacologically active sites, as they do with alcohol.

Metabolism and Elimination

Elimination of drugs and their metabolites is mostly through excretion by the kidney into the urine or by the gall bladder via the bile into the intestine and out with the feces. Cannabinoids do not pass out of the blood into the lungs and do not appear in breath in appreciable quantities. Some cannabinoids going into the intestine with bile are reabsorbed. Some also diffuse back through the kidney tubules during the process of urine formation, so the amounts finally excreted per unit of time are small. The net result of this recycling is that the cannabinoids are only slowly eliminated from the body.

Studies of the disappearance of Δ-9-THC from human plasma have led to reports of values of half-lives that ranged from 19 hours in experienced users (Hunt and Jones, 1980) to 57 hours in naive users (Lemberger et al., 1971b). Whether this difference in half-life is due to the experience of the user has not been established. Because of their high lipid/water partition coefficients, Δ-9-THC and some of its metabolites can be sequestered in fatty tissues. Following the intravenous administration of radioactive Δ-9-THC to human volunteers, however, 67 percent of the radioactivity was excreted in 1 week, 22 percent in the urine and 45 percent in feces (Lemberger et al., 1971a). Almost no Δ-9-THC itself was excreted in the urine. There may be fairly rapid and complete metabolism of free Δ-9-THC followed by slow release and metabolism of sequestered Δ-9-THC and retained metabolites. Because no direct measurements of cannabinoid levels have been made in tissue samples from human cannabis users and the data are limited in experimental animals, one can only infer from blood levels what metabolites are accumulating and where.

In rats, after inhalation or intravenous administration of radioactive Δ-9-THC, radioactivity persisted in the brain for at least 7 days, mostly as metabolites (Ho et al., 1970). When given subcutaneously in rats, even at intervals as great as a day or two apart, Δ-9-THC will accumulate as metabolites (Kreuz and Axelrod, 1973). Accumulation of some cannabinoids with even less frequent intake appears likely. Although most metabolites are concentrated in fatty tissues, they will slowly pass into plasma and circulate though all parts of the body, particularly including such organs as the brain, and generally all membranes. The health consequences of the continued presence of such foreign molecules are not known. The marked persistence of the cannabinoids is quite unlike other widely consumed agents, such as alcohol, nicotine, and caffeine, that are rapidly metabolized and leave no trace a few hours after moderate intake.

WHAT IS A LARGE OR SMALL CANNABIS DOSE?

Large and frequent doses of any drug are more likely to produce adverse health effects than small infrequent doses of the drug. Thus, judgments of health consequences of the use of cannabis can only be made with implicit or explicit knowledge about dose. For the reasons discussed above, the range of cannabinoid doses consumed varies widely. Investigators usually report dose in terms of marijuana cigarettes per unit of time, or they give some estimate of the concentration of Δ-9-THC used for oral application. This is not an adequate way to quantify the amount of cannabinoids actually entering the body. Only one epidemiologic study provides a breakdown of varying dose levels in excess of one cannabis cigarette daily (Bachman et al., 1981). Epidemiologic surveys have not quantified Δ-9-THC levels. When reporting less frequent use patterns than one cigarette per day, investigators use measures that make it difficult to compare studies. In this report, any general or average dose estimates are approximations.

It is generally agreed that smoking five or six 1-gram cannabis cigarettes daily is a large dose (Dornbush et al., 1971; Rosenkrantz, 1981). Because of the variability of Δ-9-THC content of cannabis available from street samples, it would be more appropriate to consider this heavy use. The definition of a low dose is more controversial. Some consider one marijuana cigarette a day to be a large dose. Others think even one cigarette a week is regular, frequent, and a high dose.

With tobacco and alcohol, for which dose is easier to quantify, it took many years to establish what a small or large dose might be in terms of specifying doses that significantly increased the risk of various behavioral and health consequences. Even with those drugs, there is still disagreement as to precisely what a small and "safe" dose might be. There will be even more problems in specifying typical cannabis doses and predicting their likely health consequences.

In controlled laboratory conditions, ingested doses of more than 20 mg of Δ-9-THC generally are considered by both investigators and cannabis users to be large doses. Doses of less than 10 mg are considered small. Marijuana cigarettes containing more than 20 mg of Δ-9-THC seem to be a large dose, and those with 10 mg produce effects generally considered the result of a small dose. When volunteers were allowed to select their own self-determined smoked doses in controlled experiments, some smoked only one or two 20-mg cigarettes daily, while other similar volunteers smoked six to ten or more cigarettes per day. Variability in smoking patterns is great and not easily quantified; only broad range estimates of dose are possible.

GENERAL TOXICOLOGY

Delta-9-THC and related cannabinoids have very low lethal toxicity. That is, a very high single acute dose of Δ-9-THC is required to kill half of a population of experimental animals. This lethal dose for 50 percent of the animals is called the LD_{50}. The lack of well-authenticated cases of human deaths from acute Δ-9-THC or cannabis overdose is consistent with the experimental animal data. The lethal dose increases as the phylogenetic tree is ascended. The rat has an LD_{50} of 40 mg/kg intravenously, in contrast to a 125 mg/kg in the monkey (Rosenkrantz, 1981). Death is usually due to cardiac dysfunction. Delta-9-THC appears to be the most toxic of the cannabinoids.

Studies of chronic cannabis administration to animals have demonstrated delayed lethality. Animals die after several days of a repeated high dose (Rosenkrantz, 1981). The reason for this pattern is unclear. It could be related to accumulation of Δ-9-THC or metabolites in tissues.

A 1-year chronic treatment of rats with lower doses of cannabinoids produced a pattern of toxicity consisting of weight loss, pulmonary pathology when the drug is inhaled, and slowly

developing behavioral toxicity characterized by hyperactivity, vertical jumping, fighting, and seizures (Rosenkrantz, 1981).

RELEVANCE OF NONHUMAN ANIMAL MODELS

Much of what is known about cannabis comes from experiments in animals. Some aspects of the pharmacology of any drug can only be studied in animals other than human beings. Findings from animal experiments have been criticized because of what were thought to be unreasonably high doses of cannabis given to the animals as compared with doses commonly used by human beings. Although extrapolation of human effects from animal data must be done with caution because of species differences in metabolic pathways and differing sensitivity and physiology, a blanket criticism of animal studies because of high doses is inappropriate. When an effect of a drug occurs consistently in several species, it is likely to occur in human beings. Comparisons of Δ-9-THC blood levels in human beings and in several species suggest roughly similar intensity of effects at similar blood levels in the various species (Rosenkrantz and Fleishman, 1979).

CANNABIS CONTAMINANTS

On occasion cannabis has been reported not only to contain the herbicide paraquat, but also salmonella bacteria and aspergillus fungus. Deliberate addition of such drugs as lysergic acid diethylamide (LSD), heroin, and phencyclidine (PCP) has been claimed. A plant material such as cannabis is not always handled in the most sanitary way, and a variety of contaminants are possible.

Paraquat

There is no question that large doses of paraquat by mouth or by aerosol can cause pulmonary fibrosis, but no cases in human beings have yet been proved to result from paraquat-contaminated cannabis. Few cannabis smokers are expected to be exposed to the large amounts of paraquat known to cause severe lung damage. This is not to say that no lung damage will occur from such exposure. A more extensive discussion of paraquat is in Appendix D.

Bacteria and Fungi

A few outbreaks of salmonellosis epidemiologically linked to marijuana use were reported from Ohio and Michigan (Schrader et al., 1981). Marijuana was found to be contaminated with the same type of salmonella that was obtained from the 62 patients experiencing diarrhea, fever, and abdominal pain.

Aspergillus, a fungus, is a common contaminant of some cannabis (Llewellyn and O'Rear, 1977; Llamas et al., 1978). The spores pass easily through contaminated marijuana cigarettes and when smoked are presumed to enter the body.

CELLULAR TOXICITY

A variety of effects on cellular processes have been reported, usually based on studies of in vitro systems. The low water solubility of the cannabinoids and the need to add solvents and emulsifiers, along with a common tendency to use higher in vitro concentrations than occurs in living animals, makes interpretation of such experiments difficult.

In related studies, Δ-9-THC alters the actions of a number of intracellular enzyme systems. The biological relevance of these drug/enzyme interactions is still unclear at this time, but, together with the cytotoxicity, it suggests that Δ-9-THC is producing marked effects on cell membranes and intracellular processes.

Almost nothing is known of the molecular mechanisms by which cannabinoids produce their effects in cells.

TOLERANCE AND DEPENDENCE

Repeated administration of most psychoactive drugs leads to the development of tolerance. This state of increased drug resistance results from two general mechanisms (Kalant et al., 1971):

- Dispositional tolerance resulting from lower drug concentrations at sites of action, usually because of increased rates of drug metabolism or elimination
- Functional tolerance arising from decreased sensitivity of the target cells.

Tolerance to most cannabinoid effects has been demonstrated both in animals and human beings (Jones, 1981). Tolerance can develop rapidly after only a few small doses. It disappears at an equally rapid rate for many effects, although after large doses in experimental animals some tolerance may persist for long periods (Jones, 1981). Systematic studies of tolerance loss have rarely been done. Many characteristics of tolerance to Δ-9-THC, particularly its pattern of rapid acquisition and loss, are similar to that occurring with opiates, nicotine, and cocaine (Jones, 1981). Most evidence suggests functional rather than dispositional means of acquiring tolerance.

The development of such tolerance to cannabis does not necessarily have health implications. However, if tolerance should lead to higher or more frequent doses, adverse consequences, e.g., respiratory effects, associated with higher usage could result.

Physical dependence, manifested by withdrawal signs and symptoms, can develop rapidly in animals and in human beings (Jones, 1981). The withdrawal syndrome is not life threatening. It is similar in many respects to the mild dependence produced by low doses of other sedatives. Withdrawal symptoms can include restlessness, irritability, mild agitation, insomnia, and sleep EEG disturbance.

Cannabis dependence does not mean the same thing as cannabis addiction. Dependence means only that a withdrawal syndrome can occur when drug taking is stopped. Addiction implies compulsive behavior to acquire the drug. The relationship between dependence and increased drug seeking or drug using is more theoretical than well documented, particularly in experiments with human beings. Given the appearance of tolerance and dependence with almost any psychoactive drug, it would be unusual not to find tolerance and dependence with the right dose and dosage schedule of cannabis. Good studies of the relationship of dependence, if any, to persistent drug use are important.

DRUG INTERACTIONS

Because cannabis often is consumed with other drugs, interactions can be expected. Other illicit drugs, tobacco, caffeine, alcohol, and over-the-counter or prescribed medications should be studied in combination with cannabis, because Δ-9-THC and its first metabolite are strongly bound to proteins in the plasma (Garrett and Hunt, 1974) and may interact with other drugs similarly bound. Cannabis and many other drugs share disposition by the hepatic metabolic enzyme systems, and there are possible interactions at the drug metabolism level. For example, drugs such as alcohol or pentobarbital can inhibit metabolism of Δ-9-THC by enzyme substrate competition. Or, if after a period of inhibition one drug is removed, the enzyme activity can increase so that faster than expected metabolism follows. If given simultaneously with other drugs, Δ-9-THC can slow metabolism of drugs such as theophyllin, antipyrine, ethanol, and pentobarbital (Benowitz and Jones, 1977; Jusko, 1979). Cannabidiol can also inhibit the metabolism of a variety of drugs normally metabolized by the shared hepatic enzyme systems.

Drug interactions also can occur by means of functional mechanisms. These can be additive, resulting in enhancement or prolongation of behavioral and psychological effects by cannabis when combined with other central nervous system depressant drugs, such as alcohol and barbiturates. Animals less tolerant to cannabis will also be less sensitive to other central nervous system depressants. This phenomenon is known as cross-tolerance. Drug interactions will be mentioned in subsequent chapters.

SUMMARY AND CONCLUSIONS

Cannabis is not a single drug, but a complex preparation containing many biologically active chemicals. The psychological and physiological effects produced by Δ-9-THC probably result from actions at sites within the central nervous system and elsewhere in the body, leading to the likelihood of complicated effects depending on dose, duration of use, and many other considerations.

The intensity of effect an individual experiences varies considerably according to the cannabis preparation and the amount taken, route of administration, frequency of use, and probably other not-well-recognized biological considerations. Dose variability must be considered both in conducting and in interpreting any studies of the effects of cannabis, particularly when trying to predict health consequences.

In research the use of pure Δ-9-THC avoids some problems of dose control but cannot provide a complete picture of cannabis effects, because the effects of Δ-9-THC in crude preparations of the plant may be influenced by other components. Other consequences of cannabis use, for example, exposure to harmful components in its smoke, will have deleterious health consequences in addition to anything produced by the Δ-9-THC.

The long persistence of cannabinoid metabolites in the body may have delayed effects or health implications not yet recognized, because, even with relatively infrequent use, there is chronic exposure to biologically unknown materials. In this respect, cannabis differs fundamentally from such drugs as alcohol, nicotine, and caffeine, which are rapidly metabolized and eliminated from the entire body.

Cannabinoid effects can be modified by many events, including interaction with other drugs and the development of tolerance. Both tolerance and dependence develop to many effects of the drug. The health significance of tolerance and dependence, particularly their importance in drug-seeking and drug-using behavior, has not been studied properly.

It is unlikely that adequate epidemiologic data will be available (soon) to enable good estimation of the health consequences of various usage levels.

A prerequisite is that adequate chemical analytical methods be applied on a large-scale basis to monitor actual exposures. Continued studies in experimental animals will play an essential role in the assessment of the health risks of cannabis. For example, the biological activities of Δ-9-THC metabolites can be assessed in experimental animals, but these tests are technically more difficult to do in human beings.

RECOMMENDATIONS FOR RESEARCH

Several research priorities are identified by the preceding discussion:

• Cannabinoids and their metabolites persist for relatively long periods in the body. More information is needed on the biological significance of that persistence in human beings. As a first step, the toxicological effects of the various metabolites need to be determined.

• Drug interactions alter the actions of cannabis. Cannabis use alters other drug effects. More information is necessary to make the combined effects of cannabis and other licit and illicit drugs more predictable, especially with respect to behavioral impairment and toxicity to lungs, liver, and other organs.

• Studies of the mechanism of action of cannabis should continue. Knowledge of mechanism is likely to provide powerful insights into the potential health effects.

• Improved chemical analytical methods are necessary. Epidemiologic appraisal of the health effects of cannabinoids requires methods suitable for wide-scale assays of exposures. Pharmacological verification of the self-reported extent of use will make experimental and clinical results much easier to interpret. A chemical "marker" of the frequent user would be useful. Screening techniques for the purpose of identifying and discouraging cannabis-impaired driving would also be valuable.

• Characterization of the toxicological significance of common cannabis contaminants such as paraquat and other chemicals, fungi, and bacteria should be continued.

• The development of tolerance is a factor that potentially modifies the expression of all psychoactive drug effects. Additional studies on the rates of acquisition and loss of tolerance and the relationship of these phenomena to dependence are necessary. The biological significance of the changes that underlie the development of tolerance should be established. The relationship, if any, between tolerance and dependence and drug-seeking behavior should be established.

• Cannabis products are variable and complex. More information on the amount, nature, and potency of the various preparations used around the world would facilitate calculations of exposures to its constituents. For example, what is the biological and toxicological significance of the minor components of cannabis smoke?

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2

USE OF MARIJUANA IN THE UNITED STATES

Epidemiologic studies provide information on the use of drugs in various subgroups of the population and on the changes in patterns of use over time. The epidemiologic approach is particularly useful in defining patterns of use of marijuana in American society and in describing and analyzing the behavioral and psychosocial antecedents and consequences of that use. One of the more difficult questions is whether particular behavior or effects that are associated with use of a drug are the consequences of that use, or whether attitudes, values, and behavior develop about the use of drugs to constitute factors that may actually lead to the use of drugs. One of the more useful epidemiologic study designs is a cohort study that follows the same individual with repeated observations at regular intervals over time. Such longitudinal studies have the potential for obtaining the most compelling evidence on the antecedents of known patterns of use of marijuana, as well as possible long-term psychosocial and biological outcomes for these individuals.

The committee, with the help of consultants, sought answers in the epidemiologic literature to the following five questions:

1. What are important patterns of use of marijuana in the American population including special groups?
2. What are the general characteristics of users of marijuana?
3. What is the profile of a user of marijuana on a "daily"* basis?
4. What is known about the antecedents of use of marijuana?
5. How is use of marijuana related to the use of other drugs?

The epidemiologic and survey literature have been extensively reviewed and the major longitudinal studies are summarized in a table in Appendix C. Much of our recent knowledge derives from two well-designed major, continuing nationwide monitoring efforts

*When placed in quotation marks, "daily" is used as defined by Johnston et al. (1980b), i.e., those individuals using marijuana 20 or more times in the preceding 30 days.

sponsored by the National Institute on Drug Abuse. One is based on general household population samples, the National Household Surveys. The second is based on populations of high school seniors and is called Monitoring the Future.

The National Household Surveys of the general population are conducted on an annual or biannual basis by Response Analysis Corporation and The George Washington University (Fishburne et al., 1980). There have been six cross-sectional studies since 1971. The latest one was in the winter of 1979-1980, and the next one will be initiated in 1982. The subjects are classified as youth (12-17), young adults (18-25), and older adults (26 and older). The questions relate to marijuana and other psychoactive drugs, including inhalants, hallucinogens, cocaine, heroin, stimulants, sedatives, and analgesics. Samples vary from about 3,000 to more than 7,200 new respondents at each survey. These are samples that document patterns of use of drugs in the specified populations at a given time.

Monitoring the Future (Johnston et al., 1980b) uses a cohort-sequential longitudinal design, in which a new cohort of high school seniors is surveyed each year, and a representative panel selected from that senior class is also followed over time in successive annual or biannual testings. The earliest panel has now been reinterviewed six times. This survey design makes it possible to disentangle antecedents from consequences of use as well as to distinguish changes due to increased age from changes due to cohort peculiarities or historical circumstances. Initiated in 1975 by the Survey Research Center of the University of Michigan, and directed by Lloyd Johnston and Jerald Bachman, the survey involves a questionnaire self-administered each year by more than 16,000 high school seniors in 130 public and private schools throughout the United States, and longitudinal mail follow-ups of about 2,000 former students drawn, as panels, from each of the previously participating senior classes (Johnston et al., 1979a,b; 1980a,b).

Because the National Household Surveys and Monitoring the Future are surveys of persons in households or in high school, they exclude persons most likely to be using drugs--the transients, those without regular addresses, the school absentees or drop-outs, or those living in institutions or group quarters. These persons constitute a small proportion of the general population, and their exclusion does not significantly bias the epidemiologic estimates reported for the total population (Kandel, 1975a). However, data on the very heavy use of drugs may be underrepresented.

PATTERNS AND TRENDS OF USE OF MARIJUANA

General Population

The National Household Surveys found that marijuana was the most commonly used of all the nonlegal psychoactive drugs investigated, including inhalants, hallucinogens, cocaine, heroin, stimulants, sedatives, tranquilizers, and analgesics (Fishburne et al., 1980).

In 1979 more than 50 million persons had tried marijuana at least once in their lives: 68.2 percent of young adults (18-25), or about 21 million; 30.9 percent of youth (12-17), or more than 7 million; and 19.6 percent of older adults (26 and older), or 25 million. The young adult age-group (18-25 years) has consistently showed the highest rates of current use (used in past month) and ever use (lifetime prevalence), and the older adult groups (26 and older) had the lowest user rates. Male users outnumbered females in all age groups. Between 1977 and 1979, significant increases in current use and ever use of marijuana were observed among the young adult and older adult cohorts (Figure 2). In 1979, in the young adult cohort, the most significant increases in use in the past month were found in males, whites, high school nongraduates, people in the southern United States, and those living in nonmetropolitan areas. In the older adult groups, the most significant recent increase in current use of marijuana was observed in males, whites, college graduates, and people living in the southern states (Miller and Cisin, 1980).

In the early 1960s, illicit drug use in the United States was chiefly a phenomenon of large coastal cities. But since then, rates in other regions of the country and in cities of all sizes have rapidly increased until patterns of use are becoming increasingly comparable for all sectors in the United States. At current levels of use, some experience with marijuana in adolescence is becoming the norm rather than the exception throughout the United States. Other major survey studies have confirmed the findings of the National Household Survey for comparable cohort populations (Gallup Opinion Index, 1976; O'Donnell et al., 1976).

Military Personnel

Much attention has recently been focused on what appear to be high rates of use of illicit drugs among military personnel. Studies of drug use among male army veterans of the Vietnam War in 1972 showed that marijuana was the most commonly used illicit drug before and after the war (Robins, 1974). A random sample of 470 men was selected from the 13,760 enlisted men who returned to the U.S. in September 1971. Of the 451 men who were interviewed, 69 percent had used marijuana while in Vietnam, with 28 percent stating this was their first use of the drug. The lifetime prevalence of use of marijuana was 41 percent prior to Vietnam; 45 percent of the veterans reported using marijuana in the 10 months following return to the United States. Among this group the prevalence of weekly use doubled from 12 percent prior to Vietnam to 25 percent following the war.

A worldwide survey of nonmedical use of drugs and alcohol among U.S. active duty military personnel was conducted in 1980 under the sponsorship of the U.S. Department of Defense (Burt et al., 1980). In an anonymous, self-administered questionnaire given to a representative sample of more than 16,000 persons, marijuana was found to be the most commonly used illicit drug. Twenty-six percent admitted to having used "marijuana/hashish" within the past 30 days and 35

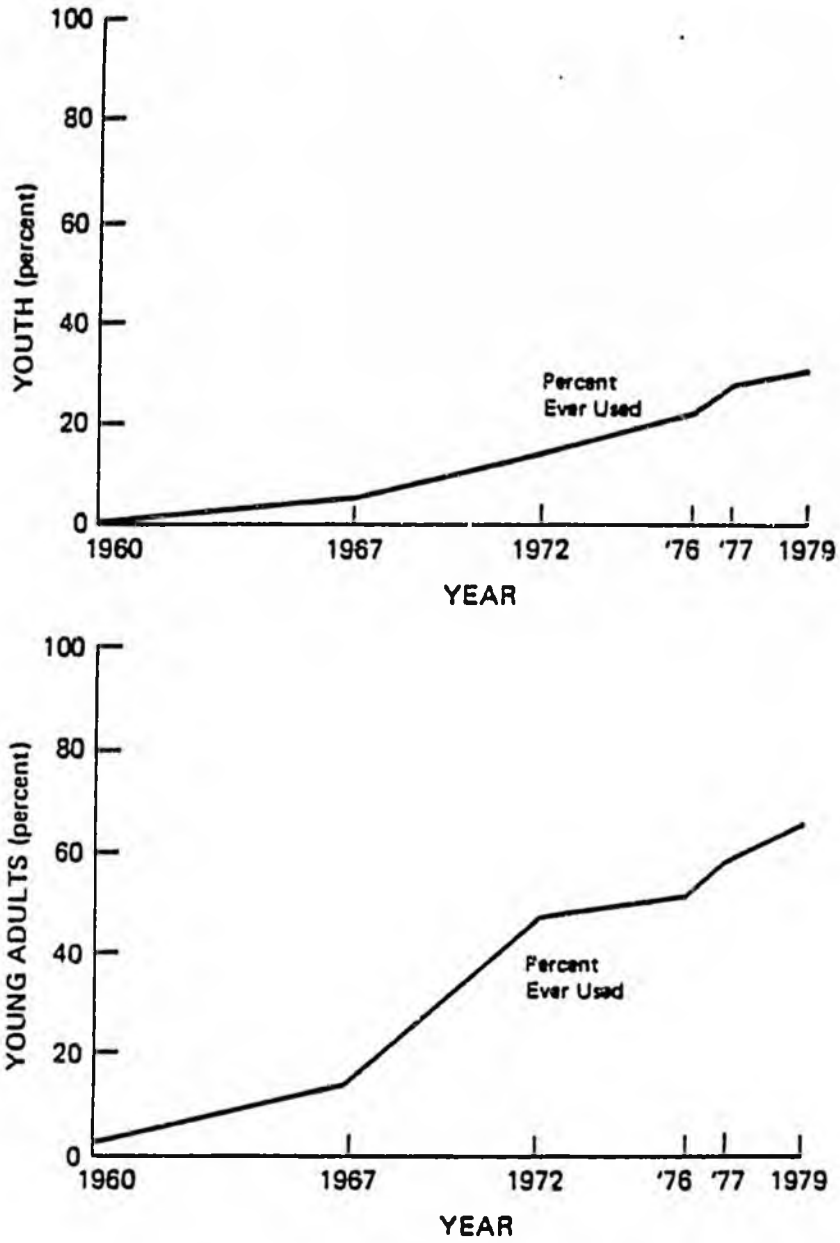


FIGURE 2 Marijuana: trends in lifetime experience, youth, and young adults. Adapted from J.D. Miller and I.B. Cisin. Highlights from the National Survey on Drug Abuse: 1979. Washington, D.C.: U.S. Government Printing Office, 1980. Youth = 12 to 17 years old; young adults = 18 to 25 years old.

percent to having used it in the past 12 months. Five percent of the sample reported use of marijuana daily.

When users of drugs were itemized according to military pay classifications, the largest percentage of current use of marijuana was in the lowest ranks of the military.

Adolescents and Young Adults

Patterns and Trends

One of the compelling reasons to focus on adolescence in studying marijuana is the pervasive and increasing use by this age group. As was mentioned earlier, in 1980 all geographical regions of the United States and all socioeconomic classes had high and increasingly comparable involvement in use of marijuana.

The year 1960 has been taken as a baseline year that represents the stable level of overall use of marijuana that had characterized the United States for most of its history. Figure 2 shows the trends for use of marijuana from 1960 through 1979, revealing the sharp upward climb of use of marijuana starting in 1967. The dramatic rise in use of marijuana by adolescents has recently slowed, and the lifetime prevalence rates (ever use) of marijuana have remained at approximately 60 percent of all high school seniors for the years 1979 and 1980 (Figure 3). To put it another way, in 1979 over 2.5 million high school seniors had tried or were users of marijuana. (This figure is derived from calculations based on 1979 Census Bureau data that give a figure of 4,276,000 for number of 18-year-olds in the population. The committee is aware that all 18-year-olds are not high school seniors and that such a calculation may underreport the numbers of users of marijuana, particularly heavy users who have been shown to be more likely to have dropped out of school. Similar calculations have been attempted throughout this chapter.)

The use of other types of drugs by young people also increased beginning in 1967 (Miller and Cisin, 1980). Figure 4 gives the most recent nationwide figures for use of 11 types of drugs among American high school seniors (average age 18 years). With the exception of negligible use of heroin, the figures for use of all other drugs are substantial. Increases in patterns of use have not been as dramatic for other drugs (except for recent cocaine increases) as they have been for marijuana. Use of marijuana, tobacco, and alcohol far outstrips that of all other drugs. In 1980 the lifetime prevalence (ever use) for these substances by high school seniors was marijuana--60 percent, tobacco--71 percent, and alcohol--93 percent.

Of even greater interest are the percentages of high school seniors who use the 11 types of drugs "daily." In 1980 marijuana was used "daily" by 9.1 percent (about 390,000), alcohol by 6.0 percent (about 256,000), and tobacco cigarettes by 21.3 percent (about 900,000) of high school seniors (Johnston et al., 1980a). No other substance was used that frequently by as many as 1 percent of the

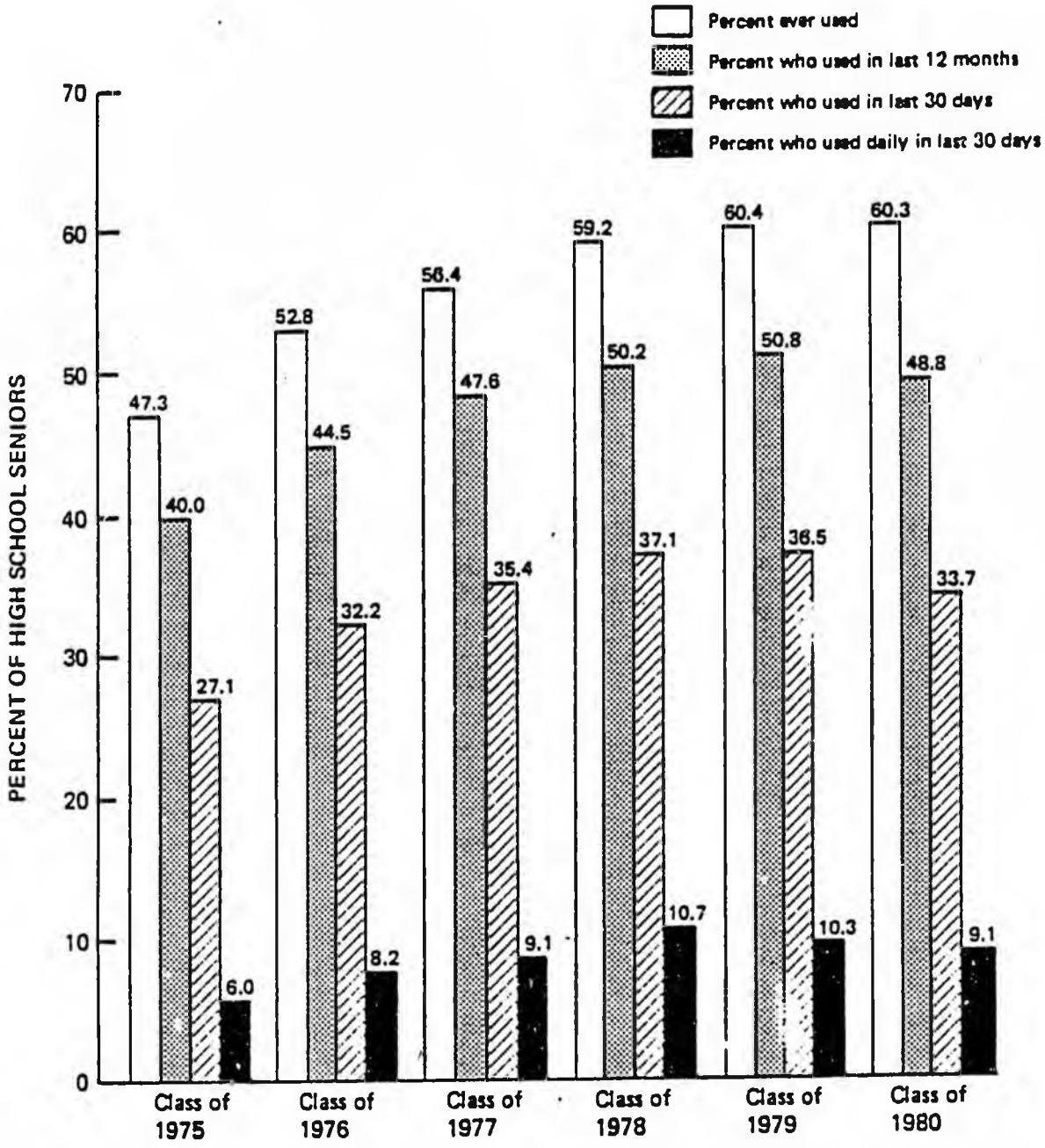
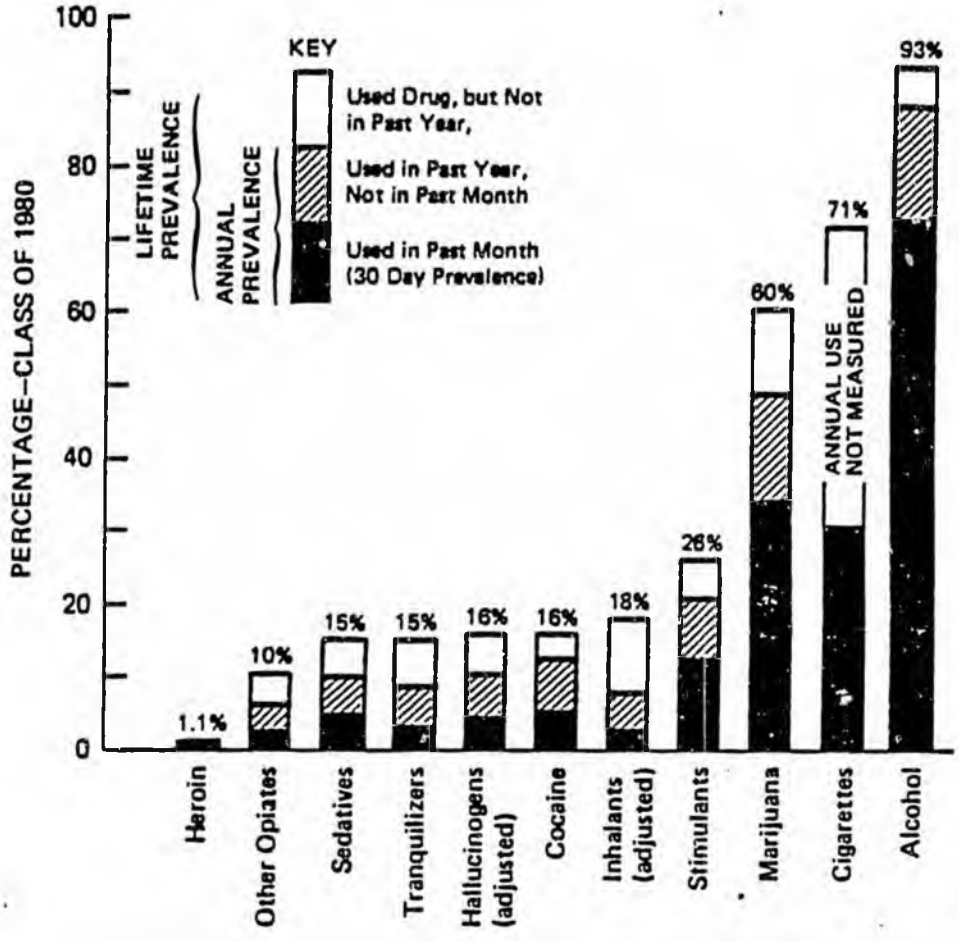


FIGURE 3 Trends in prevalence of marijuana use by high school seniors, 1975-1980 (in school). Adapted from L.D. Johnson, J.G. Bachman, and P.M. O'Malley, Highlights from Student Drug Use in America, 1975-1980. DHHS Publication No. (ADM) 81-1066. Washington, D.C.: U.S. Government Printing Office, 1980a.



NOTE: The bracket near the top of a bar indicates the lower and upper limits of the 95% confidence interval.

FIGURE 4 Prevalence and recency of use. Eleven types of drugs, class of 1980. SOURCE: Johnson, L.D., Bachman, J.G., and O'Malley, P.M. Highlights from Student Drug Use in America, 1975-1980. DHHS Publication No. (ADM) 81-1066. Washington, D.C.: U.S. Government Printing Office, 1980a.

students. These figures show that legal (for adults) drugs are used much more frequently than illegal ones. Reports of illegal use of drugs show that experimentation with marijuana has, by far, the highest prevalence. It should be noted, also, that "daily" use of marijuana (9 percent) among high school seniors is now more prevalent than "daily" drinking (6 percent) of alcoholic beverages.

In 1980, for the first time since 1975, when the Monitoring the Future data collection began among high school seniors, the percentage of "daily" users of marijuana among seniors in high school declined significantly from 10.3 percent in 1979 to 9.1 percent in 1980 (Figure 3), and there was a leveling of lifetime prevalence at approximately 60 percent. Furthermore, the proportion of current users among those who ever used marijuana also showed a statistically significant decline in 1980 as compared to 1979, from 60 percent to 56 percent. However, "daily" users may be increasingly underrepre-

sented in recent senior high school classes due to absenteeism and drop-out associated with increasingly earlier and extensive involvement in use of marijuana. The extent to which long-term "daily" users have dropped out of school by the senior year of high school cannot be ascertained from monitoring the future. Kandel (1975a) found that absentees differed from students attending school regularly. Fifty-six percent of absentees reported use of marijuana as compared to 38 percent of in-class students. Studies that document the patterns of marijuana use in school drop-outs are needed.

Correlates of Use

Overall levels of use of marijuana have been shown to correlate with patterns of use of the drug.

1. Increased prevalance is associated with younger age of initiation into use of marijuana. As successive cohorts of high school seniors have shown increasingly higher levels of experience with marijuana from 1975 through 1980, these cohorts also report increasingly earlier ages at first use of marijuana. For example, in the senior class of 1980, which had a lifetime prevalence of 60 percent by senior year, 25 percent of those using marijuana had begun in the eighth grade (average age 14) or below. In 1975 when lifetime prevalence was 47 percent, 15.3 percent of marijuana users had begun in eighth grade or below. It is of some interest to compare reported age of use of marijuana by grade for the senior class of 1980 (lifetime prevalence 60 percent) and alcohol (lifetime prevalence 93.2 percent). The more prevalent drug, alcohol, is used at earlier ages than marijuana. Thirty-three percent of alcohol users had started at eighth grade as compared to 21.5 percent of marijuana users (Johnston et al., 1980a).
2. Earlier onset of use of any drug is associated with greater involvement in use of all other drugs. The earlier the introduction to legal (for adults) drugs, the greater the probability that the adolescent will also experiment with illicit drugs. For example, among young adults 18-25 years of age surveyed from the general population in 1979-1980, the proportion who had experimented with any illicit drug other than marijuana ranged from 87 percent among those who reported having first tried alcohol or marijuana at ages 13 or 14, to 47 percent among those who first tried these drugs at ages 15-17, and 5 percent among those who first experimented at age 18 or over (Rittenhouse, 1980). The finding that the earlier the experimentation with marijuana, the greater the intensity of involvement and the greater the likelihood of using more serious drugs has been confirmed in many studies (e.g., Miller and Cisin, 1980; Johnston et al., 1980a; Kandel et al., 1981).
3. Greater overall prevalence of use of marijuana is associated with greater persistence of use of marijuana into later years of adult life. The current prevalence rates for use of marijuana by persons in their mid-30s are increasing (Cisin et al., 1978). Many

studies have not sampled this population in the belief that use of marijuana drops off sharply in the mid-20s. Among males, the prevalence rate for use of marijuana in the past month for over-26-year olds went from 4 percent in 1977 to 9 percent in 1979. It will be exceedingly important to monitor the trends in all older adult age groups.

Marijuana and the Use of Other Drugs

One of the key questions asked over the years is, does marijuana lead to the use of other drugs. In any population, the use of various drugs appears interrelated and users of any type of drug, whether legal or illegal, are much more likely to use other types of drugs than nonusers. For example, young people who smoke tobacco are also much more likely to have used alcohol or marijuana than nonsmokers (Fishburne et al., 1980). Similarly, there is a strong association between the use of marijuana and of other illicit drugs. Young people who use marijuana are more likely to be consuming other substances, such as alcohol and tobacco, as well as other illicit drugs (Johnston et al., 1980b). The association increases with extent of marijuana involvement and is especially striking among those young people who use marijuana on a "daily" basis, as will be discussed below.

Results from the National Household Surveys and from samples of high school seniors had indicated that the ratio of rates of use of illicit drugs other than marijuana to use of marijuana declined through 1979 (Kandel, 1980; Miller and Cisin, 1980). In 1980, however, the ratio started to rise again. Thus, in 1980, 65 percent of marijuana users among the high school seniors had also used other illicit drugs as compared to 61 percent in 1979 (Johnston et al., 1980a).

"Daily" Users in High School

Because any health risks resulting from the use of marijuana would be most likely to appear first in chronic users of the drug, the young persons who are chronic and heavy users are of special interest. The committee reports in some detail the findings on this group. The ranks of "daily" users are large. In 1980 they represented more than 9 percent of high school seniors or over 390,000 18-year-olds in the United States. One out of 11 seniors fitted the definition of "daily" users (20 or more occasions of reported use within the preceding 30 days). Collection of systematic data on such users began in 1975 with the annual monitoring of in-school high school seniors. There are many gaps in our knowledge about this group, but sufficient data have been accumulated that it is now possible to describe many of the behavioral attributes of the "daily" users. Most of these data come from Monitoring the Future. Some of the findings recently reported by Johnston (1980, 1981) and Bachman et al. (1981) are as follows:

Demographic Findings

Rates of "daily" use do not vary among regions of the country, but "daily" use shows a strong positive relationship to the size of the community and is more prevalent in urban areas. Males are "daily" users at almost double the rate of females (13 percent versus 7 percent). "Daily" use among white students is double that for blacks (11 percent versus 5 percent). "Daily" use is spread evenly across socioeconomic levels as defined in terms of parents' education. "Daily" use is only slightly higher among those from homes in which one or both parents are absent.

Academic Performance and Goals

"Daily" use is associated with poor school achievement. Among non-college-bound seniors the rate of "daily" use is almost double that found among the college-bound (13 percent versus 7 percent). There are strong and positive correlations of "daily" use and cutting classes, school absences, and truancy.

Much of "daily" use takes place within the school setting. A statewide study of seventh through twelfth grade pupils in New York, conducted in 1978 by the New York State Drug Abuse Commission, found that 50 percent of those using marijuana within the last 6 months had been intoxicated one or more times while in class (Johnson and Uppal, 1980). In contrast, alcohol tends to be used most frequently after school and on weekends.

Religious Commitment

A commitment to religion and self-ratings of strong belief in law-abiding behavior are associated with lower than average rates of "daily" use.

Dating and Social Life

Dating and social life show strong relationships with "daily" use of marijuana. Those who spend more time on dates have the highest rates of "daily" use of marijuana. Among those students who go out 6 or 7 nights a week and are practically never at home, 34 percent are "daily" marijuana users.

Use of Other Drugs

"Daily" marijuana users are much more likely than their peers to be extensive users of other drugs. Thus, of seniors in the class of 1979, 27 percent of "daily" users of marijuana drank alcohol as frequently, versus 7 percent for the age-group as a whole; and 59

percent of "daily" users of marijuana smoked cigarettes as frequently versus 25 percent for the group as a whole (Johnston et al., 1980b).

With respect to use of other illicit drugs, the rates for "daily" users of marijuana generally run five to seven times the average for the age group as a whole; 47 percent of "daily" users are current* users of amphetamines; 31 percent of cocaine; and their current usage figures run from 15 to 17 percent for barbiturates, for lysergic acid diethylamide (LSD), for phencyclidine (PCP), for methaqualone, and for tranquilizers. Since nearly two-thirds of daily marijuana users (64 percent) are current users of hashish, they have substantial exposure to a hi -potency form of marijuana.

We also know from data on age at first use that many of these "daily" marijuana users began their use of cigarettes, alcohol, and various other illicit drugs at quite an early age. To illustrate, by the end of eighth grade 40 percent of them had smoked cigarettes "daily" and 50 percent had taken their first drink. Just about half of them (48 percent) first tried marijuana by the eighth grade, and most of the remainder (another 30 percent) started in ninth grade. These are very early ages of initiation for all three drugs. Similarly, these youngsters tend to take up the other illicit drugs at an earlier than average age--though most of that use still is initiated after ninth grade. "Daily" use tends to persist longer into adult life than anticipated. In 1979, 4 years after graduation from high school, 51 percent of marijuana users of the senior class of 1975 were still "daily" users and an additional 34 percent were current although not "daily" users (Johnston, 1980).

"Daily" Users After High School

Using a national sample of 19- to 22-year-olds derived from the follow-up surveys of Monitoring the Future, Johnston (1981) reported on "daily" use of marijuana after high school. (These findings are reproduced nearly verbatim below.)

College Student Status

Student status after high school correlates negatively with "daily" use; that is, full-time college students have the lowest rate (8 percent), part-time students the next lowest (10 percent), and nonstudents the highest rate (13 percent). However, although full-time students have a lower than average rate of "daily" use, they showed the greatest increase after high school (up from 4.5 to 8.3 percent): they simply started from a very low level and in a sense were "catching up."

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*A current user is one who has used the drug in the thirty days preceding the surveys.

Living Status

Young people who are living away from home have a higher proportion of "daily" use than those still living with their parents (12 percent versus 10 percent), probably reflecting the result of reduced social control by parents. Those who remained living with their parents (nearly half) showed relatively little increase in use (up 1.3 percent), while those who moved out increased their daily use rate substantially (up 3.9 percent).

Marital Status

Those who are single are almost twice as likely to be "daily" users as those who are married (11.4 percent versus 6.6 percent), and those without children are somewhat more likely to use marijuana than those with children (11 percent versus 8 percent). It appears that these role responsibilities have a dampening effect on use. In the face of an overall 2.6 percent increase in "daily" prevalence after high school for the whole sample, those who were married showed virtually no increase (up 0.2 percent) and those with children actually had a decline in use (down 1.5 percent).

Type of dwelling

"Daily" use is highest for those living in a rented room (14 percent) or apartment (12 percent), and lowest for those living in a college dorm (8 percent). Obviously one's dwelling arrangement is highly correlated with his or her major activity after high school, as these differences reflect.

Employment

Employment status is unrelated to "daily" use. For those in military service, "daily" use dropped slightly after high school (from 13.4 percent to 12.4 percent). The activity group with by far the lowest "daily" use rate are the full-time homemakers (4 percent), which certainly occurs, in part, because they nearly all are female, married, and in many cases have young children.

Reasons for Using or Abstaining

Reasons for "Daily" Use of Marijuana

What reasons do "daily" users give for their use of marijuana? They tend to use marijuana to produce an intoxicated feeling, to cope psychologically with feelings of distress, to augment the effects of other drugs, and to participate in drug-using friendships. On a

checklist of 13 possible reasons, nearly all of the seniors who were "daily" users checked "to feel good or get high" (94 percent) and "to have a good time with my friends" (79 percent). Two-thirds said they used it to relax (67 percent) and nearly half said they used it to relieve boredom (45 percent). Roughly a quarter of the "daily" users checked each of the following: "to get away from my problems" (27 percent), "because of anger or frustration" (23 percent), and "to get through the day" (22 percent). These psychological coping motives in particular seem to distinguish the "daily" users from the less frequent users. A fairly high proportion (30 percent) also said that they used marijuana to increase the effects of other drugs, while only 10 percent of the other current users gave this reason. Only 11 percent of the "daily" users, or 1 percent of the total sample, stated that they used it because they felt "hooked" or had to have it. All of these responses for seniors were closely replicated among the "daily" users in the 19- to 22-year-old sample (Johnston, 1981).

Nearly all "daily" users (over 85 percent), whether in high school or past high school, say (1) that most or all of their friends smoke marijuana, (2) that most or all of their friends drink alcohol, (3) that more than a few of their friends get drunk every week, (4) that more than a few of their friends smoke cigarettes, and (5) that at least a few of their friends use a number of other illicit drugs. This degree of immersion in a drug-using friendship circle contrasts sharply to what we observe for their peers, even those who are current but less frequent users of marijuana. Clearly the social supports and the social pressures are there, both during and after high school, for the "daily" user to continue his or her habit.

Reasons for Quitting and Abstaining

A number of users of marijuana stop using the drug (Johnston, 1981). Among students (in the classes of 1978 through 1980 combined), those who have used marijuana 40 or more times but have stopped by their senior year give as their most commonly mentioned reason on a comprehensive list of 17 reasons that "they don't feel like getting high" (56 percent mentioned). Also frequently mentioned, however, are concerns about possible physical effects (41 percent); concern about possible psychological effects (38 percent); and, more specifically, concern about loss of energy or ambition (41 percent). These reasons also ranked high among those young people who smoked less than 40 times before they stopped, as did two additional reasons--concern about parental disapproval and finding that use of marijuana was not intrinsically enjoyable.

Concern about possible health effects appears to play a role in young people's giving up the drug and is mentioned considerably more often among quitters now than in 1976. Concern about physical health increased substantially between 1976 and 1980 among all high school seniors, from 35 percent to 57 percent, while concern about psychological damage went from 34 percent to 53 percent. A similar analysis of the reasons given for abstaining by the minority (about

40 percent) of seniors who have never tried marijuana reveals concern about physical (71 percent) and psychological (68 percent) consequences, which are mentioned far more often than any other type of reason. Social or ideological constraints or disinterest in getting high are infrequently mentioned. There also has been a significant increase in health concerns among the abstaining segment since 1976, though not as large as among quitters.

In summary, many "daily" users themselves see some negative consequences of their habit, and there perhaps are some consequences of which they are unaware. The fact that the "daily" smoking of marijuana is proving to be more enduring and stable than many may have thought increases the probability of cumulative, long-term effects. The fact that so many young people are becoming "daily" users now puts a substantial number of people at risk of whatever the long-term consequences may prove to be.

Sequence of Drug Use

Regardless of the age of onset, there is a predictable sequence in the patterns of initiation into the use of available drugs. Independent longitudinal studies have confirmed and identified a stable sequence of drug use (Hamburg et al., 1975; Kandel, 1975b; Kandel and Faust, 1975). The legal drugs for adults, such as alcohol and tobacco, are an early, integral, and crucial part of the sequence. Their use precedes the use of all illicit drugs. At least four distinct successive stages of adolescent involvement with drugs can be identified: (1) use of beer or wine, (2) use of tobacco cigarettes or hard liquor, (3) use of marijuana, and (4) use of other illicit drugs (Kandel, 1975b). A fifth stage, problem drinking, may take place between marijuana and other illicit drugs (Jessor et al., 1980). Adolescents rarely proceed from beer and wine to illicit drugs without use of either hard liquor or tobacco cigarettes as an intermediate step. Furthermore, there is an additive effect such that the highest proportion of adolescents who move to marijuana are those who have experience with both hard liquor and tobacco. For example, among 12- to 17-year-olds in the general population, the proportion who have ever experimented with marijuana is 81 percent among current tobacco cigarette smokers as compared to 24 percent among nonsmokers (Fishburne et al., 1980). However, position on a particular point in the sequence does not indicate that the young person will necessarily progress to other drugs higher up in the sequence. Participation in each stage is a necessary but not sufficient condition for participation in a later stage. There is no evidence to support the belief that the use of one drug will inevitably lead to use of any other drug. In other words, persons at the top of the ladder of use of drugs typically will have used all substances at lower levels, including marijuana. However, those at lower rungs may stay there and not move to higher rungs of the ladder.

For example, data from the National Household Surveys (Fishburne et al., 1980) indicate that of those 18-25 years old who have tried

marijuana, almost all are users of tobacco or alcohol; however, only slightly more than one-fourth of this 18- to 25-year-old population report having gone on to try any illegal drug other than marijuana. Of those who try other illegal drugs, only a very small percentage report being current users (Fishburne et al., 1980).

Although it is of great interest, relatively little is known about the factors that determine which persons will choose to go through the sequence of drug use or the rapidity with which they will do so. Existing research gives us some clues that users of illicit drugs possess some distinguishing features.

There are four clusters of variables--parental influences, peer influences, adolescent involvement in deviant behaviors, and adolescent beliefs and values--that assume differential importance for predicting involvement at each stage of drug behavior (Kandel et al., 1978a,b).

Involvement with drugs legal for adults is the earliest level of drug use. Adolescents who start to drink are exposed to peers and parents who drink, suggesting that these youths learn drinking patterns from their parents. Adolescents who have engaged in a number of delinquent or deviant activities, and who seek high levels of sociability with their peers are likely to become involved with alcohol. Similar patterns are found with tobacco smoking, also one of the earliest drugs to be tried.

The use of marijuana follows that of alcohol and tobacco. It is preceded by acceptance of a cluster of beliefs and values that often reflect disavowal of many standards upheld by adults. Involvement in a marijuana-using peer environment strongly predisposes to its use and is the best predictor (Becker, 1953; Goode, 1970). Participation in minor forms of deviant behaviors, such as those that also precede the use of hard liquor, is also an important precursor.

Antecedents of Adolescent Use of Marijuana

When use of marijuana first came under research scrutiny in the late 1960s, very few youths had experimented with illicit drugs. Much was made of the deviant status of use of marijuana and of the counter-cultural and rebellious meaning that came to be attached to using the drug (Suchman, 1968). Yet even today, when over 60 percent of all high school seniors have used marijuana, those youths who use marijuana are quite different from nonusers. The marijuana users in 1979 show the same patterns of disaffection from major institutions that characterized the users in 1967. The most recent data show that marijuana users perform more poorly in school, are less religious, have performed more delinquent acts, are in trouble with the law, have more traffic accidents, and use more illicit drugs than nonusers. Those persons who also use several illicit drugs show the highest involvement in deviant behaviors. There is a linear relationship with degree of involvement with illicit drugs, such that persons using marijuana exclusively are only quantitatively different from those who have also used harder drugs (Johnston et al., 1980b).

In two cross-sectional national samples of high school students, surveyed in 1974 and 1978, Jessor et al. have found that not only are the patterns of association between use of marijuana and deviant characteristics similar in both surveys, but also that the strength of the associations, as reflected in the sizes of the correlation coefficients, are almost identical. The very same conclusions derive from analyses based on five successive cohorts of high school seniors, sampled at yearly intervals in Monitoring the Future (Bachman et al., 1981).

Longitudinal studies of students aged 12-21 have done much to extend our understanding of the precursors of using various forms of drugs. Studies have been reviewed in detail by Kandel (1978a,b; 1980a; also see Appendix C) and document that many of the factors found to be associated with use of drugs at one point in time, such as low academic performance, crime, low self-esteem, depressive mood, rebelliousness, and other personality characteristics, precede the use of drugs (see in particular Mellinger et al., 1976; Jessor and Jessor, 1977; Johnston et al., 1978; Kandel, 1978a; Kandel et al., 1978b,c; Kaplan and Pokorny, 1978; Smith and Fogg, 1978; Wingard et al., 1979; Kaplan, 1980). Some of the predictive factors can be identified in childhood, such as aggressiveness with or without association with shyness (Kellam et al., 1980, in press) and rebelliousness (Smith and Fogg, 1978).

Other longitudinal studies also document that many of the factors found to be associated with use of drugs at one point in time, such as low academic performance, delinquency, low self-esteem, and depressive mood actually precede the use of drugs (O'Malley, 1975; Mellinger et al., 1976; Jessor and Jessor, 1977; Johnston et al., 1978; Kandel et al., 1978a; Kaplan and Pokorny, 1978; Wingard et al., 1979; Kaplan, 1980).

One study shows not only that certain behaviors predict use of marijuana, but also that drugs may aggravate or exaggerate certain behaviors. A cohort of high school students was followed at annual intervals throughout the four years of high school (Jessor and Jessor, 1977). During this time annual scores for various attributes were charted in four groups of students distinguished by differing drug histories: veteran users, who used drugs pre-high school; early initiates, who began relatively early in their high school career, i.e., between the first and second year of testing; late initiates, who began relatively late, i.e., between the second and the third year; and nonusers, who had not started to use marijuana at the last testing in the senior year of high school (Jessor and Jessor, 1977, 1978). These four groups of students differed on measures, such as general deviant behavior (a 12-item scale measuring frequency of involvement in stealing, fighting, property destruction, truancy, or other delinquent activities in the last year) or value on academic achievement (a five-item scale, measuring the value placed on the attainment of success in school work), at the beginning of the study. Scores predicted if and when students initiated use of marijuana. Those students already involved in use of drugs before high school scored highest on deviance and lowest on achievement motivation at

initial testing and throughout subsequent retests. The scores of all groups of users converged over time so that all three groups increased in deviance scores and decreased in their achievement orientation over the four years. The sharpest changes in scores occurred in the year preceding the drug use.

Peer Influences

The most consistent and reproducible finding in drug research is the strong relationship between an individual's drug behavior and the concurrent use of drugs by his friends. The relationship is stronger when based on adolescents' perceptions of the friends' behavior than on the friends' self-reports (Goode, 1970; Johnson, 1973; Kandel, 1973; Goldstein, 1975; O'Donnell et al., 1976; Brook et al., 1977; Jessor and Jessor, 1977; Kandel et al., 1978a; Orcutt, 1978; Smart et al., 1978; Huba et al., 1979). On no other characteristic except age and sex is the similarity within adolescent friendship pairs as high as it is for use of marijuana (Kandel, 1978c). Such similarity results not only from socialization, the influence of one friend on the other, but also from a process of interpersonal selection (assortive pairing), in which adolescents with similar values and behavior seek each other out as friends. Longitudinal data on the formation and dissolution of friendships indicate that selection and socialization contribute about equally to the similarity in values and behaviors (Kandel, 1978d). Available data on sex differences in peer influence indicate that females are more susceptible than males to such influence (Jessor et al., 1973; Margulies et al., 1977). Susceptibility to peer influence is related to involvement in peer-related activities, e.g., dating or getting together with friends, and to degree of attachment to and reliance on peers rather than parents (Jessor and Jessor, 1978; Kandel et al., 1978a; Brook et al., 1980). Contact with other users increases the likelihood that the individual will have increased opportunities to get the drug. Peer-mediated approaches have been shown to be an effective vehicle for interventions to prevent smoking of tobacco in adolescents (Evans, 1977; McAlister, 1979). The powerful role of peer influence on the use of marijuana would seem to suggest that it would be also useful for preventive marijuana programs.

SUMMARY

There has been a steep rise in the use of marijuana and other illicit drugs in the past decade. So far it is primarily a youth phenomenon. Since 1971 there has been at least a doubling of lifetime experience with marijuana in every cohort in the 12- to 24-year age group. Of all psychoactive drugs investigated (including inhalants, hallucinogens, cocaine, heroin, stimulants, sedatives, and tranquilizers), marijuana is by far the most commonly used illicit drug. Legal drugs for adults, such as alcohol and tobacco, are the most widely used of

all drugs among adolescents. Although substantially more students have ever used alcohol in their lifetime than have ever used marijuana, more high school seniors use marijuana on a "daily" basis (9 percent) than use alcohol that frequently (6 percent). "Daily" users report the use of marijuana in school, whereas daily use of alcohol tends to occur after school and on weekends.

Some trends in use of marijuana are apparent. The continuing dramatic rise in the use of marijuana has recently slowed. It is too early to tell whether this decrease will continue or is merely a pause in the rise. The overall prevalence of use of marijuana has remained at approximately 60 percent of high school seniors for the years 1978, 1979, and 1980. Between 1975 and 1978 there was an almost twofold increase in "daily" use of marijuana from 6 percent in 1975 to a peak rate of 11 percent in 1978. In 1980 the "daily" use rate of high school seniors dropped by 1.2 percentage points, or more than 10 percent. This may signal a reversal of the upward trend in "daily" use unless higher absenteeism and school drop-out of daily users are significant factors in the decline. Multiple sources suggest that out-of-school age mates are heavier users than those in school. Other trends have not slowed. There was a continuing rise in 1980 of the proportion of high school seniors who during the year had used some illicit drug other than marijuana, from 28 percent in 1979 to 30 percent in 1980.

Throughout the 1970s, as a correlate of continuing rise in prevalence rates, there was a trend toward younger ages of first use of all of these drugs. For marijuana this age trend continues but has slowed somewhat. In 1979, 23 percent of seniors who had used marijuana started their use in the eighth grade or below as compared to 25 percent in 1980.

"Daily" use of marijuana in high school and in early adult life is very high and merits special attention. Drawing on data from Monitoring the Future, characteristics of "daily" users were described. For high school seniors the rate of "daily" marijuana use in 1980 was 9.1 percent. Such users have very high involvement with other drugs and begin their use of drugs at very early ages. "Daily" users are predominantly urban although rates do not vary by geographical regions of the country, whereas use among white students is double that for blacks. "Daily" use is only slightly higher in disrupted or single parent homes than in nuclear families, and use is associated with poor school achievement, absenteeism, and dropout. Non-college-bound students are twice as likely to be "daily" users as were students planning to attend college. Religious commitment and self-ratings of strong belief in law-abiding behavior are associated with lower "daily" use rates. "Daily" users are involved in more automobile accidents and delinquency.

Post-high school "daily" user rates are lowest among full-time college students and those living in a college dormitory. "Daily" use among non-college students was not related to joblessness, employment, or military service. Single persons are twice as likely as married persons to be "daily" users. Among the married, those with children had very low rates of "daily" use. The "daily" use

habit has a remarkable stability. By 4 years after high school, 85 percent of "daily" using seniors in the class of 1975 were still using marijuana, with 51 percent of them continuing to be "daily" users.

In these studies, students report reasons for using marijuana: to have a good time with friends, to get "high," to relieve boredom, to enhance the effects of other drugs, and to cope with stress. "Daily" users are deeply immersed in a drug-using circle of friends.

Some "daily" users have discontinued their habit. Reasons given for stopping use of marijuana are loss of interest in getting "high," concern about harmful physical or psychological effects, and concern about their loss of energy or ambition.

More is known about the antecedents of using marijuana than is known about the consequences of using marijuana (to be discussed further in the chapters that follow). Longitudinal studies have established that use of marijuana is preceded by acceptance of a cluster of beliefs and values that are favorable to use of marijuana and also by the adoption of deviant behaviors. The deviant psychosocial attributes of marijuana users that were described almost a decade ago, when use of marijuana was a rare event, are just as characteristic of marijuana users today, when 60 percent of all high school seniors report some experience with the use of marijuana. Daily users show the extremes of these deviant behaviors but less deeply involved users also exhibit some deviancy. Friendship patterns and peer influence play a uniquely powerful role in determining youthful marijuana use. Negative parental relationships do not appear to be associated as an antecedent to use of marijuana.

RECOMMENDATIONS FOR RESEARCH

Additional research needed includes (1) epidemiologic studies on patterns of use of drugs among young adolescents, including those who leave school, (2) longitudinal studies to investigate the antecedents and consequences of use of marijuana, and (3) studies of the effects of marijuana in combination with use of other drugs.

Because samples of high school seniors exclude youths most at risk for high marijuana involvement, namely adolescents not regularly attending the high school, additional cohort-sequential epidemiologic surveys beginning with prepubertal children are needed in order to follow development and behavior from early in life. An all-conclusive approach would be both a prospective (concurrent) cohort study and a retrospective case-control study of possible outcomes of and risk factors for marijuana use (this recommendation is described in detail in Chapter 6).

"Daily" users have been understudied and may have the most severe risk in terms of loss of learning potential, biological risk, and psychosocial handicap. Studies should be undertaken to predict who among the large numbers of young people who try marijuana are at risk of becoming "daily" users.

Research on the factors involved in cessation of the use of marijuana should also be carried out. Tobacco smoking is declining among youth (National Institute of Education, 1979). The reasons for this decline could be applicable to marijuana use and should be sought.

Studies should be undertaken to learn how peer influence can be reliably used to moderate or prevent marijuana use in young adolescents.

Properly planned longitudinal cohort studies should be conducted on both the behavioral and physiological antecedents and consequences of the use of marijuana. Detailed and continuing medical and psychosocial data are needed on the life careers of American adults who use marijuana "daily." Retrospective studies of middle-aged and elderly persons who have a history of chronic heavy use of marijuana would be systematically studied for medical and psychosocial attributes and for effects on job performance. These are especially needed for urban industrialized populations.

Little is known about the consequences of using marijuana in combination with other drugs. Inasmuch as the rates of use of other drugs are so high, this is of great salience. Interdisciplinary and collaborative efforts are crucial if the complexities of multiple drugs and intercorrelated behaviors are to be disentangled.

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3

EFFECTS OF MARIJUANA ON THE RESPIRATORY AND CARDIOVASCULAR SYSTEMS

RESPIRATORY SYSTEM

Performance (Pulmonary Function)

The lungs are the natural target for the harmful effects of smoked materials. This is as true for marijuana as for tobacco. In both instances, smoke is drawn into the lungs where it can harm not only the cells that line the airways (trachea, nasopharynx, bronchi, and alveoli) and constitute the lung tissue, but also impair such cells as lung macrophages, which are part of the immune system. As a result, the smoke may inflict injury directly on parts of the system and also make the lungs vulnerable to agents that normally are held at bay by self-cleansing and self-protecting mechanisms.

Different effects would be expected from tobacco and marijuana smoking because of the striking differences in the way in which the two substances are smoked: marijuana smoke usually is drawn deeply into the lungs by one or a few deliberately deep breaths, whereas tobacco smoking is generally more automatic, repetitive, and variable in pattern. Moreover, because marijuana is a "street drug," it not only is inconsistent in its content but also is subject to contamination. Also, filters are not usually used by marijuana smokers, although water pipes are used occasionally. Consequently, under natural conditions it is difficult to judge dosage of active ingredients, to sort out the influence of contaminants, and to compare the consequences of marijuana and tobacco smoke.

Experience over the years with cigarette smoking has shown that continued exposure to tobacco smoke entails the risk of producing chronic bronchitis and/or carcinoma of the lung. But, although cannabis products have been smoked for centuries, remarkably little is recorded about their effects on the lungs. Whatever contemporary information exists is confounded by the fact that most marijuana smokers are also tobacco smokers.

In recent years, interest has heightened in the smoking of marijuana as a therapeutic measure. The inhalation route takes advantage of the large surface area afforded by the lungs for administering the effective constituents of marijuana. However, this

practice entails the disadvantage of administering a therapeutic agent in a cloud of air pollutants.

In brief, our appraisal must assess the impact of chronic bronchial irritation and inflammation on the airways and gas-exchanging surfaces of the lungs.

Acute Effects

Marijuana affects the control of the breathing pattern in different ways depending upon the dose, the preparation, and its psychotropic effect on the consumer. One marijuana cigarette generally stimulates ventilation (air exchange between the lungs and the ambient air) in conjunction with an increase in the metabolic rate and a heightened response to carbon dioxide (CO_2) as a regulatory stimulant (Vachon et al., 1973; Zwillich et al., 1978). On the other hand, larger doses of smoked marijuana may depress the ventilation and responsiveness to the CO_2 stimulus (Weil et al., 1968; Bellville et al., 1975). The intravenous administration of Δ-9-THC in equivalent doses has much less of an effect either on the ventilation or on the effectiveness of CO_2 as a respiratory stimulant (Malit et al., 1975).

Much more consistent and predictable is the effect of marijuana on the airways. The inhalation of small amounts of marijuana smoke causes bronchial dilation in persons without demonstrable lung disease (Tashkin et al., 1973; Vachon et al., 1973). The bronchodilation is easily demonstrable; the inhalation of isoproterenol (1250 μg), a potent bronchodilator, caused less of an improvement in airways conductance than the peak effect observed after smoking 2 percent marijuana (Tashkin et al., 1973). Ingestion of Δ-9-THC is less effective than smoking marijuana in producing bronchodilation; the bronchodilator effects of smoked marijuana last as long as 60 minutes; that of ingested Δ-9-THC up to 6 hours. Aerosolized Δ-9-THC has a local irritating effect on the airways, which often overrides the bronchodilating effect to the point of making it unsuitable for therapeutic purposes (Tashkin et al., 1977a).

Except for bronchodilation, acute exposure to marijuana has little effect on breathing as measured by conventional pulmonary tests. Thus, in young marijuana smokers (21-30 years of age) who smoked at least four cigarettes per week and no tobacco for at least 6 months before, ventilatory mechanics and gas exchange were normal by conventional tests (Tashkin et al., 1976). In contrast, heavy marijuana smoking, i.e., at least 4 days per week for 6 to 8 weeks did cause mild airway obstruction (Tashkin et al., 1976).

Acute smoking of marijuana, as well as the ingestion of Δ-9-THC, also causes bronchodilation in individuals with mild to moderate asthma (Tashkin et al., 1974). Marijuana smoking or ingestion of Δ-9-THC also dilated airways in asthmatics in whom bronchoconstriction was deliberately provided either by exercise or by the inhalation of methacholine, a bronchoconstrictor (Shapiro et al., 1976a). The mechanism by which bronchodilation is effected is not clear, but does not involve stimulation of beta-adrenergic

receptors or blockade of muscarinic receptors in airway smooth muscle (Shapiro et al., 1976a). Adding to the difficulties of interpretation are the psychotropic effects of marijuana: four of the individuals who had previously used cannabis could distinguish the marijuana cigarette from the placebo on the basis of the intoxicating experience afforded by the marijuana smoke. Although the four subjects without previous cannabis experience did not experience any central nervous system effects, they did note mild somnolence or light-headedness after marijuana use.

Among the experiments with induced asthma were some that employed the inhalation of cannabinoid-free marijuana smoke (Tashkin et al., 1975). The results indicate that the smoke of the marijuana cigarette does not prevent methacholine-induced bronchospasm (Tashkin et al., 1976). Smoking of marijuana did not aggravate or perpetuate bronchoconstriction in stable asthmatics, and it promptly reversed experimentally induced bronchospasm (Tashkin et al., 1978). Addition of Δ-9-THC to placebo smoke caused a prompt, complete, and sustained reversal of methacholine-induced bronchospasm. Although ingestion of Δ-9-THC in a sesame oil vehicle has produced bronchodilation in asthmatic patients, less dilation was noted than after smaller doses of Δ-9-THC delivered by smoking (Tashkin et al., 1974).

Although it appears that the mechanism of Δ-9-THC-induced bronchial dilation is mediated by the autonomic nervous system, the process of dilation is not understood (Gill and Paton, 1970; Cavero et al., 1972; Shapiro et al., 1973).

Subacute Effects

Pulmonary function tests in 28 healthy young experienced cannabis users before and after a 47-59-day period of heavier than customary marijuana usage (group daily average of 5.2 cigarettes, with a daily mean range of 1.7 to 10 cigarettes per subject) disclosed the development of mild but significant decreases in specific airway conductance and forced expiratory flow as well as in diffusing capacity (Tashkin et al., 1976). Cessation, by reduction in smoking, gradually restored the tests toward normal. The clinical significance of these abnormalities is uncertain. The marijuana smoked and the impairment in pulmonary function, coupled with the observation that reversibility of function was incomplete 1 week after marijuana smoking had stopped, suggests that heavy marijuana smoking over a much longer period could lead to clinically significant and less readily reversible impairment of pulmonary function.

Chronic Effects

A study of 31 American soldiers stationed in West Germany who smoked large quantities of hashish (100 grams or more per month for periods

of 6 to 15 months) found their ailments to be principally respiratory, including bronchitis, sinusitis, asthma, and rhinopharyngitis (inflammation of the nasopharynx) (Tennant et al., 1971). In one-third of the soldiers, sputum-producing coughs, difficulty in breathing, and wheezing followed 3 to 4 months of regular use of hashish. However, they had a normal chest radiograph and normal sputum. Antibiotics failed to relieve the symptoms. The symptomatic patients could not work and four required hospitalization. An unspecified decrease in hashish consumption improved their symptoms.

Pulmonary function tests in these individuals showed mild airway obstruction after 3 days of lessened hashish intake. Moreover, the response of these individuals to isoproterenol suggested that reversible bronchospasm and/or the accumulation of fluid in the bronchi was involved in the pathogenesis of the airway obstruction. Patch and serological tests failed to implicate allergy as a cause of the upper respiratory symptoms and signs.

In Jamaica (Hall, 1975), where marijuana usage is heavy, chronic bronchitis is frequent. However, marijuana smoking is usually associated with tobacco smoking, which confounds interpretation of the effects of marijuana alone. Adding to the uncertainty about the effects of marijuana as a cause of chronic regulatory abnormalities are two other studies, one in Jamaica (Rubin and Comitas, 1975) and the other in Costa Rica (Hernandez-Bolanos et al., 1976), which failed to find any difference in the prevalence of chronic respiratory disease between smokers and nonsmokers of marijuana. These results cannot be accepted as conclusive, because in each study the number of marijuana smokers was small, the subjects were not randomly selected, and the use of tobacco was not taken into account.

Much more convincing is a recent study (Tashkin et al., 1980) of 74 persons who smoked marijuana for 2 to 5 years, typically as frequently as several times per day, 3 to 6 days per week. Care was taken to obtain proper control groups. The results indicated that habitual smoking of marijuana causes a mild but significant increase in resistance to airflow in the large airways without an appreciable effect on conventional tests.

Another study was of 200 American soldiers stationed in West Germany who voluntarily sought medical attention for such respiratory symptoms as pharyngitis, sinusitis, bronchitis, and asthma related to chronic heavy hashish smoking (Henderson et al., 1972). Analysis of the hashish available and in use in the locale of this study showed concentrations of 5 to 10 percent Δ-9-THC. Two to 3 percent of samples were contaminated with cocaine, opium, morphine, spices, or feces. Two aspects of hashish smoking are relevant to the question of lung injury produced by hashish: 1) hashish is usually smoked in a pipe (occasionally in a water pipe), although it is occasionally eaten, drunk as a tea, or rolled into a cigarette and smoked, and 2) hashish smoke generally is regarded by users as burning much hotter than tobacco smoke.

Soldiers with pharyngitis usually smoked less than 25 grams of hashish monthly; those with bronchitis and asthma consumed more than 50 grams per month. The common complaint of sore throat in these

heavy hashish smokers occurred most often in those who smoked hashish in a pipe without a screen or cotton filter; in them, the roof of the mouth and the back of the throat were inflamed. Persistent rhinitis (inflammation of the nasal mucous membranes) was present in 26 patients. As a rule, allergy could not be implicated in the nasopharyngeal manifestations. Treatment with antibiotics, decongestants, and phenylephrine (a vasoconstrictor) relieved the symptoms, but they recurred in those who continued smoking hashish.

Twenty high-dose hashish smokers (more than 50 grams/month) had chronic bronchitis as manifested by a chronic sputum-producing cough, shortness of breath, and decreased exercise tolerance. On physical examination, abnormal respiratory sounds--rhonchi, wheezes, and rales--were present. Chest radiographs were consistently normal, but pulmonary function was abnormal; the vital capacity (the maximum volume of gas taken in) was 15 to 40 percent below normal. In six of these subjects who smoked 50 or more grams per month, biopsy of bronchial mucosa revealed changes that resembled the abnormalities that occur in older heavy smokers of tobacco (Auerbach et al., 1961). The biopsies also turned up atypical cells not found in tobacco smokers.

The study of a respiratory disease in hashish or marijuana smokers is difficult because the great majority also smoke tobacco cigarettes. Also, the illegality of marijuana smoking prevents people from volunteering information and cooperating in experimental studies. Baseline physiological or clinical studies are difficult, because the subject is not identified until he seeks medical help.

Rats (Fleischman et al., 1979) and dogs (Roy et al., 1976) have been exposed experimentally to marijuana smoke over long periods (1 year and 900 days, respectively) to determine its morphological effects on the lungs. At autopsy, the animals demonstrated damage of the airways and also of the lung substance. However, it is difficult to relate the results of these animal experiments, in which the artificial pattern of smoking differed markedly from that of the human smoker, to the effects that chronic marijuana smoking might elicit in man.

Defense Mechanisms (Alveolar Macrophages)

Little is known about the effects of marijuana on the defense mechanisms of the lungs. Although some observations have been made on the alveolar macrophage, an important element in this system, the results have been inconsistent. For example, some studies of the rat lung found that macrophages obtained by washing out the lung and exposing them to marijuana smoke manifested a depression in bactericidal activity (Huber et al., 1975, 1979a,b, 1980). On the other hand, another report failed to disclose a significant effect, not only of marijuana, but also of tobacco smoke on the bactericidal activity of macrophages (Drath et al., 1979). Finally, others have found that alveolar macrophages differ slightly in their morphological responses to tobacco and to marijuana smoke. The significance of

these differences, especially in terms of their long-term effect on pulmonary defense mechanisms, remains to be defined.

Explants of lung have also been examined after exposure in culture to marijuana smoke (Leuchtenborger et al., 1973a,b; Leuchtenberger and Leuchtenberger, 1976). Striking changes have been observed in the appearance and growth characteristics of exposed cells.

Carcinoma of the Lung

The effect of marijuana as a carcinogen for lung, airways, and upper respiratory organs has not been systematically explored. Evaluating the carcinogenicity of marijuana is difficult, because most marijuana smokers also are tobacco cigarette smokers and because such carcinogenicity could have a long period of latency; studies of tobacco carcinogenesis indicate that 20 to 30 years of exposure must occur before tumors appear in the lung. It is understandable that information concerning the carcinogenic properties of marijuana are not yet available, particularly in the United States, where the agent has come into extensive use only during the past two decades. An important problem in evaluating carcinogenicity is the fact that the leaf is used by igniting it and the inhaled products of its combustion may be carcinogenic, as in the case of tobacco products. Even if it proved to be carcinogenic, the question would still remain as to what constituent in marijuana smoke was at fault.

The potency of a substance as a mutagen (ability to change genetic material) can provide a clue as to its possible role as a carcinogen. Induction of genetic mutations by a substance in test strains of bacteria correlates with induction of tumors in test animals. Fractions from extracts of marijuana smoke particulates ("tar") have been found to produce dose-related mutations in four out of five test strains of bacteria (Busch et al., 1979; Seid and Wei, 1979; Wehner et al., 1980). By itself, Δ-9-THC was not active as a mutagen in bacterial strains (Glatt et al., 1979) or in mammalian test systems (van Went, 1978).

The extent to which marijuana smoke differs from tobacco smoke is discussed in detail in Chapter 1. In general, except for the presence of cannabinoids in one and tobacco alkaloids (nicotine) in the other, the combustion products of tobacco and marijuana are qualitatively similar. On occasion, however, differences that may be meaningful have been found. For example, one study (Hoffmann et al., 1975) reports that tobacco smoke contains more isoprene and volatile phenols, whereas marijuana smoke contains about 50 percent more carcinogenic hydrocarbons.

Tumorigenicity of marijuana and tobacco smoke condensates on mouse skin have been reported. In mice painted three times weekly with a tar suspension of smoke condensate, survival at 74 weeks was better in the marijuana group than in the tobacco group. Six of 100 mice painted with marijuana condensate developed skin tumors, all of which were benign, whereas 14 of 100 in the tobacco condensate group developed tumors, two of them malignant (Hoffman et al., 1975).

Because marijuana smoke has adverse actions similar to tobacco smoke on cell function in the respiratory and cardiovascular systems, it has been proposed that marijuana smoke, rather than only the cannabinoid, should be used to obtain information about effects on cell injury and response (Leuchtenberger and Leuchtenberger, 1971). Exposure of human lung cells in culture to freshly generated marijuana smoke for up to 2 months resulted in increased mitotic indices, stimulation of DNA synthesis, and an increase in the population of cells with four times the DNA content of control cells or those exposed to tobacco smoke (Leuchtenberger et al., 1973a,b). Long-term exposure of hamster lung cells to the smoke of either marijuana or tobacco led to abnormal proliferation and malignant transformation within 3 to 6 months of exposure (Leuchtenberger and Leuchtenberger, 1976). Since malignant transformation was also noted in unexposed lung cells after 12-24 months of culture, it appears that the smoke of marijuana or tobacco accelerates, rather than initiates, the malignant change.

Although no instance of human lung carcinoma attributable solely to marijuana smoking has yet been reported, abnormalities suggestive of cancerous lesions have been recorded. For example, in several of the U.S. servicemen who smoked 50 grams of hashish or more per month and developed upper respiratory disorders, mucosal biopsy showed extensive cellular abnormalities, including loss of cilia, proliferatior of basal epithelial cells, and atypical cells (Tennant et al., 1971; Henderson et al., 1972). Comparison of 30 American hashish smokers (25-150 grams/month for 3-24 months; 23 also smoked tobacco and 7 did not), 3 tobacco smokers (1.6 packs/day for 11.3 years) who did not smoke marijuana and 3 nonsmokers of tobacco or hashish, indicated exposure to combined marijuana and tobacco smoke produced more harmful effects than that produced by either substance alone (Tennant et al., 1980). In the hashish smokers who did not smoke tobacco, abnormalities in the tracheal biopsies were no more frequent or severe than in those persons who smoked only tobacco.

Exception has been taken to the idea of an additive effect of tobacco and hashish smoke. A Greek study that compared chronic hashish and tobacco users with tobacco smoking controls found that although the hashish smokers had considerably more throat irritation and cough, the prevalence of bronchitis in both groups was about the same (Boulougouris et al., 1976); no biopsies were taken. The differences between the Greek and American studies may reflect differences between the two populations: The American study, done in Germany, favored inclusion of men with severe respiratory disturbances (Tennant et al., 1980), whereas the Greek study (Boulougouris et al., 1976) appears to have included persons with less severe illness.

The finding of known carcinogens in marijuana smoke and the presence of epithelial abnormalities known to be the precursors of lung cancer in heavy smokers of tobacco suggest the possible development of lung cancer in chronic, heavy users of marijuana and/or hashish after a prolonged period of use, especially if they are also smokers of tobacco. However, evidence to support this hypothesis is not available. Because marijuana smoking is an ancient

custom in Asia and the Middle East, lung cancer would be expected to be more prevalent in these parts of the world if a causal relationship did exist. Unfortunately, no reliable data have been gathered to settle this question. Heavy smoking of marijuana, in quantities comparable to that of tobacco, has been relatively uncommon in the United States. Therefore, the contribution of marijuana smoking to the incidence of primary lung cancer cannot yet be answered with any authoritative data.

Summary: Respiratory System

Lung Function and Defense Mechanisms

The most important question about the effects of marijuana on the health of the respiratory system is whether acute or chronic marijuana smoking cause detectable structural or functional impairment of the lungs. Mild but measurable airway obstruction, affecting both large and small airways, can be shown to exist after 6 to 8 weeks of smoking marijuana daily, averaging five marijuana cigarettes a day; this decrement in function is reversible, but does not return to normal within one week of abstaining from smoking.

In persons with histories of heavy smoking, particularly of hashish, chronic inflammatory changes are seen in the bronchi and uvula, often in association with chronic sinusitis. These manifestations of upper respiratory disturbance have been described in individuals with histories of marijuana smoking usually in excess of 3 years and are reversible when marijuana smoking is stopped.

Acute exposure of alveolar macrophages *in vitro* to marijuana smoke causes a reduction in phagocytic activity, a cell defense mechanism. The agents responsible for this change in macrophage function are in the vapor phase of marijuana smoke and are not related to the presence of Δ-9-THC. Also, lung explants exposed to marijuana smoke *in vitro* show changes in the chromosomal structure of nuclei.

There is as yet no information about the effects of prolonged smoking of marijuana, that is, beyond 5 years. Although some populations have been examined for the effects of chronic marijuana smoking, controlled studies are sparse and populations exposed to marijuana smoke only--without exposure to tobacco--apparently are not available. Particularly conspicuous is the lack of information about the effect of chronic marijuana smoking begun in late childhood or adolescence and continued to adulthood. Such studies would require morphological examination of biopsy material from the bronchi and respiratory passages to determine the presence of structural changes that indicate the development of chronic bronchitis and/or lung cancer. Morphological changes associated with smoking marijuana could be compared with the morphological abnormalities associated with chronic tobacco smoking.

The acute response to inhalation of marijuana is an appreciable bronchodilation, both in normal subjects and in individuals with

bronchial asthma. However, the bronchodilator effects of marijuana are a response to acute exposure; chronic exposure usually evokes bronchoconstriction.

With respect to therapeutic application, the effects of smoking marijuana in producing bronchial dilatation do not exceed those that follow the inhalation of beta-agonist drugs. Moreover, the doses required for bronchodilatation usually elicit the psychotropic effects of marijuana and may be associated with changes in the structure of bronchial and parenchymal lung cells, the significance of which remains to be assessed. For these reasons therapeutic usefulness as a bronchodilator drug is open to serious question (see Chapter 7).

Carcinoma of the Lung

One of the great uncertainties about marijuana smoking is its neoplastic potential. No reliable data are available concerning the incidence of carcinoma of the lungs and upper respiratory passages in long-term users of cannabis.

But a variety of experimental studies has sounded the alert that marijuana smoking--just as tobacco smoking--may be carcinogenic and that a combination of tobacco and marijuana smoke may have greater neoplastic potential than either one alone. Although the experimental observations have raised the suspicion, long-term observations on human subjects--and possibly on smoking animals--will be necessary to settle the issue.

Recommendations for Research

Lung Function and Defense Mechanisms

With respect to the performance and defenses of the lungs, these studies would be informative:

- the physiological, biochemical, and morphological interactions of combined exposures of the respiratory tract to tobacco and marijuana smoke;
- the interactions of cannabis and alcohol on the function of the respiratory tract;
- the long-term effects, i.e., 10 to 30 years, of exposure of the respiratory tract to frequent use of cannabis in the absence and pressure of exposure to tobacco smoke (for this purpose, large-scale epidemiological studies may be required);
- the physiological effects and clinical consequences of exposure of alveolar macrophages and other lung cells to long-term exposure to marijuana smoke;
- the immunologic effects of marijuana smoke exposure on cells and on the entire body.

Carcinoma of the Lung

With respect to carcinoma of the lung, these studies seem essential:

- an epidemiological survey to determine over the next 20 to 30 years if there will be an increased incidence of primary lung, laryngeal, oropharyngeal, esophageal, nasal, or sinus cancer in chronic marijuana smokers;
- epidemiologic and pathological studies in humans and experimental studies in animals to evaluate the carcinogenic potential of chronic marijuana smoking on the lung, larynx, oropharynx, nasal, and sinus epithelium.

CARDIOVASCULAR SYSTEM

Normal Heart and Circulation

Heart (Direct Effects)

With respect to the heart and circulation, the most evident effect in human beings of smoking marijuana, or of ingesting the active ingredient (Δ-9-THC), is a brisk increase in heart rate (tachycardia). Although this is not threatening to the normal heart, the rapid heart action can be harmful to the heart in which the circulation is compromised by atherosclerosis or is on the verge of failing.

The responses of the cardiovascular system to acute exposure to marijuana differ between human beings and most other mammals in that the human subject typically responds with an increase in heart rate (Bright et al., 1971; Beaconsfield et al., 1972; Perez-Reyes et al., 1973), whereas most mammals show a slowing in rate (bradycardia) (Cavero et al., 1973; Graham and Li, 1973; Rosenkrantz and Braude, 1974; Vollmer et al., 1974; Adams et al., 1976; Hardman and Hosko, 1976; Kawasaki et al., 1980). Human blood pressure usually increases moderately on acute administration of Δ-9-THC, but in monkeys and dogs acute administration is followed by a decrease in systemic arterial pressure. Typical effects on heart rate and blood pressure have been attributed to altered autonomic function (Loewe, 1944; Joachimoglu, 1965; Ames, 1968; Gill and Paton, 1970).

Effects on the cardiovascular system are to some extent a function of dose, route of administration, and duration of exposure. Tolerance to some of the cardiovascular effects in human beings develops with chronic use (Benowitz and Jones, 1975, 1977a,b; Nowlan and Cohen, 1977), but continued use does not result in any persistent alteration in cardiovascular function after cessation of exposure (Dornbush and Kokkevi, 1976).

Effects on Heart Rate In healthy young adults, acute administration of marijuana by smoking (10 mg total dose) causes a prompt increase in heart rate (increasing by up to 90 beats/minute) for about 1 hour.

The change in heart rate caused by Δ-9-THC appears to result from alterations in both sympathetic and parasympathetic efferent activity to the normal cardiac pacemaker (Beaconsfield et al., 1972; Martz et al., 1972; Sulkowski et al., 1977). The results of studies designed to determine whether beta-adrenergic stimulation is responsible for the tachycardia have not been consistent: In one series of reports, prior administration of propranolol,* in a dose sufficient to block the heart's beta-adrenergic receptors, prevented the increase in heart rate (Bright et al., 1971; Beaconsfield et al., 1972; Perez-Reyes et al., 1973), whereas in other reports, propranolol failed to block the marijuana-induced tachycardia (Kanakis et al., 1976; Tashkin et al., 1978). Although part of the discrepancy may be attributable to differences in dosages, not all of it can be rationalized this way, leaving an unexplained disparity.

Hemodynamic Effects Effects of marijuana on blood pressure and cardiac output, as mentioned above, are a function of the nature of exposure (acute or chronic), of the dose, and of the body position; also, there are differences among human beings and a number of mammalian species. In human beings lying supine, acute exposure to Δ-9-THC typically causes a modest increase in blood pressure, although in some instances no significant change in pressure has been observed (Beaconsfield et al., 1972; Kanakis et al., 1976; Benowitz et al., 1979). On assuming the upright posture, blood pressure may drop considerably. Cardiac output, in the supine position following an injection of Δ-9-THC, has been found to increase by as much as 30 percent (Malit et al., 1975; Tashkin et al., 1977b). The increase in cardiac output in the face of only a modest increase in blood pressure clearly results in a substantial decrease in peripheral vascular resistance. The change in resistance varies among the different vascular beds, being greatest in the vessels to the skeletal muscles.

Chronic administration of quite large oral doses of Δ-9-THC exerts different effects (than the acute) on the circulation (Bernstein et al., 1974; Benowitz and Jones, 1975; Benowitz et al., 1979). Systolic and diastolic pressure usually fall slightly, but these changes are not always sustained. As the blood pressure falls, the heart rate slows from the high levels caused by initial marijuana administration. The decrease in blood pressure can be accentuated if the subject assumes an upright posture. The extent to which it drops appears to be a reciprocal function of the extent to which plasma volume has increased.

Effects on Heart Muscle Data about changes in human left ventricular function caused by marijuana are not entirely convincing because most studies have relied on noninvasive measurements and

*Propranolol is an agent that blocks beta-adrenergic neurotransmitters and is used in treatment of cardiac arrhythmias.

because it has not been possible to control separately the several variables that modify left ventricular function and are changed by administration of Δ-9-THC. Changes in heart rate, afterload (systemic vascular resistance, blood pressure), or preload (plasma volume, venous return) individually can cause changes in heart size and ventricular performance. In spite of these limitations, conclusions can be drawn from the observations on human beings. Definitive animal studies of Δ-9-THC effects on ventricular performance have not been done.

Indices of cardiac performance usually improve after marijuana or Δ-9-THC. Almost invariably this improvement can be attributed to the increase in heart rate (Gash et al., 1978). The acute administration of Δ-9-THC (25 μg/kg intravenously) to healthy young males elicits, in association with the increase in heart rate, changes in the ventricular contraction periods (an increase in ejection time and shortening of the preinjection period), while systemic arterial pressure is unaffected (Weiss et al., 1972; Kanakis et al., 1976). Beta-adrenergic blockade by propranolol is followed by less striking changes in the contraction time intervals. Another study of 17 subjects who smoked two to three cigarettes (20 mg Δ-9-THC per cigarette) found cardiac output increased by 28 percent and heart rate by 30 percent, in conjunction with a slight decrease in stroke volume, which affects pulse pressure (Tashkin et al., 1977b).

Autonomic Nervous System

Marijuana could influence autonomic function in several ways: (1) by changing the sensitivity of reflexes that influence and control cardiovascular function; this effect could result either from changes in the processing of nerve impulses in the central nervous system or autonomic ganglia (a group of nerve cells outside the central nervous system), from changes in the liberation or metabolism of transmitters at the autonomic nerve terminals, or from changes in the sensitivity of the pre- or postjunctional receptors; (2) by a change in the levels of neurotransmitters, the catecholamines (norepinephrine, epinephrine) in the blood as a result of actions on the adrenal medulla, which secretes these neurotransmitters; activation of the adrenals could be a direct effect or by reflexes or by a central action of Δ-9-THC; and (3) by exerting effects on dopamine activity (an intermediate product in the synthesis of norepinephrine) either in the central nervous system or periphery.

Unfortunately, it is unclear how the effects of Δ-9-THC are exerted on the autonomic nervous system (Truitt and Anderson, 1971; Beaconsfield et al., 1972; Weiss et al., 1972; Englert et al., 1973; Ho et al., 1973; Howes and Osgood, 1974; Ho and Johnson, 1976; Huot, 1976; Benowitz and Jones, 1977a,b; Gash et al., 1978; Stefanis, 1978). The data are insufficient to determine if the effects come by way of the central nervous system, or by peripheral neural structures, or by the adrenal medulla. It is also difficult to assess the role of

reflex adjustments in the heart and systemic circulation. Finally, other possibilities, such as desensitization or blockade of peripheral adrenergic receptors, have not been examined.

Although the data on human beings are not adequate to determine how marijuana influences autonomic function, evidence that it does has been obtained. For example, Δ-9-THC appears to reduce a number of autonomic reflexes: After marijuana, the typical changes in heart rate and blood pressure elicited by the Valsalva maneuver (a forced exhalation effort against the closed glottis) are decreased, and so are the reflex circulatory responses to immersion of the hand in cold water (Beaconsfield et al., 1972; Benowitz et al., 1979). However, during chronic administration of Δ-9-THC, no change occurs in the reflex decrease in heart rate caused by infusion of a dose of the vasoconstrictor phenylephrine sufficient to increase the blood pressure (Benowitz and Jones, 1975; Benowitz et al., 1979).

Exercise

Acute exposure to Δ-9-THC modifies exercise performance by human beings. Smoking (20 mg of Δ-9-THC) decreased the duration of exercise but caused no change in any cardiopulmonary parameter at any work load except for heart rate, which increased (Shapiro et al., 1976b).

Other Effects (Plasma Volume, Sodium Retention)

Acute administration of Δ-9-THC would not be expected to have prominent effects on sodium balance or plasma volume. Chronic administration, on the other hand, has distinct effects. With chronic ingestion of large doses of Δ-9-THC there is a consistent gain in body weight and plasma volume, the latter caused by sodium retention (Benowitz and Jones, 1975, 1977a,b). The change in plasma volume seems to be causally related to the decrease in orthostatic hypotension during chronic exposure. The mechanisms responsible for the retention of salt and water have not been explored and may include changes in renal perfusion, inhibition of prostaglandin (a substance that affects blood pressure) synthesis by Δ-9-THC (Burstein and Raz, 1972; Howes and Osgood, 1976), or some modification in pituitary-adrenal function (Birmingham and Bartova, 1976).

Abnormal Heart and Circulation

Although smoking marijuana or the introduction of Δ-9-THC into the body is apparently without deleterious effect on the normal heart and circulation, the possibility is great that the abnormal heart and circulation will not be as tolerant of an agent that speeds up the heart, sometimes unpredictably raises or drops the blood pressure,

and modifies the activities of the autonomic nervous system. Therefore, it is pertinent to examine the prospects that marijuana (or Δ-9-THC) may be harmful in individuals with coronary heart disease, cerebrovascular disease, hypertension, and heart failure. Moreover, it may be important to determine if Δ-9-THC interacts in its effects on the abnormal heart or circulation with other agents that are being administered for therapeutic purposes.

Coronary Heart Disease

Data on this topic are sparse, presumably because of the relatively short time that marijuana has been available in this country. Those who have smoked marijuana are just entering the age when coronary atherosclerosis is common. However, it has been shown both in normal individuals and in individuals with coronary artery disease that the acute administration of Δ-9-THC by smoking or injection can cause changes in the electrocardiogram (ECG) (Johnson and Domino, 1971; Beaconsfield et al., 1972; Kochar and Hosko, 1973). Premature beats have also been noted. The reasons for the changes are unclear. Also not understood is the contribution of the increase in heart rate itself to the ECG changes and to the premature beats.

In some patients with coronary artery disease, increased catecholamines can induce arrhythmias. It seems likely that in such patients Δ-9-THC could have the same effect. Also, in patients with coronary artery disease a large increase in heart rate can induce angina (pain) and even ischemic damage from insufficient oxygen as a result of an obstructed blood vessel. If Δ-9-THC were to increase heart rate markedly in such patients, and at the same time increase the need for cardiac perfusion because of the increased cardiac work and because of the intensified effect of catecholamines on the heart, it seems reasonable that there could be induction of angina and potentially precipitation of ischemic damage. Furthermore, if Δ-9-THC dulled the appreciation of pain and the appropriate responses to pain, the patient might not take suitable measure to relieve the angina, thereby increasing the risk of damage or arrhythmias.

A decrease in oxygen-carrying capacity of blood because of formation of carboxyhemoglobin could also be troublesome. Exercise tolerance has been reported to decrease in individuals with angina after smoking marijuana; this decrease is in contrast to the unaffected exercise tolerance after smoking a placebo marijuana cigarette (Aronow and Cassidy, 1974). Oral ingestion of Δ-9-THC or smoking marijuana apparently can cause marked hypertension in association with an increase in systemic vascular resistance (Benowitz et al., 1979), which would place the heart with coronary artery disease at risk of damage.

These observations concur in indicating that marijuana and Δ-9-THC increase the work of the heart, often in many ways. The conclusion seems inescapable that this increased work, coupled with stimulation by catecholamines, may tax the heart to the point of clinical hazard.

Cerebrovascular Disease

There are few, if any, indications that Δ-9-THC has direct effects on the cerebral circulation that would be important in patients with cerebrovascular disease. In the occasional patient who develops hypertension after smoking, there would be an increased risk of a cerebral vascular accident (stroke). Also, because Δ-9-THC administered after atropine can cause marked increases in blood pressure, this combination would place the patient with cerebrovascular disease at risk, as would smoking after ingestion of other muscarinic blockers. In some patients, postural hypotension could be a problem, not only for persons with abnormal cerebral circulations, but also with abnormal coronary circulations.

Hypertension

The factors that act to intensify angina would be of importance in hypertensive patients. Although data are lacking on the magnitude of change in blood pressure caused by Δ-9-THC in hypertensives, it seems reasonable to assume that hypertensives smoking marijuana might have a greater increase in blood pressure than normals do. The increase in plasma volume and sodium retention that are associated with chronic exposure to Δ-9-THC could increase blood pressure in hypertensives and the mechanisms responsible for these changes very likely would interfere with the action of a number of antihypertensive medications.

Heart Failure

Because marijuana can cause tachycardia, a decrease in systemic vascular resistance (required for increased cardiac output to sustain blood pressure) and salt and water retention might place patients with severe heart failure at a disadvantage by exposure to Δ-9-THC. Data on such patients are lacking. In older patients treated by Δ-9-THC or who have smoked marijuana for glaucoma or cancer, orthostatic hypotension has been both disabling and a threat of cardiovascular complications (Merritt et al., 1980). However, tolerance to orthostatic hypotension seems to develop during continued intake of Δ-9-THC or continued smoking of marijuana. Dehydration, as during vomiting or diuretic therapy, predisposes to the orthostatic hypotensive effects and resists the development of tolerance because it prevents expansion of blood volume.

Interactions with Cardioactive Drugs

Few studies evaluate interactions between Δ-9-THC and other drugs that act directly or indirectly on the heart. Propranolol usually attenuates the increase in heart rate caused by Δ-9-THC. Atropine

can greatly potentiate the ability of Δ-9-THC to increase systemic arterial pressure (Benowitz and Jones, 1977a,b). A number of possible interactions can be imagined. If a patient were taking a drug that blocked uptake of catecholamines by nerve terminals, then those effects of Δ-9-THC that are mediated by catecholamines would be intensified. Because a great many psychotropic and antihypertensive drugs modify metabolism of neurotransmitters in the central nervous system and periphery, a wide variety of interactions with Δ-9-THC seems possible.

Summary: Cardiovascular System

The smoking of marijuana causes changes in the heart and circulation that are characteristic of stress. But there is no evidence to indicate that it exerts a permanently deleterious effect on the normal cardiovascular system. Neither is there convincing evidence that marijuana would be of particular benefit in treating any of the major forms of cardiovascular disease.

The situation is quite different for those with an abnormal heart or circulation. Evidence abounds that marijuana increases the work of the heart, usually by increasing heart rate, and in some persons by increasing blood pressure. This increase in workload poses a threat to patients with hypertension, cerebrovascular disease, and coronary atherosclerosis. The magnitude and incidence of the threat remains to be determined because marijuana smoking has largely been confined to younger adults who are only now entering the age of serious complications of atherosclerosis on the heart, brain, and peripheral vessels.

Marijuana also can cause postural hypotension. This drop in blood pressure could be hazardous in those individuals with compromised blood flow to the heart or brain, especially if they are volume-depleted (dehydrated) or if other drugs have impaired reflex control of their blood vessels.

Marijuana appears to intensify the effects of the sympathetic nervous system on the heart, an undesirable consequence in patients with coronary artery disease and in those susceptible to arrhythmias. Many of the undesirable effects of marijuana on the cardiovascular system seem to become less severe following chronic exposure. Whether the relative paucity of reports of the ill-effects of marijuana on the abnormal cardiovascular system is a consequence of adaptation to chronic usage or to lack of exposure to marijuana of a population that is sufficiently advanced in years to be susceptible to its untoward effects remains to be determined.

Recommendations for Research

Additional studies are needed both (1) to provide information on the mechanisms responsible for the observed effects of marijuana on the cardiovascular system and (2) to provide new data on the effects of marijuana in patients with known forms of cardiovascular disease.

- The manner in which Δ-9-THC acts on the heart to change the rate and force of contraction needs clarification. Direct effects on the heart are not likely to differ among species, and thus experiments can be planned for a "standard" heart preparation.
- Direct effects on electrical activity, which might relate to reports of changes in electrical activity and production of premature impulses as well as changes in sinus rate, should be evaluated with standard methods and standard preparations.
- Direct effects of Δ-9-THC on vascular smooth muscle should be explored. For this purpose, it would be essential to use some vessels that did, and others that did not, have functioning nerve terminals. It would be important here to include studies on selected coronary vessels and on vessels which play a dominant role in the regulation of systemic vascular resistance.
- A number of related studies are needed before the effects on humans can be explained in full, particularly the effects of Δ-9-THC on the renin-angiotensin system in the kidney, which provides control of arterial pressure, and on the several sequences of prostaglandin metabolism.

Studies also are indicated to obtain new data about the effects of marijuana on:

- persons with hypertension, coronary artery disease, and cerebrovascular disease;
- increases in systemic arterial pressure in low- and high-renin hypertension and the interactions between Δ-9-THC and several classes of antihypertensive medications;
- the interactions between the salt and water-retaining effect of Δ-9-THC and diuretics that could be employed both in hypertensives and those with heart failure.

Additionally, studies should be done on the use of standard monitoring techniques to quantify any effect of marijuana smoking on tendencies toward arrhythmias, and on interactions of Δ-9-THC with drugs that modify synaptic transmission in the central nervous system.

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4

EFFECTS OF MARIJUANA ON THE BRAIN

The most clearly established effects of cannabis are upon behavior. These effects, described in Chapter 6, indicate that major actions of cannabinoids are upon the brain. The ways in which marijuana alters the brain to produce its behavioral effects are not known.

Efforts to discover the causes of the behavioral effects have included studies on brain morphology, physiology, and chemistry to be reviewed in this chapter. Effects of marijuana on brain electrical activity and on brain chemistry have been measured, but their significance for brain function is not known because of our limited knowledge of brain-behavior relations. Marijuana causes temporary intoxication and results in changes in brain physiology and chemistry similar to those caused by other intoxicating drugs. Although these kinds of studies may ultimately shed light on the way marijuana produces its behavioral changes, they do not provide answers to important clinical questions. Does marijuana cause long-term changes in the brain that lead to chronic psychiatric or neurological disorders? So far, the studies reviewed below provide no convincing evidence for long-term changes because of use of marijuana.

BRAIN MORPHOLOGY

There is substantial controversy about whether marijuana causes changes in brain structure or in brain cells. Two studies have reported that marijuana produces changes in brain morphology. Both suffer sufficiently from methodologic and interpretational defects that their conclusions cannot be accepted. Furthermore, other studies have not found changes in morphology.

Gross Morphology

Data suggesting that use of marijuana causes brain atrophy were obtained by pneumoencephalography (injection of air into spaces in and surrounding the brain) on 10 users of marijuana who had sought medical attention because of neurologic complaints (Campbell et al., 1971). The size of the largest brain cavities (ventricles) was

measured to determine whether loss of brain tissue had occurred. The authors interpreted their data as showing that atrophy was present.

One of the first critics of this report questioned the interpretation of the radiologic techniques used (Bull, 1971). The results also have been seriously criticized because of the marijuana users studied. They had neurological symptoms or signs sufficient to justify an invasive and painful diagnostic test, but there is no evidence that such neurological complaints occur with greater frequency in users of marijuana than in the general population. Further, Campbell's patients did not only use marijuana, but also used such behavior-altering drugs, as lysergic acid diethylamide (LSD) and amphetamines.

More recent evidence has been provided by computed tomography (CT) scans of the brain. This technique, which is noninvasive, painless, and yields more precise and quantifiable measures of brain atrophy, has replaced pneumoencephalography as a diagnostic test. Using CT methods, two studies failed to find evidence of cerebral atrophy in healthy chronic marijuana users (Co et al., 1977; Keuhnle et al., 1977). These latter results suggest that the earlier findings were attributable to the imprecision of conventional pneumoencephalography, or to the fact that a group with neurologic complaints was studied, or to the use of multiple psychoactive drugs by these individuals. This last possibility is reinforced by CT scans of animals who received a variety of psychoactive drugs. Marijuana alone produced no evidence of brain atrophy, whereas other drugs, such as amphetamines, did produce changes (Rumbaugh et al., 1980).

Microscopic Morphology

Three post mortem studies on monkeys in the same laboratory have reported changes in the microscopic morphology of the brain at the ultrastructural level (Harper et al., 1977; Meyers and Heath, 1979; Heath et al., 1980). No similar studies on human beings have been reported. The monkeys received either chronic exposure to marijuana smoke or chronic injections of Δ-9-THC. Changes reported to have occurred in the brains included alteration in synaptic* cleft width, increased density of synaptic cleft material, a decrease in volume of rough endoplasmic reticulum, presence of clumping of synaptic vesicles in axon terminals (where impulses travel away from the cell body), and an increase in intranuclear inclusions. These changes appear dramatic, but they must be interpreted with caution. The three studies are based principally upon examination of two limited brain areas only in three treated monkeys, two receiving marijuana smoke

*A synapse is the region of communication between nerve cells, forming the place where a nervous impulse is transmitted from one nerve cell to another.

and one intravenous Δ-9-THC; a fourth treated animal was added to the last study and more brain areas were analyzed in it (Heath et al., 1980). Further, although the material was evaluated "doubleblind" after electron micrographs had been made, it would appear that fixation, tissue preparation, and photography were carried out before these safeguards against bias were applied. It is possible that unknown but systematic differences occurred between experimental (treated) and control animals in fixation and preparation of tissue or in selection of samples for micrography. In addition, it should be noted that at least one of the changes noted, clumping of synaptic vesicles (Harper et al., 1977), is a normal variant in the synaptic morphology of axon terminals in mammalian brain (Sipe and Moore, 1977) and does not represent a pathological change. Also, these studies have not been replicated and, because the basis for interpretation is such a limited sample, it is concluded that no definitive interpretation can be made at this time. However, the possibility that marijuana may produce chronic, ultrastructural changes in brain has not been ruled out and should be investigated.

NEUROPHYSIOLOGY

One source of information on the mechanisms of action of a drug, such as marijuana, is the study of its physiological effects. Effects of marijuana on the electrical activity of the brain have been demonstrated by means of the electroencephalogram (EEG). The standard, or clinical, EEG measures tiny variations at the scalp of voltages produced by the electrical activity of the brain. Voltage differences between two points on the scalp, or between the scalp and an inactive reference site, are recorded on moving paper, producing a graph of voltage over time. The waves observed are classified according to frequencies as delta, theta, alpha, and beta. While the changes in EEG described below are of interest, their biological significance is unknown.

Acute (Short-Term) Effects in Waking EEG

Ingested marijuana or Δ-9-THC produces rather slight effects on the EEG of an awake subject. Relatively high doses (210 mg Δ-9-THC or its equivalent/day) have failed to produce measurable changes even though marked behavioral effects were observed. The EEG effect most frequently reported in recent studies has been an increased abundance of alpha waves associated with a slight slowing (about 0.25 Hz) of the alpha frequency (Rodin et al., 1970; Volavka et al., 1971; Fink, 1976). However, reduced alpha abundance and increased fast frequency activity (beta) have also been reported (Wikler and Lloyd, 1945; Jones and Stone, 1970). Most studies which report EEG changes have noted that tolerance develops with repeated drug administration. No significance with respect to hazard can be inferred from the effects

of cannabis on the waking EEG. For a further review of this literature, see Fried (1977).

Persistent Effects in Waking EEG

The occurrence of persistent (long-lasting) changes in EEG with use of marijuana would cause concern even if their significance for brain function was unknown. However, in attempting to investigate the question of whether such changes occur, there inevitably arise crucial issues of subject selection. If one selects only chronic marijuana users who are in good health, one may be eliminating systematically those who have been adversely affected by use of the drug and who might have shown EEG changes. On the other hand, if one includes in such studies marijuana users who suffer from various illnesses or behavioral disturbances, one might find abnormalities of the EEG that result from these conditions rather than from the marijuana.

Long-term use of marijuana, either in the modest doses customarily used in this country or the heavy doses of hashish and ganga used by certain studied populations abroad, has not been shown to produce changes in the EEG. No abnormalities were found in the EEG of 10 healthy students who had smoked marijuana regularly for 1 year (Rodin et al., 1970). Another study compared clinical EEG records of 46 hashish users and 40 matched controls in Greece (Fink, 1976). Each record was evaluated independently by four qualified neurologist-electroencephalographers. No differences were observed in the incidence of abnormal records in the users and controls, a result consistent with the absence of significant differences between the two groups in various tests of neurological function.

Essentially, the same negative results were obtained in studies of ganga users in Jamaica (Rubin and Comitas, 1975) and marijuana users in Costa Rica (Karacan et al., 1976). In these later studies subjects were carefully selected to include only those in good health who were functioning adequately in the community. As mentioned above, this method of selection runs the risk of eliminating subjects whose health or behavior were adversely affected by marijuana and who might have shown EEG changes. This methodological difficulty cannot be eliminated in any small sample investigation of marijuana users.

Acute Effects in Event-Related Potentials

One can employ computer averaging to retrieve from the EEG certain information that is not detectable by visual inspection. In this way, the electrical events that follow a stimulus may be studied in subjects who are at rest, asleep, or carrying out certain tasks. These computer-averaged potentials provide clues to the sequential processing of information by the brain.

Although the literature is inconsistent, it is clear that cannabis can produce effects on event-related potentials (EPs) (Herning et al., 1979). Effects on amplitude are more often reported than effects

on latency of the event-related waves. Several studies with inconsistent results have appeared; these inconsistencies result from differences in task, dose, or duration of administration. Thus, EPs in response to sensory stimuli are unaffected or even increased by cannabis if the subject is passive, but are decreased in amplitude if the subject is performing a task. One study found the first negative wave, a component of the auditory EP, was reduced at a dose of 180-210 mg per day, but not at a dose of 70-90 mg per day during acute (1 to 3 days) administration (Herning et al., 1979). After 2 weeks at the higher dosage, this effect was observed only for the more difficult tasks. This study demonstrates differences in marijuana effects on EPs according to dose, duration of administration, and task complexity.

Acute Effects in Sleep EEG

Drugs often produce marked effects on the EEG during sleep, but producing little or no change in the waking EEG. This is the case with marijuana and Δ-9-THC.

In relatively high doses (70-210 mg/day), Δ-9-THC and marijuana extract produced marked effects on sleep EEG (Feinberg et al., 1975, 1976). On initial administration, the time spent in REM sleep* (stage REM duration) was reduced below baseline levels (placebo) by 18 percent and the number of eye movements by 49 percent. Some tolerance (return toward baseline levels) was apparent during the period (12-16 days) of drug administration. On withdrawal, REM duration was increased above baseline by 49 percent and rapid eye movements were increased by 67 percent. While these effects are quite large, their clinical significance is unknown. They were not accompanied by such unusual behavioral changes as hallucinations or disorientation, although there was evidence of withdrawal--irritability, increased reflexes, and mild agitation. With much smaller doses of Δ-9-THC, either a small reduction in REM sleep (Pivik et al., 1972; Freemon, 1974) or no change has been reported (Barratt et al., 1974; Hosko et al., 1973; Pranikoff et al., 1973).

Persistent Effects in Sleep EEG

We are not aware of any investigation of sleep in abstinent long-term marijuana users. However, 32 male chronic marijuana users and matched controls were studied in Costa Rica (Karacan et al., 1976). The users habitually smoked 2.5 to 23.3 cigarettes per day (mean = 9.2) and had used the drug for 10 to 27 years; they continued their usual intake during the study (Costa Rican cigarettes contain about 200 mg

*A stage in sleep during which Rapid Eye Movements may be detected and vivid dreaming usually occurs.

of marijuana). The subjects selected for this study had normal medical, neurologic, and laboratory evaluations.

Sleep was recorded for 8 consecutive nights. Prior to each night's recording, the users described their marijuana intake during the previous 24 hours. This intake was not directly monitored or controlled by the experimenters, because the goal was to observe sleep patterns under "naturalistic" conditions. The subjects were forbidden to use marijuana during the 2-3 hours prior to sleep recording. (For further details of this extensive study, see Karacan et al., 1976.)

All of the major variables derived from visual sleep stage classification were examined. The only statistically significant differences between marijuana users and their matched controls were in one of the sleep latency measures and in REM percentage of total sleep and average REM period length. The differences were quite small and may have been due to the subjects experiencing early withdrawal at the time their sleep was recorded. This is a likely explanation for these findings according to studies described previously (Feinberg et al., 1975, 1976).

The Costa Rican study concluded there was a lack of evidence of major disturbances of EEG sleep patterns in user subjects studied in situ (Karacan et al., 1976). Thus, long-term marijuana use has not been demonstrated to cause marked and consistent abnormalities of sleep EEG that can be demonstrated in studies with small samples.

Electrophysiological Studies in Animals

Sleep Studies

The findings of several animal studies carried out to investigate the effects of marijuana on EEG differ in some respects to those in human beings. Species differences are thought to be responsible for some of the variations found from species to species. For example, 5 and 10 mg/kg Δ-9-THC administered acutely to rats suppressed REM, reduced slow-wave sleep, and increased wakefulness (Moreton and Davis, 1973). Chronic administration caused an initial suppression of REM, which returned to baseline after 4 days and remained at baseline levels for a further 16 days. In contrast to the human studies, there was no withdrawal increase in REM above baseline during a 10-day withdrawal period. Similar results were obtained in a short-term study that employed intravenous doses of Δ-9-THC (0.5 and 1.0 mg/kg) to rabbits (Fujuimori and Himwich, 1973).

Appreciable qualitative differences in sleep EEG response to Δ-9-THC have also been detected in primates when compared with human studies. When 1.2 mg/kg Δ-9-THC is administered to squirrel monkeys in a single oral dose, daily for 60 days, no significant effects on REM sleep duration occurred; instead, a decrease in EEG stages 3 and 4 was noted (Adams and Barratt, 1975).

EEG Studies in Subcortical Structures

Electrode implantation is rarely possible in man, but is a routine and essential technique for the study of brain electrophysiology in animals. Animal experiments also permit use of higher doses and more prolonged administration than is possible with human subjects. For these reasons, animal experiments can yield important data that cannot be obtained in human studies. In general, EEG recordings after short-term administration of marijuana are similar from surface (cortex) or from deep brain (subcortex) regions. However, after chronic administration of high doses of Δ-9-THC, abnormal recordings have been observed in subcortical regions of some animals, readings not seen in the cortex. Although these findings have not been replicated, they are of particular concern, because they raise the possibility that chronic exposure to high doses of marijuana produces long-lasting effects on brain physiology.

After intravenous administration of a range of Δ-9-THC doses (from 0.05 to 12.8 mg/kg) to rhesus monkeys, a general increase in EEG synchrony was observed; and at higher dose ranges, there were specific EEG changes in the limbic system, frontal cortex, thalamus and fastigial nuclei (Martinez et al., 1972). In this study, the increase in high-voltage activity showed a good dose-response relationship. In a second study, oral dosing of three rhesus monkeys with a crude marijuana extract containing 25 percent Δ-9-THC produced dose-related EEG changes, including slow waves in the hippocampus, amygdala, and septum (Stadnicki et al., 1974). Tolerance to the behavioral and EEG changes occurred with daily treatment, which was stopped after 51 days. Behavioral withdrawal effects were noted, but EEG changes during withdrawal were minimal and there was no evidence of EEG changes persisting beyond the period of Δ-9-THC ingestion.

Two studies that monitored EEG recording from deep brain sites after chronic administration of high doses of marijuana found changes in EEGs from deep brain sites that were not observed in surface areas after drug withdrawal (Fehr et al., 1976; Heath, 1976; Heath et al., 1979). Studies of two rats with electrodes implanted in the anterior neocortex, dorsal hippocampus, and mesencephalic reticular formation 1 year after exposure to 20 mg/kg for 6 months (Fehr et al., 1976) yielded hippocampal recordings with "epileptiform" abnormalities, in contrast to one control and two alcohol-treated animals.

The second study was carried out on thirteen feral-raised rhesus monkeys (Heath 1976; Heath et al., 1979). Ten monkeys had electrodes implanted in deep sites and in brain cortex. Four monkeys were made to smoke marijuana three times a day, 5 days per week for 6 months; two other monkeys with implants were given 0.6 mg/kg Δ-9-THC each day, 5 days per week for 6 months; still other monkeys were used as controls or received smaller doses of marijuana. In three high-dose monkeys, two smoking and one ingesting Δ-9-THC, changes in EEG could be detected in recordings from deep brain sites; the changes continued 7 months after cessation of marijuana exposure. No EEG abnormalities were present in recordings from the brain surface.

One of the major criticisms of both these studies is their use of small numbers of animals. Furthermore, there have been no attempts at replication by other workers. Nevertheless, because these findings provide some of the only evidence for a possible irreversible effect of chronic high doses of marijuana, they are mentioned here with a strong urging for additional studies in an effort to replicate these findings.

EPILEPSY

Because of the effects of marijuana on brain electrical activity, questions have been raised about its association with epilepsy. Two questions are raised in the literature. First, does marijuana produce seizures? Second, does marijuana or a derivative prevent seizures? The first question will be discussed here. The second is reviewed in Chapter 7, which is concerned with the potential therapeutic uses of cannabis.

There are anecdotal reports in the literature that suggest seizures may be induced by marijuana in some persons with a known seizure disorder. A rigorous study, using adequate numbers of patients with documented seizure patterns, has not been done. Reports of experimental animal studies are conflicting and varied (Feeney et al., 1973, 1979; Lemberger, 1980). There are some circumstances in which cannabis administration does not alter certain types of seizures such as the photosensitive seizures in the baboon (Meldrum et al., 1974), and others in which it seems that seizures are induced. A single rabbit that responded to Δ-9-THC administration with seizures was bred to establish a colony of rabbits with similar response (Consroe and Fish, 1981). It will be of considerable interest to determine mechanisms of seizure induction and pharmacologic response patterns in this unusual animal model. However, as described further in Chapter 7, the bulk of the animal literature and some data from human studies suggest that the more prominent effect of marijuana derivatives, especially cannabinol and cannabidiol, is to decrease rather than increase seizure susceptibility (see Karler and Turkanis, 1981, for review).

NEUROCHEMISTRY

Our knowledge of the effects of marijuana on brain chemistry has come largely from studies in animals. Cannabis and some of its derivatives have been shown to cause chemical effects in the brain, as demonstrated by effects on neurotransmitters and on nucleic acids. The evidence is reviewed below.

Neurotransmitters

The brain is composed of many information-processing networks of nerve cells. Within each of these networks the transfer of informa-

tion from one nerve cell to another is dependent upon chemicals called neurotransmitters. These substances are produced by nerve cells, released when the cells are stimulated and act to alter the excitability of neighboring nerve cells. Neurotransmitters play an essential role in the transmission and processing of information, and it is not surprising that many drugs that alter behavior do so by their actions on neurotransmitters. The understanding of the effects of marijuana on the brain must include knowledge of its effects on neurotransmitter systems.

Several different classes of chemicals act as neurotransmitters. The first chemical to be demonstrated to have this function was acetylcholine, and it is now established that acetylcholine is the neurotransmitter for several nerve cell networks in the brain. A number of studies in animals have examined the effect of marijuana on brain acetylcholine (see Domino, 1981, for a brief review of the extensive literature). The most clear-cut effects have been on acetylcholine turnover, a measure of the level of activity of neurons producing the chemical. Small doses of Δ-9-THC cause a reduction in acetylcholine turnover in the hippocampus (Domino et al., 1978; Revuelta et al., 1978; Domino, 1981) and this results from reduced activity of the acetylcholine neurons. It is noteworthy that the effect is produced by small doses and only by cannabinoids. Administration of physostigmine, a drug that enhances acetylcholine action by partially blocking its breakdown, to five healthy human volunteers (2 hours after ingestion of 20 to 40 mg of Δ-9-THC) produced enhancement of the lethargy and somnolence occurring late in the course of the Δ-9-THC intoxication (Freemon et al., 1975). The results of this study, and others in man and animals (El-Yousef et al., 1973; Low et al., 1973; Drew and Miller, 1974; Freemon et al., 1975), have led to the conclusion that Δ-9-THC acts to inhibit acetylcholine nerve cell networks. The exact nature of this action is not known, but it may be related to the memory deficits produced (Domino, 1981).

There have been studies of cannabinoids on several other neurotransmitters in brain, including catecholamines, serotonin, and gamma aminobutyric acid (Banerjee et al., 1975; Bracs et al., 1975). Although some effects have been reported, they either are produced by a very high dose or are so fragmentary that their implications are unclear. The effects of cannabinoids on neurotransmitters that have been studied to date, other than acetylcholine, are not striking. In particular, there is no evidence for any significant, long-term toxic effect of cannabinoids on any of the nerve cell networks that produce identified neurotransmitters.

Proteins, Enzymes, Nucleic Acids

A very few studies have examined the effects of marijuana on neurochemical variables other than neurotransmitters (Luthra and Rosenkrantz, 1974; Luthra et al., 1975, 1976). After chronic administration to rats either of Δ-9-THC or marijuana smoke (for

periods from 28 to 180 days), these investigators examined brain lipid, protein, and ribonucleic acid (RNA) content. With very high doses of Δ-9-THC (up to 500 mg/kg/day), some decrease in brain protein and RNA was noted; no decrease was noted in lipid content. However, with smaller doses, or administration of marijuana smoke, no consistent or marked changes were noted. The significance of these effects is unknown. Whether additional effects might be observed with more sophisticated and sensitive methods directed to more restricted analytical problems cannot be answered at present.

SUMMARY

There is no persuasive evidence that marijuana causes morphological changes in the brain. Computer tomography studies on users of marijuana reveal no gross changes in brain structure. Electron micrographic studies of monkey brains indicating morphologic changes are methodologically flawed and cannot be used as evidence for an effect of marijuana on brain cell morphology. Clear effects on brain electrical activity in human beings and in animals have been found after drug exposure. These effects have not been demonstrated to persist in human beings after the drug has been discontinued. Studies of EEG from deep brain structures in chronically treated animals have shown changes after the withdrawl of the drug. These limited findings need to be confirmed by further studies. Studies in human beings and animals indicate that, despite the neurophysiologic effects demonstrated in EEG studies, marijuana does not appear to increase epileptic seizure susceptibility. Current evidence has shown marijuana causes some chemical changes in brain. Cannabinoids affect several neurotransmitter systems, especially the cholinergic system. At high doses marijuana also has been shown to affect nucleoprotein synthesis. The significance of these findings for brain function as demonstrated by human behavior or their clinical relevance is unknown.

RECOMMENDATIONS FOR RESEARCH

In view of the widespread use of cannabis, it would be worthwhile to carry out further and more systematic studies of the effects of cannabis on brain structure, chemistry, and electrophysiology. Such studies should be closely correlated with behavior, e.g., learning, psychomotor coordination (see Chapter 6). One useful approach might be to investigate the effects of medium and high doses of cannabis (defined in terms of the patterns of human consumption) on juvenile and adult monkeys during and after long-term exposure. Juvenile monkeys should be included because the immature nervous system may be more sensitive to harmful drug effects; this issue is of great clinical concern, because marijuana use by human beings now begins quite early in life (see Chapter 2). Observations also should be made during long-term abstinence after previous long-term exposure to

determine whether any persistent abnormalities have been produced. A systematic approach to these questions using modern methods of measurement and analysis could extend our present knowledge substantially.

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5

EFFECTS OF MARIJUANA ON OTHER BIOLOGICAL SYSTEMS

This chapter covers what little is known about the effects of cannabis on male and female reproduction and endocrine systems, birth defects and teratogenic effects, genetics, the immune system, and body temperature.

MALE REPRODUCTIVE FUNCTION

A variety of studies indicate that marijuana and some of its derivatives have reversible, suppressive effects upon testicular function in animals and men. These have been measured in terms of diminished weights of the prostate gland, seminal vesicles, or testes, and in decreased levels of testosterone (the male hormone) in blood plasma or suppression of spermatogenesis following chronic or acute administration of cannabis or Δ-9-THC. Appropriate observations have indicated that the effects of cannabinoids on the male reproductive tract and on testicular function were completely reversed 1 month after drug withdrawal.

There is no general agreement as to the cause or magnitude of these effects. The major reasons for this lack of agreement relate to major differences in study design, including species studied (man, monkey, or rodent), route of drug administration, and purity of the drug used.

Human Studies

In 1974, a group of 20 men were studied who had used marijuana at least 4 days a week for a minimum of 6 months without the use of other drugs (Kolodny et al., 1974). Plasma testosterone levels in subjects smoking five to nine marijuana cigarettes per week were significantly lower than controls (however, only 2 had levels out of the normal range, i.e., below 400 ng/dl); all but 1 of the men smoking more than 10 marijuana cigarettes per week had testosterone levels below 400 ng/dl. These results suggest that there was a dose-dependent effect of marijuana on testosterone levels. Plasma levels of lutenizing hormone (LH) and follicle-stimulating hormone

(FSH), gonadotropins that control the growth of the ovaries or testes and their hormonal activities, were in the normal range; however, in men smoking more than 10 marijuana cigarettes per week, the FSH level was significantly lower than for those who smoked 5 to 10 marijuana cigarettes per week. Because only random samples of blood were obtained for gonadotropic measurements, small but significant changes could have been missed. Levels of prolactin, the female hormone involved in lactation and also present in small quantities in men, were all in the low normal range. In addition, the men who smoked more than 10 marijuana cigarettes per week had significantly lower sperm counts than those who smoked the lesser quantity (26 versus 68 million/ml). These individuals obtained marijuana from a variety of sources, and there was no way to determine whether they were taking other drugs that could lower plasma testosterone.

Later in 1974, another study reported that plasma testosterone levels were not suppressed in 27 men studied in a research ward (Mendelson et al., 1974) These individuals smoked marijuana cigarettes supplied by the federal government. For unexplained reasons, the mean testosterone levels in these individuals were greater than 1,000 ng/dl (higher than the normal mean) before and during the smoking periods. This is in marked contrast to the mean value of 742 ng/dl for nonsmokers in the study of Kolodny et al. mentioned above. There was no report of gonadotropic values or semen analysis in the Mendelson Study.

A study of 16 patients on a metabolic ward who smoked NIDA cigarettes (Hembree et al., 1979) showed that 5 to 6 weeks of high-dose (2 percent) marijuana administration (8-20 cigarettes/day) was associated with a decline in sperm count during the fifth and sixth weeks after initiation of drug exposure. This was preceded by a decrease in sperm motility and an increase in abnormal forms of sperm. Once a week during the study five blood samples were obtained at 15-minute intervals for measurement of testosterone, LH, and FSH. No change in these hormone levels was noted throughout the study (although no values were reported). The relationship in time of these samples to the last previous cigarette was not mentioned, therefore the test would not have excluded a transient decline in hormonal levels after each cigarette. However, because hormonal suppression of spermatogenesis takes longer than 4 weeks and usually is not associated with an increase in the number of abnormal forms and a decrease in motility, the authors concluded that the effect upon the seminiferous tubular epithelium was direct rather than by suppression of gonadotropins. This is the only reported study in man that measured the hour-to-hour fluctuations in gonadotropic levels.

Another study (Coggins et al., 1976) evaluated the health status of 84 marijuana smokers who had used the agent three or more times per week for a minimum of 10 years. Testosterone levels were measured in 38 users and 38 nonusers. The mean levels and ranges were virtually identical. This heterogeneous group of men patients studied in Costa Rica was not recruited for the purpose of studying the pituitary-gonadal axis. No gonadotropic levels or semen samples were studied.

Endocrine function studies are briefly mentioned in a paper by Cohen (1976). Subjects were recruited on the basis of heavy marijuana use and were studied in a metabolic ward. They smoked an average of five marijuana cigarettes per day, which was believed to be the equivalent of 103 mg of Δ-9-THC. During acute administration, mean levels of plasma testosterone declined from 754 to 533 ng/dl over a 3-hour period. After 9 weeks of smoking, plasma testosterone levels had declined from 740 to 509 ng. Plasma LH levels were reported to have fallen after the fourth week; however, no absolute values were given. In addition, no standard errors are given for any of the means presented in this paper. Therefore, it is impossible to evaluate the significance of the reported findings.

In Greece, a population of 47 chronic hashish users was studied. Electron microscope studies of the acrosome, the head of the sperm, showed abnormality in some patients (Issidorides, 1979). It is difficult to evaluate the study because no quantitative data were presented.

Animal Studies

All of the studies mentioned below are substantially different from those of human beings because, with one exception, the active agent (usually Δ-9-THC) was administered intraperitoneally at a dose of 2.5 to 25 mg/kg. Based on calculations given by Cohen (1976), 3 to 6 mg/kg/day would be considered a large dose in human beings.* Also, human beings self-administer the drug over many hours rather than as a single dose.

In castrated rhesus monkeys, plasma LH and FSH fell acutely following acute administration of Δ-9-THC (Smith et al., 1980). During this suppression period, both gonadotropins could be stimulated by lutenizing hormone-releasing factor (LHRF), which causes the release of LH. The effect of Δ-9-THC was to suppress prolactin release, which, in turn, could be stimulated by thyrotropin-releasing hormone (TRH). Studies in other species have tended to confirm these observations in monkeys.

The results are compatible with the hypothesis that the effect of marijuana and its derivatives is on gonadotropic secretion (Harclerode et al., 1979). Testicular cytochrome P-450 (an enzyme) decreased in the rat following 2 to 9 weeks of treatment. The concentrations of this enzyme, plus a variety of other testicular markers, were restored with FSH and LH therapy. The effect of various cannabinoids has been studied on sperm morphology in the mouse (Zimmerman et al., 1979).

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*Rosenkrantz (1981) considers 0.6-3.0 mg/kg by inhalation and 1.8-9.0 mg/kg orally to be large doses in human beings. For the monkey, 1.8-9.0 mg/kg by inhalation and 5-27 mg/kg orally would be considered a high dose. (These concentrations are equivalent to six cigarettes/day.)

Mice were given five daily intraperitoneal injections of Δ-9-THC, cannabidiol, or cannabinol at doses approaching or exceeding the LD_{50} (the dose necessary to kill 50 percent of the animals). Thirty-five days after the last treatment, animals were killed and sperm were evaluated by scanning electron microscopy. Control animals had 1.5 percent abnormal forms. Animals that received LD_{50} doses of the various derivatives had 2.4 to 5.0 percent abnormal forms.

Only a few studies have examined the effects of cannabis on spermatogenesis (Huang et al., 1979). Marijuana was administered to rats in a smoke machine. After 30 days of exposure, marijuana smoke lowered the sperm counts in animals significantly, as did cannabinoid-free smoke. By 75 days, however, only the marijuana smoke group maintained a low sperm count. In the marijuana-treated group, there was an increased number of abnormal forms, particularly with an increase in dissociation of sperm heads and tails. In the discussion of this paper, the authors reported elevated serum FSH levels following marijuana exposure, but did not present data. They concluded that marijuana has a direct effect on the testis. A variety of *in vitro* studies support this suggestion (Jakubovic et al., 1977, 1979).

Marijuana and its derivatives also have been shown to be antiandrogenic (antagonistic to male hormones) (Purohit et al., 1980). Several constituents, including Δ-9-THC, can bind to the receptor for androgen. Marijuana also has been demonstrated to be estrogenic (like female sex hormones) *in vivo*, and recent studies suggest that these effects may be mediated via the estrogen receptor. These observations have been disputed by others (reviewed by Purohit et al., 1980). The ability to inhibit or mimic the action of sex steroids provides one mechanism by which these agents can produce their effects. There obviously are many others.

FEMALE REPRODUCTIVE FUNCTION

The effect of cannabis on female reproduction has been studied in rats, mice, rabbits, and monkeys. The work in rhesus monkeys is of particular importance, because of the similarity in the menstrual cycle among primate species, including human beings.

Human Studies

There is only one study reported on the effects of marijuana on reproductive function in women. The work has appeared in print as a report of the proceedings of a 1978 symposium held in Mexico City (Bauman et al., 1979) and as part of the congressional record subsequent to testimony before a Senate committee hearing (Bauman, 1980). These publications do not provide details on methodology or on individual hormone values. Differences between the control and experimental groups, recognized by the investigators, could be of

importance; alcohol use, for example, was more frequent in the marijuana-using group. The study attempted to establish the endocrine (hormonal) profile and menstrual patterns of women who used marijuana on a chronic and frequent basis. Twenty-six women who used it at least three times a week for 6 months were compared with 17 women who had never used the substance. The number of cycles studied for each variable investigated is not clear from the publications. This difficulty notwithstanding, the report reveals no difference in plasma levels of LH and FSH between the two groups and no change in peaks and basal values of the female hormones estradiol or progesterone, the critical hormone levels controlling the process of ovulation. It would be expected that no major difference was found in the incidence of anovulatory cycles between the two groups. By combining anovulation and shortened luteal phase, however, the authors report a statistically significant difference in the marijuana-using group, which could be clinically important in causing subfertility. This evidence is, at best, only suggestive. The observation that testosterone levels in marijuana-using women are elevated is difficult to interpret in terms of clinical significance; apparently, the subjects did not report episodes of acne, abnormal hairiness, or other testosterone-dependent side-effects. According to the authors, serum prolactin levels are lower in marijuana users than in controls. The implications of this observation for fertility, lactation, or the development of breast cancer are not clear.

The absence of other studies on users of marijuana makes it difficult to draw conclusions on the implications of the data cited above. Several of the effects noted are different from the more extensive and experimentally controlled observations in rhesus monkeys and other laboratory animals. This situation calls attention to the urgent need for more comprehensive endocrine and gynecologic investigations of women who use marijuana.

Animal Studies

Administration of crude marijuana extract to rats or mice resulted generally in suppression of ovarian function and in various aspects of estrogen activity, such as uterine metabolism, weight, glycogen content, and levels of RNA and sialic acid (Chakravarty et al., 1975; Dixit et al., 1975).

The administration of crude marijuana extract for 30 days to rats and mice abolished the estrus cycle and caused a significant reduction in the size of the ovaries and in some primordial ova (Dixit et al., 1975). Intraperitoneal administration of Δ-9-THC to rats, appropriately timed, has also been reported to block ovulation (Nir et al., 1973). This effect of Δ-9-THC was exerted by suppressing the characteristic preovulatory surge of plasma LH. Other investigators have reported suppression also of plasma FSH and prolactin when Δ-9-THC is given just before ovulation (Ayalon et al., 1977). The substance was found to depress plasma concentration of LH in ovariectomized rats (Marks, 1973; Tyrey, 1978, 1980) and

rhesus monkeys (Besch et al., 1977). Asch et al. (1979) also showed in the rabbit, a reflex ovulator, that a precoital single dose of Δ-9-THC blocks the postcoital LH surge and ovulation.

Administration of LHRF was able to bring about the release of LH in Δ-9-THC treated rats and rhesus monkeys (Smith et al., 1979). These results indicate a direct effect of cannabinoids at the level of the hypothalamus, part of brain important in reproductive hormone regulation. The ovulation-blocking effect of the cannabinoids was further investigated by Cordova et al. (1980). Natural and chemically modified cannabinoids blocked ovulation in rats.

Administration of Δ-9-THC to rhesus monkeys during the follicular phase resulted in prolonged periods of amennorhea (absence or abnormal stoppage of the menstrual flow), absence of midcycle LH surge, and progesterone levels characteristic of anovulation (Asch et al., 1981).

BIRTH DEFECTS AND TERATOGENICITY

Because Δ-9-THC crosses the placenta it is a potential teratogen, an agent that causes defects in the developing embryo. This effect could occur in either of two ways: (1) exposure to cannabis prior to conception could harm the sex cells (the ova and sperm), or (2) the fetus could be harmed directly during organogenesis. In addition, Δ-9-THC can be secreted in breast milk and, therefore, can be toxic postnatally.

Human Studies

The evidence for teratogenicity in human beings is very difficult to interpret. Although there is widespread use of marijuana in young women of reproductive age, there is no evidence yet of any teratogenic effects of high frequency or consistent association with the drug. There are isolated reports of congenital anomalies in the offspring of marijuana users, but there is no evidence that they occurred more often in users than in nonusers and in those cases there was coincident use of other drugs. Subtle development effects in offspring, such as nervous system abnormalities, and reductions in birth weight and height may indeed exist (Finnegan, 1980; Friad, 1980; Hingson et al., in press). Additional carefully designed, prospective studies should provide valuable information in this area.

Animal Studies

Crude marijuana extract and Δ-9-THC are teratogenic at certain doses in animals.*

*Bibliography available upon request from the Institute of Medicine, National Academy of Sciences.

One study reported that subcutaneous injection of pregnant hamsters and rabbits with various doses of crude marijuana extract caused malformations of the brain, spinal cord, forelimb, and liver, as well as edema of the head and spinal region in developing embryos (Gerber and Schramm, 1969). In hamsters, significant embryocidal and growth retardation effects also were noted. It was concluded that doses greater than 200 mg/kg in hamsters and 250 mg/kg in rabbits were teratogenic. Caution in interpreting these findings must be exercised because the teratogenic effects may be caused by any combination of constituents of the cannabis extract.

In a study of mice, the teratological effects of Δ-9-THC were evaluated for doses ranging from 3.0 to 400 mg/kg by various routes of administration--intravenous, subcutaneous, and intragastric (Joneja, 1976). Significant fetal growth retardation was induced at higher dose levels and by some routes of administration. For example, a high dose of 400 mg/kg was significantly teratogenic by the intragastric route; 12.1 percent of the live fetuses were malformed.

In a study of female monkeys given an oral dose of 2.4 mg/kg Δ-9-THC for 1 to 4 years, a nonspecific pattern of reproductive difficulties was observed characteristic of "high-risk" pregnancies, including a high rate of offspring loss during pregnancy or in the early postnatal period (Sassenrath et al., 1979).

GENETIC EFFECTS

The potential genetic effects of marijuana are of major concern because of its prevalent use by young people in their reproductive years (see Chapter 2). Although there is a growing amount of evidence that drugs can induce mutations, and an improving ability to use toxicological methods to evaluate agents for their mutagenic potential (such as the Ames test, which detects changes or damages in the genetic material), the available information on the genetic hazards or even on the potential genetic hazards of the use of marijuana is extremely limited.

Mutagenicity

Elsewhere in this report (Chapter 3) the scientific evidence that marijuana smoke and tar are mutagenic has been discussed. Lung explants of mice and human fibroblast cultures exposed to fresh smoke showed abnormalities of cell division, as well as changes in chromosome structure and in DNA synthesis (Leuchtenberger and Leuchtenberger, 1971; Leuchtenberger, et al., 1973a,b). Moreover, extracts and smoke condensates of marijuana are mutagenic when evaluated by the Ames test (Busch et al., 1979; Said and Wei, 1979; Wehner et al., 1980). Animal studies on rodents painted with marijuana tar, three times weekly for 1 year, resulted in skin papillomas, carcinomas, and fibrosarcomas (Hoffmann et al., 1975).

However, extensive testing with Δ-9-THC using three established tests for mutagenesis failed to detect any mutagenic effect, or any effect as an inhibitor of DNA repair (Legator et al., 1976; Glatt et al., 1979; Zimmerman et al., 1978).

Cytogenetic Effects

The numbers and kinds of chromosomes (structures in a cell nucleus that contain and transmit genetic information carried in DNA) are highly characteristic for a given species. Structural variation and changes in numbers of chromosomes may be evidence for genetic damage produced by drugs and other chemical agents. Unfortunately, the literature on the effects of marijuana on chromosomes is limited and conflicting. Studies suggesting that marijuana probably does not break chromosomes are fairly conclusive. There is less evidence that marijuana may produce aneuploidy (abnormal numbers of chromosomes) in some daughter cells during cell division.

Does marijuana cause chromosome breaks? The weight of the evidence from in vitro cultures of human cells and from in vivo animal and human studies is that neither marijuana nor Δ-9-THC causes chromosome breaks.

In Vitro and Animal Studies

Cultures of human leukocytes, exposed to different concentrations of Δ-9-THC, showed no increase in the incidence of chromosome breaks or gaps when compared to controls (Stenchever and Allen, 1972). Studies of golden hamsters given subcutaneous injections for 10 days of marijuana extract distillate containing 17.1 percent Δ-9-THC (Nicholson et al., 1973), and of beagle dogs trained to smoke high doses of marijuana (3 g/day/week for 30 months), showed no significant differences in chromosome gaps or breaks when compared with control groups (Genest et al., 1976).

Human Studies

Cytogenetic analysis of chromosomes from peripheral blood leukocytes and cultures of subjects exposed to marijuana smoking, marijuana extract, or synthetic Δ-9-THC revealed no increase in chromosome breakage attributable to these compounds (Nichols et al., 1974; Matsuyama, 1976; Morishima et al., 1979). Doses ranged from 20 mg Δ-9-THC per day to 12-16 marijuana cigarettes per day. Studies that have reported chromosome breaks or gaps in cell cultures of users of marijuana have largely been carried out on multiple drug users, and the breaks and gaps may be due to other factors associated with a life of heavy drug use (Gilmour et al., 1971; Herha and Obe, 1974). However, in a retrospective study on college students, chromosome breaks were found in blood cultures of 49 light (one or

less exposure per week) and heavy (more than two exposures per week) users of marijuana (Stenchever et al., 1974). One problem in this study is the poor dose characterization. Furthermore, the increase in the numbers of breaks in both light and heavy users of marijuana was not dose-related; the same frequency of breaks was observed in both groups. Although the evidence is inconclusive, it suggests that marijuana does not cause chromosome breaks.

Does marijuana interfere with cell division and chromosome segregation, thereby resulting in abnormal numbers of chromosomes? There is conflicting evidence in the literature. On the one hand, no significant effects of marijuana smoke or Δ-9-THC on chromosome complement have been reported using the micronuclei test in mice or in cytogenetic studies in dogs (Genest et al., 1976; Legator et al., 1976). On the other hand, more extensive studies have demonstrated aneuploidy resulting from in vitro exposure of cells to marijuana as well as in vivo studies of animals and human beings.

In Vitro and Animal Studies

Exposure of mouse lung and adult human lung tissue culture to marijuana smoke in vitro resulted in abnormal cell proliferation and abnormalities in DNA content (Leuchtenberger and Leuchtenberger, 1971; Leuchtenberger, et al., 1973b). Addition of Δ-9-THC and olivetol, a compound with a ring structure similar to cannabinoids, to normal human leukocyte cultures induced hypodiploidy (defined as metaphase nuclei with a chromosome complement of less than 30 chromosomes--a normal human cell contains 46 chromosomes) (Morishima et al., 1976). Hybrid mice treated for 5 consecutive days with Δ-9-THC, cannabinol, and cannabidiol at a dose of 10 mg/kg had a three- to fivefold increase of micronuclei over controls. The number of micronuclei increased with increasing Δ-9-THC dosage. Examination of bone marrow mitosis in these same mice showed a five- to sevenfold increase in chromosome number aberrations during metaphase (Zimmerman and Raj, 1980).

Human Studies

Studies of lymphocytes cultured from human marijuana smokers defined either as "moderate" users (at least one marijuana cigarette per week, range 1-10 for a minimum of two years) or "heavy" users (more than three times per week) all of whom consumed between 12.9 and 15.3 marijuana cigarettes per day during the experiment, turned up a significantly larger number of cells with less than 30 chromosomes than would be found in normal control cultures (Morishima et al., 1979). These positive findings suggest that marijuana may affect chromosome segregation during cell division and result in cells with fewer than the normal number of chromosomes. What these findings mean in terms of risk for abnormalities in offspring or possible disease is not known. Findings in lymphocyte cultures may not be relevant to what is happening in the germ cells (sex cells).

THE IMMUNE SYSTEM

The immune system functions in protecting the body against viruses, bacteria, and other infections. It also plays a major role in preventing the growth and dissemination of cancerous cells.

There have been reports that cannabis is immunogenic, capable of activating components in the immune system. These components include such cells as lymphocytes, some of which produce antibodies in response to invasion by a foreign agent, and macrophages, which can be stimulated by inflammation to ingest invaders.

Human Studies

There have been reports that cannabis interferes with components in the immune system in man. Antibodies will develop in response to marijuana in some people, along with an allergic response, while others develop antibodies without apparent allergic reaction (Liskow et al., 1971; Shapiro et al., 1974, 1976; Lewis and Slavin, 1975). However, the studies reporting these effects were not designed to determine which components of the marijuana are immunogenic and which are allergenic.

Studies of various aspects of the immune system in persons who were chronic users of marijuana have indicated mild decreases in activity of one or another component of the system; however, other investigators have noted no changes outside of the normal range (Gupta et al., 1974; Petersen et al., 1975, 1976; White et al., 1975; Lau et al., 1976; Rachelefsky et al., 1976; Silverstein and Lessin, 1976; Cushman and Khurana, 1977; McDonough et al., 1980). These apparent inconsistencies may stem from the variability in the amount of marijuana consumed among users in different studies and the differences in the immune system assays. Hashish, as distinct from marijuana, was shown to have a slight temporary stimulatory effect on the immune system (Kaklamani et al., 1978; Kalofoutis et al., 1978).

Animal Studies

A number of studies have shown that Δ-9-THC and other cannabinoids induce immunological defects in rodents (Petersen and Lemberger, 1976; Lefkowitz and Klager, 1978, Lefkowitz et al., 1978; Preuss and Lefkowitz, 1978). The doses varied from 5 to 25 mg/kg (intraperitoneally) to 100 mg/kg (orally). At the higher doses there was a diminution of immune response, as measured by standard immunological assays. Delta-9-THC had the same effects on cells grown <u>in vitro</u>. Other cannabinoids also have been tested for their effects. Cannabinol, Δ-8-THC, and 1-methyl-Δ-8-THC had the same immunosuppressive effects as Δ-9-THC, but cannabidiol had no immunosuppressive effect. Immunizing rabbits with Δ-9-THC resulted in the production of antibodies (Chiarotti et al., 1980).

BODY TEMPERATURE

Regulation of body temperature is a complex process that can be influenced by drugs. In several species of animals, Δ-9-THC produces a lowering of body temperature (hypothermia). The effect is seen when animals are housed at normal room temperatures, and it is greater with colder ambient temperatures (Pertwee and Travendale, 1979). Marijuana apparently causes a decrease in heat production for reasons that are unclear.

In experiments with human subjects, marijuana has produced little or no change in body temperature when given in a cool environment (Beaconsfield et al., 1972; Hanna et al., 1976). In a hot environment (40°C) marijuana caused inhibition of sweating and a consistent rise in body temperature (Jones et al., 1980). Thus, there is evidence that marijuana does interfere with temperature regulation, although there is no currently known clinical significance to this finding.

Cannabis appears to interfere with temperature regulation, but the clinical significance is unknown.

SUMMARY

Male Reproductive Function

In animals, marijuana and its derivatives can acutely lower gonadotropic secretion when administered intraperitoneally. There is also some evidence in animals to suggest that these agents can directly affect the seminiferous tubule. In man, sperm number and motility are decreased during chronic marijuana use. From the available studies, it appears this was due to a direct effect of the cannabinoids either on the seminiferous tubular epithelium or the epididymal sperm. Due to conflicting and incomplete evidence, it is not possible to conclude at the present time whether marijuana smoking has a significant effect upon gonadotropic and testosterone concentrations in humans. Whether the decrease in sperm number or motility has any effect on fertility is not known.

Female Reproductive Function

There is only one study of human beings that attempts to establish the endocrine profile and menstrual patterns of women who used marijuana on a chronic and frequent basis. By combining categories of anovulation and shortened luteal phase, a statistically significant difference was noticed in the marijuana using group. It is not known if this leads to problems with fertility or lactation, or if it leads to cancer of the reproductive organs.

Animal studies have shown that Δ-9-THC lowers the serum gonadotropic levels. It is unknown if there is a direct effect on the reproductive tissues, particularly under prolonged use of cannabis products.

Birth Defects and Teratogencity

Cannabis is teratogenic at high doses in animals. There is no evidence of obvious teratogenicity or structural defects in the offspring of human users. But the data are not adequate to reveal a long-range functional impairment or a very low level of teratogenicity if one is present. It may be impossible to identify a distinct role for cannabis in the production of subtle effects in offspring, because of the confounding influences of malnutrition, smoking, and alcohol.

Genetic Effects

Marijuana and Δ-9-THC do not appear to break chromosomes, although there is some conflicting evidence on this point. Multiple drug use seems to be correlated with an increase in the numbers of gaps and breaks in the genetic material. Furthermore, marijuana may affect chromosome segregation during cell division, resulting in abnormal numbers of chromosomes in daughter cells. While these conflicting results are worrisome, their clinical significance is not known. Further investigations, especially controlled prospective studies, of human beings are needed.

The Immune System

The data from animal studies suggest that Δ-9-THC and some of its analogues have a mild, transient, immunosuppressant effect in both *in vitro* and *in vivo* systems; the effects are mild compared with known immunosuppressant drugs. The studies in human beings are contradictory; some demonstrated mild, immunosuppressive effects, but others, using the same or similar methods, did not find any differences in the immune system between normals and chronic marijuana smokers. At the present time, there have been no human or animal studies that have determined if marijuana smokers are more prone to infections or other diseases. Because of the widespread use of marijuana, even weak immunosuppressive effects are a concern. Since further research may not demonstrate definitive findings, immunologic effects should be studied along with other variables in a larger investigation. If marijuana is to be used on immunosuppressed patients (for example, for antiemetic purposes during cancer chemotherapy), even minor additional suppression might be dangerous.

RECOMMENDATIONS FOR RESEARCH

The committee recommends the following types of studies.

- Further observations should be made regarding the relation of marijuana use to reproductive defects in human beings, especially

on young users whose reproductive biology is undergoing rapid change. The principal need is for assessment of endocrine profiles and semen analysis in male users versus nonusers, with adequate control of confounding variables--for example, diet, alcohol, other drug use. In women, the principal need is for more data on endocrine and menstrual patterns in users versus nonusers, with particular attention to the length of cycles, the presence or absence of ovulation, and the existence or absence of subfertility. More studies are needed to detect subtle, low-frequency, or cumulative effects on reproductive function in long-term, heavy users.

- Although routine testing of teratogenicity in human beings is not recommended at this time, the collection of precise epidemiologic information on the outcome of human pregnancy in marijuana users is of great importance and must be carefully controlled.
- There are no good animal models for studying the effects of smoking marijuana, but cytogenetic studies in animals after exposure to Δ-9-THC by other routes than smoking would be of some value. The most relevant studies still would be in vivo human studies.
- Marijuana has been found to have mild immunological effects in a variety of test systems, but studies of its influence on the body's immune defense against microorganisms are lacking and need to be conducted.
- Critical experiments are needed to test the hypothesis that Δ-9-THC causes disruption of thermoregulatory effector responses rather than an alteration of the level of thermoregulation.
- Inherited variation in the way some drugs are metabolized is widely recognized. This type of variation must be evaluated in respect to susceptibility to marijuana.

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6

BEHAVIORAL AND PSYCHOSOCIAL EFFECTS OF MARIJUANA USE

The mind-altering effects of marijuana underlie its widespread and increasing popularity. Marijuana users who experience effects on mood, perception, and motivation report that they seek the "high" and the "mellowing-out." However, under some circumstances many of these same effects can be considered adverse. Perceptual distortions that are sought by users pose risks for driving cars or using other machines. There is reason to be concerned about effects on learning by students using marijuana in school. Older adults receiving Δ-9-THC as therapy may be highly intolerant of altered consciousness and perceived loss of control. Thus, it has become a matter of practical as well as scientific interest to learn more about the effects of marijuana on the brain and behavior.

Many psychological and neuropsychological studies have been conducted to investigate specific effects of marijuana on behavior. These include studies of intellectual functions, such as memory, attention, sequential information processing, and decision-making, as well as perceptual and psychomotor functions. There is a methodological challenge in trying to design experiments that will discriminate reliably among these functions and determine precisely which is being affected when a drug produces a particular behavioral outcome. For example, one's ability to process and respond to environmental stimuli represents a chain of events. The sequence begins with a sensation or perception. Drugs can influence the manner, speed, and accuracy with which this input is received. The information must then be stored in memory, even if only very briefly, and then retrieved from memory to be integrated with recalled prior experiences and other sensory inputs. The response from the subject is the result of the integration of new and old information. A drug acting at any point in this chain of events can alter behavioral performance.

Studies of the effects of marijuana on complex behavior must be carefully interpreted, because there are numerous variables that can influence the results. First, there is the drug itself. The dose, type of preparation, route of administration, and speed of administration must be specified. Next, the user--his personality, level of innate ability, motivation to perform, and especially his previous experience with marijuana, are powerful influences on test results. Finally, there is the type of behavioral test and the setting in

which it is performed. Simpler and well-practiced skills are less susceptible to disruption by drug effects than are novel or complex tasks. The studies in the literature vary in their attention to these factors.

Most of these studies have been carried out on male college students who volunteer for marijuana research. Although this age-group (19-25) represents a period of peak use of marijuana, it cannot be assumed that findings from a college population will generalize to other sectors of the youth population. The differing motives of student volunteers seriously confound the interpretation of results in intellectual areas, where it has been established that motivation plays a significant role in determining performance. Some dedicated users want to do well and demonstrate that marijuana has no harmful effect. Others are simply interested in obtaining the drug and enjoying its effects with little interest in the experiment. Additional methodological issues that recur in this body of research include: (a) reliance on self-reports by subjects regarding personal history of frequency and intensity of drug use, (b) occasional reliance on self-reports of drug dose and level of intoxication at the time of the experiment, (c) lack of standardized dosages and methods of administration of Δ-9-THC even when the drug is administered by the investigator, and (d) lack of attention to motives and beliefs of users and nonusers with whom they interact.

A representative sample of studies will be reviewed here, and a summary table of 88 reports of the relationship between marijuana use and behavioral and psychosocial functioning is available from the Institute of Medicine by request.

PERCEPTUAL AND PSYCHOMOTOR FUNCTIONS

Acute Effects

The studies reported here cover the range of commonly used doses* from very low up to 0.250 mg/kg of Δ-9-THC in marijuana cigarettes at a single sitting. These are acute effects--changes that can be seen after a single dose. The effects begin to be seen at about the same dose level at which a "high" is perceived (0.050-0.150 mg/kg Δ-9-THC). Generally the effects are dose-related. In other words, low doses have small effects; higher doses tend to have greater effects.

*Doses are reported in milligrams per kilogram (mg/kg) where provided by the authors or as total doses in milligrams with the route of administration.

Coordination

Marijuana has been found to impair motor coordination at doses commonly used in social settings by both naive and chronic users. The functions studied include: hand steadiness (Mayor's Committee on Marihuana, 1944; Clark et al., 1970; Milstein et al., 1975), body sway (Mayor's Committee on Marihuana, 1944; Kiplinger et al., 1971; Evans et al., 1973), and accuracy of execution movements (Rafaelsen et al., 1973; Milstein et al., 1975; Kvalseth, 1977). Studies have also showed a dose-related increase in impairment of postural stability as measured by increased body sway (Kiplinger et al., 1971).

Reaction Time

Reaction time is defined as the time lag between a signal and the response a subject makes to that signal. Most studies examine the time that it takes a subject to respond to a visual or auditory signal. The effects of marijuana on either speed of initial detection of the signal or speed of response have been inconsistent at doses commonly used in social settings ("low to moderate"). The same subjects are impaired at some times, but not at other times (Mayor's Committee on Marihuana, 1944; Clark et al., 1970; Dornbush et al., 1971; Moskowitz et al., 1972, 1974; Borg et al., 1975; Schaefer et al., 1977; Peeke et al., 1976; Stillman et al., 1977). The meaning of this inconsistency is uncertain, but it probably involves an effect on attention mechanisms. When a subject is intoxicated with marijuana, he is probably less likely to attend to the reaction time task. Perhaps it is when he does pay attention to the task that function on this test is not impaired.

Tracking

Tracking is the term used to describe the act of following a moving stimulus. It is an important component of driving and flying skills. Tracking behavior is highly sensitive to the effects of marijuana. Impairment of tracking occurs even at very low doses (4.5 mg by smoking) in naive subjects (Weil et al., 1968). Studies of experienced users have also demonstrated consistent impairment. The tracking impairment has been found to persist for 4 to 8 hours, well beyond the feeling of intoxication ("high") by one laboratory (Moskowitz and Sharma, 1979; Moskowitz et al., 1981). No other studies have measured the effects of marijuana beyond 2 hours. This finding on the long-lasting effects has very important implications, as will be discussed later when the effects of marijuana on driving are reviewed, and, therefore, such studies should be repeated by other investigators.

While reaction time studies (as noted above) showed inconsistent results, tracking behavior is regularly and significantly diminished by marijuana at doses usually used in social settings. Tracking

tasks differ from reaction time studies, because the subject must continuously pay attention to the task. Since reaction time tests are intermittent, continuous attention is not required, and this may explain why reaction time studies fail to show consistent marijuana effects.

Sensory and Perceptual Functions

Tests that measure a subject's ability to detect a brief flash of light show significant impairment by low to moderate doses (2-3 mg are examples) of smoked marijuana (Sharma and Moskowitz, 1972, 1973, 1974; Moskowitz et al., 1972, 1974; Casswell and Marks, 1973; Jones and Stone, 1970). Sustained attention is required in signal detection tasks, and the relation between this sustained attention requirement and motivation effects has not been explored. Signal detection tasks are prototypes of perceptual demands found in man-machine interactions. The large reductions in signal detection that occur under the influence of marijuana may suggest a substantial risk for users who are operating machines. Other visual functions, such as visual search, that depend on eye movements are not impaired.

Intellectual and Cognitive Functions

The effects of marijuana on such intellectual and cognitive functions as verbal fluency, short-term memory, learning ability, calculation skills, ability to follow complex directions, and time sense have been investigated and are reported below. However, this area of study has been hampered by the lack of standard measures of functioning in the intellectual and cognitive areas tested. Overall, the investigation of marijuana effects on intellectual and cognitive functioning has not followed a logical progression.

Learning and Memory When studying the effects of drugs on learning, it is difficult to control all of the factors that might influence the results; for example, as noted above, how hard a subject tries to perform can make a big difference even in the presence of a sedating drug. Thus, it is not surprising that early studies of marijuana's effects gave inconsistent results.

More recently, several studies have demonstrated that a single moderate dose of marijuana impairs short-term memory. This effect is especially noticeable in the phases of short-term memory that are heavily dependent on attention, such as information acquisition and storage (Abel, 1970, 1971; Dornbush et al., 1971; Dittrich et al., 1973; Melges et al., 1974; Belmore and Miller, 1980). Examples of the types of impaired tasks would be remembering a sequence of numbers or syllables or memorizing and following a sequence of directions.

Physiological changes have been monitored in some of the same studies in which intellectual impairment has been reported. Miller

and Cornett (1978) found that increases in heart rate are produced by marijuana to about the same degree as impairment on intellectual tasks. This linking of a physiological marker with studies of behavioral effects is a useful model for research in this field.

Time Sense Another intellectual function influenced by marijuana is time sense. Under the influence of moderate doses of the drug, most investigators report that subjects consistently overestimate the amount of time that has elapsed. Thus, under the influence of marijuana, a given event is reported to last longer than it actually does last (Clark et al., 1970; Vachon et al., 1974; Tinklenberg et al., 1976a).

State-Dependent Learning State-dependent learning refers to a situation in which material that is learned while under the influence of a drug is remembered best in the state of drug intoxication in which it was originally learned. A series of studies were conducted with oral doses of 20 mg (in a subsequent study this dose was calibrated to 0.3 mg/kg) of Δ-9-THC to investigate the extent to which learning and memory are linked to the state of intoxication (Darley et al., 1973a,b, 1974, 1977). This modest dose of marijuana caused learning to take place more slowly than when the subject was drug-free. Once learned, recall of the learning that occurred during intoxication was best when the subject was again under the influence of marijuana. Although state-dependent learning occurs with marijuana, the quality of learning and recall is impaired because the information or problem-solving skills learned in the marijuana-intoxicated state will be reduced or impaired. These investigators believe that the major deficit is in the attention-storage phase of learning.

Oral Communication

Marijuana use in low to moderate doses impairs oral communication, especially clarity of sequential dialogue with other persons (Dornbush et al., 1971; Paul and Carson, 1973; Zeidenberg et al., 1973; Crockett et al., 1976; Miller et al., 1977a-d, 1978a,b, 1979; Pfefferbaum et al., 1977; Miller and Cornett, 1978; Natale et al., 1979; Belmore and Miller, 1980). Marijuana at moderate doses disrupts continuity of speech by impairing short-term memory (6-18 seconds duration) (Belmore and Miller, 1980). Communication while intoxicated is also impaired by the intrusion of irrelevant words and ideas into the stream of communication. When a list of words is learned and then the subjects are asked to recall those words without regard to sequence, words that were never in the original list are inserted during recall more often by subjects given Δ-9-THC than by those who were drug-free (Pfefferbaum et al., 1977; Miller and Cornett, 1978; Miller et al., 1978a,b). Zeidenberg et al. (1973) administered 5 mg Δ-9-THC orally and found that, in a social context, phrases became shorter, speech became slower, and there was

greater lag time between the cue to talk and the actual onset of talking. These subjects were also less able to recognize three-letter nonsense syllables to which they had previously been exposed. Further, when experimental subjects were all given the same dose of Δ-9-THC, they reported different subjective levels of intoxication. Those who reported more intoxication showed greater disruption of two-person communication (Paul and Carson, 1973).

Experimental subjects who were asked to tell stories about ambiguous pictures (the Thematic Apperception Test) demonstrated drug impaired organization and integration of stories. The authors reported "a timeless, nonnarrative quality, with greater discontinuity in thought sequence and more frequent inclusion of contradictory ideas" (Roth et al., 1975). When asked to talk for five minutes on any topic, subjects under Δ-9-THC demonstrated decreased variability of language and an increase in personal references, as well as less detailing of items mentioned in the monologue and less critical evaluation of those items (Natale et al., 1979).

Auto Accidents

Simulator Studies

A driving simulator is a laboratory instrument that requires the subject to perform a sample of the behavior required in automobile driving situations. Simulators differ from most of the laboratory studies described above in that complex behavior is required. Although simulators are representative of the multitask character of driving, no one simulator is capable of presenting all aspects of driving simultaneously. The behavior sampled varies across simulators; however, in comparison to car driving situations, the simulator has the advantage of presenting a standard stimulus to all subjects.

Most simulator studies reveal impairment of driving skills following moderately intoxicating doses of marijuana such as 10-15 mg (Crancer et al., 1969; Dott, 1972; Ellingstad et al., 1973; Rafaelsen et al., 1973; Moskowitz et al., 1976; Smiley et al., 1981). These impairments have been reported in simulators that test the perceptual functions as well as those that test motor skills of car control.*

*Another type of simulator study examined marijuana's effect on performance in a flying simulator (Janowsky et al., 1976). Subjects smoked marijuana cigarettes with 0.09 mg/kg Δ-9-THC, a dose of Δ-9-THC commonly used in social settings. Significant impairment of short-term memory was noted. Subjects were unable to recall where they were in the execution of a task. On the simulator they tended to forget where they were in a given flight sequence.

Test Courses

Experimental studies of the effects of marijuana on closed course automobile driving performance show that this skill is impaired by marijuana. Car handling skills were reduced, as shown by objective measures (Klonoff, 1974; Hansteen et al., 1976; Attwood, in press). It should be noted that these studies, involving subjects under the influence of marijuana, examined performance in less complex situations than are actually met in real-life driving situations. However, a closed course has the advantages of standard conditions and safety factors. In real-life driving situations, the perceptual and cognitive demands are considerably more complex. The Klonoff (1974) study of driving performance on city streets indicates that smoked marijuana (5-10 mg Δ-9-THC) impairs judgment and concentration in addition to impairing car handling skills.

Accident Surveys

Experimental evidence of impairments caused by marijuana on psychomotor functions, judgment, and motor skills involved in driving has led to research on the relationship of the use of marijuana and automobile accidents. A strongly positive relationship between use of alcohol and increased driving risk has long been established. The techniques used to establish the relationship of alcohol to accidents might appear to offer an excellent paradigm for comparable marijuana-accident research. However, there have been practical reasons why the roadside survey model of using breath samples obtained from accident drivers and comparing those to breath samples of randomly selected drivers who are passing the accident site in the same direction, the same time of day, and same day of the week has not worked for marijuana studies. Whereas there has been 97 percent cooperation for alcohol breath analysis, marijuana determination requires a blood sample, and only a minority of drivers willingly cooperate. Further, marijuana has a quite different body distribution pattern due to its high fat solubility. Delta-9-THC is not only technically quite difficult to detect in samples of body fluid, but it may be active in the nervous system long after it is not detectable in blood. The detrimental effects on driving skills (Moskowitz and Sharma, 1979; Moskowitz et al., 1981) may even persist 4 to 8 hours beyond the time when the user has had subjective feelings or euphoria or sleepiness.

Several reports of accident surveys have recently been published (Teale et al., 1977; Cimbura et al., 1980; McBay and Owens, 1981), but all suffer from the problems discussed above and particularly from the lack of a reasonable comparison group. For example, one study reported that 16 percent of Boston drivers had Δ-9-THC in their blood (Sterling-Smith, 1975). There was no description of the group who declined to give a blood sample but provided breath or urine samples instead. Also, there is no information as to the frequency of finding Δ-9-THC in the blood of those drivers who have

not had an accident or otherwise come to police attention. In addition, many users of marijuana also use other drugs so that data are available on only a few subjects who only used marijuana.

In an effort to obtain some reference point for the association of marijuana with accidents as compared with other drugs, Warren et al. (in press) reanalyzed the Cimbura et al. (1980) data. Twelve percent of the fatally injured drivers and pedestrians in that study had been found to have Δ-9-THC in their blood. The presence of other drugs was also determined and a culpability index was developed. A culpability index compares the frequency that a drug is found in drivers assigned responsibility for causing a collision with the frequency in individuals from the same sample who had not caused an accident.

Aspirin was found to have a culpability index of 1.0. That is, it was no more frequent in individuals assigned responsibility for a collision than on those who were not. This is of some significance because it serves as an internal check on the technique, agreeing with the a priori assumption that it would be unlikely for aspirin users to be overrepresented among those responsible for accidents. In contrast, subjects with cannabinoids present in the urine were found to have a culpability index of 1.7, the same culpability level found for the presence of alcohol. This indicates an excess of Δ-9-THC-positive drivers in the category responsible for accidents. The presence of antihistamines produced a culpability index of 1.5, and tranquilizers/antidepressants, 1.8.

Given the difficulties in executing epidemiologic studies where it is so difficult to obtain adequate control groups, it would appear that only tentative conclusions about marijuana's role in accidents can be reached. Supportive evidence that marijuana is a contributing cause of accidents comes from surveys of marijuana users who report they receive a higher-than-average number of tickets for driving violations and are involved in a higher-than-average number of accidents (Johnston, 1980). Nevertheless, the problems described above are yet to be solved. But the culpability index model presents a methodology that may be refined and utilized in future studies.

Alcohol-Marijuana Interactions

Surveys show that marijuana and alcohol are frequently consumed together (Fishburne et al., 1980; Johnston et al., 1980). Thus, it is important to determine what interactions, if any, occur between these two drugs. As both drugs have sedative properties, an additive effect would be expected and has been found in the few systematic investigations of the effects of this combination. One study reported that 0.05 percent blood alcohol level concentration (BAC) increased the impairment produced by 5 mg of smoked Δ-9-THC on tracking behavior (Manno et al., 1971). In a study using two doses of alcohol and two doses of marijuana, even the low dose of alcohol (0.07 percent BAC) and the low dose of Δ-9-THC (1.4 mg) impaired complex tracking in an additive fashion (Hansteen et al., 1976).

Higher doses produced more pronounced decrements. A combination of Δ-9-THC (0.320 mg/kg) and ethanol (a dose that produces a peak blood level of less than 0.08 percent BAC) has also produced an additive effect on the ability to perform on a psychomotor test (Belgrave et al., 1979). This additive effect would be of concern to those operating a motor vehicle.

The issue of alcohol-marijuana interactions is an important one, but currently few data are available. Clearly, more studies of marijuana's interaction with alcohol and other commonly used drugs are needed.

Chronic Effects

Animal Studies

Studies of chronic effects are necessary to determine whether a drug produces changes that persist after administration has stopped. In view of the theoretical possibility of cumulative or persistent marijuana effects, it is surprising that only a few laboratories have conducted experiments involving repeated dosing and testing for residual effects. Mice injected with 10 mg/kg Δ-9-THC for 20-40 days were found to be persistently impaired in new learning 100 days after the injections stopped (Radouco-Thomas et al., 1976). Similarly, rats given 20 mg/kg of Δ-9-THC orally for 180 days had learning still impaired 2 months after the Δ-9-THC treatment stopped (Fehr et al., 1976). This was confirmed by the same group in two subsequent studies (Fehr et al., 1979; Stiglick and Kalant, in press). Another group of investigators, however, could find no residual learning effects in monkeys 20 days after stopping comparable doses of Δ-9-THC (Ferraro and Grilly, 1974).

Human Studies

Clinical reports of memory impairment, lack of concentration, lethargy, etc., in nonintoxicated chronic users of marijuana have led to studies in which psychological testing was administered to users of marijuana and controls. The results of these studies are inconclusive. Several studies show impaired performance in users as compared to controls (Agarwal et al., 1975; Soueif, 1976; Wig and Varma, 1977; Mendhiratta et al., 1978); others found no significant residual effects in the marijuana users (Bowman and Pihl, 1973; Rubin and Comitas, 1975; Satz et al., 1976; Ray et al., 1978; Schaeffer et al., 1981). All of these studies can be criticized on methodological grounds, and the results have been disputed. This is not surprising, because it is technically very difficult to obtain a sample of chronic marijuana users, get them into a truly drug-free condition, test them, and similarly test an appropriate group of controls.

Several groups of investigators (Dornbush et al., 1972; Frank et al., 1976; Harshman et al., 1976; Rossi et al., 1977) examined

chronic marijuana users before and after 21-94 days of chronic intoxication in a research hospital setting. None of the investigators found any psychological changes during postdrug testing. However, 2 months of use is a relatively short period of time for a change to be detected, and the subjects had already been using marijuana for at least a year prior to entering each study (Fehr et al., 1976).

The available studies of chronic behavioral effects lead to no clear conclusions. Although some animal studies demonstrated a learning deficit that persisted for months after daily marijuana exposure was discontinued, the human studies have such methodological weaknesses that they cannot be interpreted. A prospective concurrent cohort study and a retrospective case-control study of possible outcomes of and risk factors for use of marijuana could add useful information. (See research recommendations at the end of this chapter.)

CLINICAL SYNDROMES

In this section we will discuss both acute and chronic behavioral changes that have been reported in the clinical literature to be associated with the use of marijuana. An association based on case reports does not imply causality. Studies of appropriate control groups are necessary. In general, acute or immediate clinical effects of drugs can be determined scientifically much more readily than chronic or delayed effects. This is as true for marijuana as it is for alcohol and other drugs. Thus, the acute effects of marijuana are based on more solid evidence than are the reported chronic effects.

Acute Effects

The acute clinical effects of marijuana seem to occur on a continuum from mild dysphoria to acute brain syndrome. In the literature, three different syndromes have been described, although there is blurring of the boundaries in this classification and no general agreement as to diagnostic criteria.

Anxiety/Panic Reaction

A major portion of the evidence for this effect comes from reports by marijuana users themselves. Marijuana's popularity notwithstanding, a surprisingly high proportion of users report reactions that they regard as unpleasant or undesirable. For example, 33 percent of regular users reported that while intoxicated they occasionally experienced such symptoms as acute panic, paranoid reaction, hallucinations, and unpleasant distortions in body image (Tart, 1970; Negrete and Kwan, 1972). Another study reported that 16 percent of

regular users reported anxiety, fearfulness, confusion, dependency, or aggressive urges as a "usual occurrence" (Halikas et al., 1971). Similar findings in groups of stable, well-adjusted, moderate users have been found by other investigators (Annis and Smart, 1973; Marcus et al., 1974). First-time users are more likely than are experienced users to report adverse reactions. The frequency of such reactions appears to be higher when the setting for use is not a favorable one; for example, when the user sees the environment as threatening.

These adverse psychological reactions also have been observed in subjects of laboratory experiments with marijuana. Such controlled observations of persons whose immediate prior mental status and whose dosage were known give a basis for concluding that acute adverse psychological reactions can occur under single moderate doses of marijuana. These effects are more likely at higher doses. They usually last no longer than 2 to 4 hours. Acute paranoid reactions under these controlled conditions have been reported (Mendelson and Meyer, 1972; Tassinari et al., 1973; Frank et al., 1976; Melges, 1976). Ingestion, in which titration of dose (dose adjustment as occurs during smoking) is difficult, may be more likely to produce adverse effects than administration by smoking marijuana. However, chronic use and interaction with other psychoactive substances are not required.

As frequently as these adverse reactions are observed and self-reported, medical treatment is rarely sought. For example, a college student health clinic reported only six students per year sought medical treatment for an adverse reaction to marijuana out of a student population of 20,000 (Pillard, 1970). In the general population, a diagnosis of acute cannabis reaction was found in only 10 cases out of 700,000 hospital admissions in the United States (Lundberg et al., 1971). In the U.S. Army, only 18 such cases were treated over a several-year period from a military population of 33,000 (Tennant and Groesbeck, 1972). There are no recent figures showing requests for medical treatment now that the use of marijuana is more intense, widespread, and reaching younger age-groups. However, a unique monitoring of drug causality behavior documenting emergency room encounters conducted by the Drug Enforcement Administration and the National Institute on Drug Abuse (U.S. Department of Health and Human Services, 1979) may in the future provide additional information about the frequency of adverse reactions to use of marijuana.

Dysphoric Reaction

Therapeutic trials have been carried out testing Δ-9-THC as a possible treatment for mood disorders (see Chapter 7). Severe dysphoric reactions characterized by disorientation, catatonialike immobility, acute panic, and heavy sedation have occurred in several patients. The dysphoric symptoms appeared at moderate doses comparable to those used in social settings. They lasted only a few hours and responded to discontinuation of the drug and reassurance of the patients (Kotin et al., 1973; Ablon and Goodwin, 1974).

Similar dysphoric reactions have been reported in cancer patients who were on a therapeutic trial of Δ-9-THC to control the nausea associated with chemotherapy. The symptoms, course, and response to ceasing use of the drug were identical to those described above. Investigators have suggested that the dysphoric response is more likely to occur in older patients not accustomed to drug use for whom the mood-altering effects are unanticipated and unwelcome (Shiling and Stillman, 1980).

Acute Brain Syndrome

Diagnostic criteria for the syndrome now called delirium and previously called acute brain syndrome appear in Diagnostic and Statistical Manual of Mental Disorders, Third Edition, 1980 (DSM III). These include: (a) a clouding of consciousness as manifested by impairment of ability to sustain attention to environmental stimuli, or impairment of ability to sustain goal-directed thinking or goal-directed behavior; (b) a disorder of memory or orientation; (c) perceptual disturbances; and (d) a change in sleep pattern and/or a change in psychomotor activity. The symptoms develop over a short period of time and fluctuate rapidly.

Both the symptom pattern and the course of the acute brain syndrome fit the descriptions of one type of behavior disorder associated with use of marijuana. It has been reported to develop in persons who have a history of prolonged, regular, heavy use of marijuana. It is defined as an "acute" brain syndrome because it comes on during the period of drug use and it gradually disappears after the drug is stopped. The majority of case reports have come from Eastern countries where the cannabis products customarily used have high potency (Spencer, 1970; Chopra and Smith, 1974; Meyer, 1975). It has also been reported in U.S. Army personnel stationed in Viet Nam (Talbott and Teague, 1969) and in Europe (Tennant, 1972), where soldiers had access to very high Δ-9-THC concentrations in cannabis substances. In contrast to the Indian public mental hospital patients who were hospitalized for many weeks, U.S. soldiers recovered in 3 to 11 days and returned to duty. This difference in duration may reflect sociocultural differences in length of in-patient treatment more than a difference in the disorder.

Withdrawal Syndrome

Studies of animals and human subjects given moderate to high doses of marijuana orally or by inhalation several times per day have demonstrated tolerance to many of the effects of marijuana (see Chapter 1). When such use of marijuana is stopped after several days, a withdrawal syndrome occurs. In human subjects, this resembles the typical mild withdrawal symptoms seen after prolonged sedative use (Jones and Benowitz, 1976). Subjects show irritability, agitation, insomnia, and EEG changes (see Chapter 4). These symptoms are self-limiting; they peak at 30 hours and disappear by 90 hours.

There is no clinical evidence that physical dependence plays an important role in persistent use of marijuana. Withdrawal symptoms would not be expected in intermittent users; however, daily round-the-clock users of high-dose marijuana may be expected to show some symptoms of withdrawal soon after stopping regular use.

Chronic Effects

Cannabis Psychosis

Cannabis psychosis refers to a chronic psychotic condition (out of contact with reality) reportedly seen in heavy marijuana users, but extending beyond the period of acute intoxication. Some authors have described a schizophrenialike picture with delusions and hallucinations, and others have stressed the existence of organic mental confusion. Most of the reports have come from observation of hospitalized patients in Asian and African countries (Asuni, 1964; Chopra and Smith, 1974; Thacore and Shukla, 1976). There are no reports in the North American literature. At this time, there is insufficient evidence to say that cannabis psychosis exists as a separate clinical entity (Murphy, 1963; Edwards, 1976).

"Amotivational Syndrome"

Clinicians coined the term "amotivational syndrome" to describe a characteristic set of personality changes seen in some daily users of marijuana (McGlothlin and West, 1968; Smith, 1968). The changes include apathy, loss of ambition, loss of effectiveness, diminished ability to carry out long-term plans, difficulty in concentrating, and a decline in school or work performance. As usually described, these changes are seen in frequent or daily users, and thus they may be considered a form of chronic intoxication. The term "amotivational syndrome" is not an official diagnosis, but there is agreement among many clinicians who treat young people that this constellation of symptoms is common. It may also be seen in nonmarijuana users, and daily use of marijuana is not always associated with loss of motivation.

The evidence presented for the linking of this syndrome with marijuana consists of case reports. For example, Baker and Lucas (1969) described the case of a man whom friends described as previously conscientious, capable, and effective; but after smoking hashish daily for 3 years, he changed into a person for whom use of drugs was a way of life and in whom a serious deterioration of social function was observed. Other reports consist of groups of cases with similar histories (Thurlow, 1971). The symptoms mentioned, in addition to loss of motivation, include falling grades, difficulties in concentration, intermittent confusion, and impaired memory. Some authors report improvement when use of marijuana is stopped (Kolansky and Moore, 1971, 1972).

A variety of other data support such a condition. In a large survey, daily marijuana users were asked about the drug's adverse effects (Johnston et al., 1980). The most common response was "loss of energy" (42 percent). Nearly a third (32 percent) of the daily users thought that marijuana caused them to be less interested in other activities than they had been before, and a third (34 percent) thought that it hurt their school and/or job performance. Another type of evidence comes from comparisons of college students who use marijuana with others who do not. Several such studies (Shean and Fechtmann, 1971; Linn, 1972; Simon, 1974; Finnell and Jones, 1975) found marijuana users had increased levels of psychological disturbance, lower academic performance, and lower performance on scales measuring attitudes toward achievement and purpose in life. But some studies in both the United States and foreign countries have failed to show significant differences between marijuana users and abstainers (Brill and Christie, 1974; Rubin and Comitas, 1975).

Interpretation of the evidence linking marijuana to "amotivational syndrome" is difficult. Such symptoms have been known to occur in the absence of marijuana. Even if there is an association between this syndrome and use of marijuana, that does not prove that marijuana causes the syndrome. Many troubled individuals seek an "escape" into use of drugs; thus, frequent use of marijuana may become one more in a series of counterproductive behaviors for these unhappy people.

The available evidence does not allow a sorting of the various possibilities in the relationship between use of marijuana and the complex of symptoms in the "amotivational syndrome." It appears likely that both self-selection and authentic drug effects contribute to the "motivational" problems seen in some chronic marijuana users (see Chapter 2). Persons who are experiencing loss of motivation, apathy, and the other aforementioned symptoms probably will worsen the situation by taking any sedating drug. They should be warned to avoid frequent use of marijuana, alcohol, and other nonprescribed drugs.

"Flashbacks"

In 1968, Keeler et al. reported four cases of the brief spontaneous recurrence of a mental state similar to that experienced during marijuana intoxication 1 to 21 days after the last drug use. Three of the four subjects complained of hallucinations comparable to flashbacks usually associated with LSD (Horowitz, 1969). Three separate reports of marijuana flashbacks followed (Smith, 1968; Favazza and Domino, 1969; Weil, 1970) and all of these latter subjects had used LSD prior to marijuana. In a survey of 720 servicemen, not a single case of flashback in any subject for whom hashish was the only drug consumed was documented (Tennant and Groesbeck, 1972). But in the same sample, 15 subjects were identified who had LSD flashbacks precipitated by use of marijuana. A larger sample of 2,001 army personnel (Stanton et al., 1976) revealed that use of marijuana had the highest and only statistically

significant association with the precipitation of LSD flashbacks among five classes of abused drugs. Clinical studies also have provided evidence that marijuana precipitates a recurrence of the LSD flashbacks experience (Holsten, 1976; Abraham, 1981).

The existence of flashbacks following use of either LSD or marijuana is entirely based on self-reports, because there are no distinctive physical signs or tests, such as EEG changes, to identify this condition. There is no current pharmacological explanation of the phenomenon, and data regarding dose and time parameters do not exist. Still, the reports by users are reasonably consistent. Thus, there is clinical evidence that use of marijuana by those who have previously used LSD increases the likelihood of recurrence of the LSD experience.

Effects on Preexisting Mental Illness

Only evidence available regarding this issue consists of case [illegible]s of patients who had recovered and apparently were doing well un[illegible] they used marijuana. There is no information on the number of mentally ill patients who have used marijuana without complications.

The available data, therefore, do not prove that marijuana worsens mental illness. Still, there are sufficient numbers of uncontrolled clinical reports showing a temporal association between use of marijuana and return of mental symptoms, so that patients should be warned of this possibility.

Patients with a history of schizophrenia may be particularly sensitive to marijuana's effects. Four schizophrenic patients who were otherwise well controlled with medication suffered serious relapse of their schizophrenic symptoms following use of marijuana (Treffert, 1978). Other cases have been reported (Smith and Mehl, 1970; Weil, 1970; Bernhardson and Gunne, 1972). These all were cases in which marijuana was purchased on the street, so the dose and purity were unknown.

Patients with mood disorders have also been reported to show worsening of mental symptoms after use of marijuana. For example, four cases are known in which marijuana apparently precipitated a relapse of psychotic (hypomanic) behavior (Harding and Knight, 1973). Furthermore, depressed patients treated with Δ-9-THC have been observed to show a high incidence of dysphoric reactions (Ablon and Goodwin, 1974).

Effects Sometimes Reported By Users

Mood Changes

There is a general belief that use of marijuana alters mood. This property is one of the desired effects sought by many users. Investigators have described a number of variables that enter into the mood response to marijuana (Jones, 1971). These include dosage,

past experience, attitude, expectations, and setting. For example, individuals who used marijuana in isolation tended to be relaxed and slightly drowsy; in contrast, when the user was in a group situation, marijuana was associated with euphoria and lack of sedative effect (Jones, 1971). Further evidence that mood changes are not attributable solely to the pharmacological action of marijuana comes from a study that found that elevation in mood occurred immediately before use of marijuana and immediately after, but that mood was not correlated with other indications of the subjective level of intoxication (Rossi et al., 1978). Instead, mood was correlated significantly with the moods of others, whether or not the other persons were intoxicated.

It appears that preexisting mood can influence the decision to use marijuana. High school students who exhibit symptoms of depression are more likely than are others to begin using marijuana as well as other illicit drugs (Paton et al., 1977). There is some evidence that students use the drug as a self-prescribed remedy for their own mood problems, often reporting that they use marijuana as a means of psychological coping (Johnston et al., 1980; Kaplan, 1980).

A belief that marijuana can be used to alleviate clinical depression is not supported by other studies, including one in which Δ-9-THC was carefully tested as an antidepressant. It was given to depressed patients as an experimental treatment without success (Ablon and Goodwin, 1974) (see Chapter 7).

Interpersonal Behavior

Adolescents and young adults often report that they use marijuana to facilitate interaction in new social situations (Mirin and McKenna, 1975). In a survey of 704 midwestern undergraduate students, most reported that marijuana was a meaningful "tool of social bonding" (Linn, 1971). There seems to be a widespread belief that marijuana smoking has several facilitative effects, including enhanced social effectiveness, closer social bonding, heightened interpersonal sensitivity and empathy, and enhanced sexual pleasure. The subcultural lore on one of these measures of interpersonal behavior--sexual effects--has not been studied systematically either in surveys or in experimental studies. The effects on sex hormones are controversial (see Chapter 5). Studies in experimental situations have failed to show any enhancement of social interaction and, in fact, some decrements were noted (Galanter et al., 1974; Clopton et al., 1979; Janowsky et al., 1979). Data from natural settings rather than experimental settings are not available.

Effects on Aggression

Because marijuana users have been involved in delinquent behavior, a number of investigators have questioned whether use of marijuana enhances aggressiveness in human beings. There are specific concerns

about potential links of use of marijuana to aggression. Both retrospective and experimental studies in human beings have failed to yield evidence that marijuana use leads to increased aggression. Most of these studies suggest quite the contrary effect. Marijuana appears to have a sedative effect, and it may reduce somewhat the intensity of angry feelings and the probability of interpersonal aggressive behavior (McGuire and Megaree, 1974; Tinklenberg, 1974; Salzman et al., 1976; Taylor et al., 1976; Tinklenberg et al., 1976b; Hemphill and Fisher, 1980).

SUMMARY

There is experimental evidence that marijuana seriously impairs psychomotor performance. Strong evidence for impairment has been found in:

- coordination as examined by hand steadiness, body sway, and accuracy of execution of movement;
- tracking performance;
- perceptual tasks;
- vigilance;
- performance on automobile driving and flying simulators; and
- operating automobiles on test roadways.

Less reliable evidence of impairment or reliable evidence of a small degree of impairment was found in reaction time, simple sensory functions, and control of eye movements. Although the effects that marijuana produces on psychomotor functions used in driving are clear, studies linking marijuana to auto accidents are inconclusive. The research is impaired by methodological problems related to the pharmacology of marijuana. One recent study reported that marijuana and alcohol had a similar degree of association with fatal accidents, but more investigation is needed.

Studies also have shown acute effects of marijuana on short-term memory. State-dependent learning also has been shown, in that information or problem-solving skills learned in the intoxicated state will be reduced or impaired in the drug-free state. One laboratory has shown tracking impairment to persist for 4 to 8 hours beyond the feeling of intoxication. Some animal studies demonstrate a learning deficit that persists for months after marijuana exposure has been discontinued, but human studies do not permit secure conclusions.

The acute clinical effects of marijuana are fairly well established, although there is no general agreement as to how to classify them. Anxiety and panic reactions have been reported by users and observed in experimental situations. They are not uncommon, but they rarely require medical attention. When marijuana is used to treat nausea and other conditions, mental effects can occur, which some patients, especially older persons, may regard as unpleasant. These mental effects may require cessation of the treatment.

Marijuana also has been found to produce an acute brain syndrome. This is a more severe mental problem consisting of confusion and loss of contact with reality. It lasts from several hours to several days and appears to be more likely to occur with higher doses.

Chronic effects of any drug are more difficult to assess than are immediate effects. The evidence that marijuana produces a chronic psychosis is not convincing. The possible role of marijuana in causing an amotivational syndrome is a matter of great concern. Apathy, poor school work or work performance, and lack of goals characterize a number of long-term marijuana users. But it has not been possible to determine how much is caused by use of marijuana and how much was antecedent; it seems likely that both factors (drug effect and self-selection) contribute to the motivational problems seen in chronic users of marijuana. Existing studies have produced conflicting results. None of the investigators has looked at effects on the very young daily marijuana user, who is regarded as potentially at high risk for damaging effects because of physiological and psychological immaturity.

There is clinical evidence that marijuana use by former LSD users may precipitate a recurrence of LSD-type hallucinations known as a "flashback." Other clinical evidence raises the possibility that marijuana use can worsen preexisting mental illness.

RECOMMENDATIONS FOR RESEARCH

The committee recommends the following types of studies.

- Systematic research on acute behavioral and psychosocial effects of marijuana should be extended to other age groups. There are virtually no data on prepubertal children, young adolescents, older adults, and aging persons.
- Studies of effects of daily use of marijuana on school children are greatly needed. These effects should include the learning of new material, physical, psychological, and social development, acquisition of coping skills, and tools of daily living.
- Systematic studies of long-term effects of marijuana are increasingly possible now that longitudinal studies have identified representative panels of persons known to be chronic heavy users. These studies should cover interactive effects of marijuana and other drugs on behavioral and psychosocial responses, especially interactions of alcohol and marijuana because of their frequency of associated use.
- Dosage effects should be restudied, taking into account the higher potency cannabis that is in current use. Further study is needed of the timing and depth of inhalation of cigarettes with standard doses of marijuana. More animal studies at varying doses are needed. In view of the long-term retention of marijuana in body tissues, further study is needed to see whether or not chronic users may have impairments of function even in the absence of an acute dose

of marijuana. The factors that influence the persistence of effects following an acute dose are not understood.

- The correlation of changes in a physiological marker, such as increased heart rate, with observations of behavioral effects should be encouraged.
- Many of these recommendations, along with those of other chapters, could be consolidated and carried out as part of a study that is both a prospective cohort study and a retrospective case-control study of possible outcomes and risk factors with marijuana use.
- A cohort of drug-naive junior high school students could be assembled and followed over time to see which students become marijuana users and which remain nonusers. Students would be subjected to physical and psychosocial testing at predetermined time intervals. The two groups would be evaluated in terms of the incidence of specific outcomes and the relative risks associated with these outcomes after appropriate follow-up periods.

In order to identify risk factors for marijuana use, individuals who become marijuana users would be compared to individuals who remain nonusers using a case-control methodology. By combining these two epidemiologic research strategies, the etiology and effects of marijuana use may be studied.

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7

THERAPEUTIC POTENTIAL AND MEDICAL USES OF MARIJUANA

There has been growing interest in the possibility that cannabis and its derivatives will be valuable for the treatment of several medical and psychiatric conditions. The 97th Congress, for example, introduced a bill (H.R. 4498) "to provide for the therapeutic use of marijuana in situations involving life-threatening or tense-threatening illness and to provide adequate supplies of marijuana for such use."

Most of the putative therapeutic effects of cannabis are believed to be mediated by the central nervous system. These include effects on appetite, nausea and vomiting, epilepsy, muscle spasticity, anxiety, depression, pain, and on glaucoma, asthma, and the symptoms of withdrawal from alcohol and narcotics. The literature on these and other therapeutic actions believed mediated by the central nervous system will be reviewed in this chapter.

In general, the committee finds that cannabis shows promise in some of these areas, although the dose necessary to produce the desired therapeutic effect is often close to one that produces an unacceptable frequency of toxic (undesirable) side-effects. What is perhaps more encouraging than the therapeutic effects observed thus far is that cannabis seems to exert its beneficial effects through mechanisms that differ from those of other available drugs. This raises the possibility that some patients who would not be helped by conventional therapies could be treated effectively with cannabis. A second possibility is that cannabis could be combined with other drugs to achieve a therapeutic goal, but with each drug being used at a lower dose than would be required if either were used alone. As a result, fewer side-effects would be expected to occur. It may be possible to reduce side-effects by synthesizing related molecules that could have a more favorable ratio of desired to undesired actions; this line of investigation should have high priority, because such synthetic derivatives may ultimately have widespread therapeutic use.

GLAUCOMA

Glaucoma is the leading cause of blindness in the United States. The term is used to describe a group of ocular diseases characterized by an increase in intraocular pressure, which damages the optic nerve and leads eventually to loss of vision. The disease affects over two million Americans of age 35 or older. Although there is increasing risk of glaucoma with increasing age, there are forms that develop in infancy. The National Society to Prevent Blindness (1980) also estimates that 300,000 new cases are diagnosed each year.

Treatment of glaucoma depends on the type and cause. It may be pharmacological or surgical. Surgery is useful treatment in relatively few cases; there is a high incidence of failure and serious complications may occur. Available antiglaucoma drugs are effective in regulating intraocular pressure in many patients, and are the mainstay of treatment in the most common form of glaucoma, but there are some adverse side-effects. Some patients are refractory to present forms of treatment and become blind as the disease progresses; for them, there is a particularly urgent need to find effective drugs.

Cannabis (the crude drug), Δ-9-THC (the pure compound), and some other cannabinoid derivatives lower intraocular pressure when administered by various routes, such as inhalation, oral, or intravenous. However, adverse side-effects of cannabis and Δ-9-THC also have been reported. Most patients with glaucoma are elderly, and have a reduced tolerance for many of these side-effects. Even without the adverse side effects, smoking, oral, and intravenous routes of administration are not suitable for the long term. For example, to give adequate control for intraocular pressure, four marijuana cigarettes per day of 2 percent Δ-9-THC would be necessary; this amount is considered heavy usage and could pose a serious health problem in long-term use. Therefore, topical application would be the most salutary route of administration for the patient who needs continuous treatment.

Human Studies

Interest in using cannabis for the treatment of glaucoma was first stimulated by the observation of Hepler et al. (1971, 1972) that intraocular pressure decreased when healthy human subjects smoked cannabis (0.9 percent and 1.5 percent Δ-9-THC content) using an ice-cooled water pipe. (See Green, 1979, for an extensive literature review.)

A study of the acute ocular effects of cannabis in 429 subjects showed there was a dose-related and statistically significant reduction of intraocular pressure following the smoking or ingestion of cannabis containing 1, 2, or 4 percent Δ-9-THC (Hepler et al., 1976a). The amount of pressure decrease was in the range of 30 percent for the cannabis that contained 2 percent Δ-9-THC. Nineteen hospitalized subjects who smoked cannabis of 1 or 2 percent

Δ-9-THC content were observed for 35 days and another 29 subjects were observed as in-patients for a total of 94 days. There was a consistent drop in intraocular pressure in those smoking the 2 percent cannabis and the reduction appeared to last 4 to 5 hours (Hepler et al., 1976a). The authors noted that there did not seem to be much of a cumulative effect on size of pupils or upon intraocular pressure response. Studies by other investigators have confirmed this effect of cannabis and Δ-9-THC in causing reduction of intraocular pressure in humans (Shapiro, 1974; Purnell and Gregg, 1975).

Perez-Reyes et al. in 1976 investigated the effect of intravenous infusion of six cannabinoids in healthy volunteers. Delta-8-THC, Δ-9-THC, 11-hydroxy-Δ-9-THC, cannabinol, cannabidiol, and 8-β-hydroxy-Δ-9-THC were tested on healthy subjects with normal intraocular pressure; Δ-8-THC, Δ-9-THC, and 11-hydroxy-THC caused the greatest reduction in pressure. Of these Δ-8-THC caused the largest decrease in intraocular pressure, with the least number of psychological side-effects.

In a preliminary study of 11 human glaucoma patients who smoked marijuana (1, 2, and 4 percent) or ingested Δ-9-THC (15 mg), intraocular pressure was lowered an average of 30 percent in 7 out of 11 patients (Hepler et al., 1976a). Another study showed that most patients had a decrease in intraocular pressure after ingestion of 15, 20, or 30 mg of Δ-9-THC and after smoking cannabis containing 1, 2, and 4 percent Δ-9-THC (Hepler et al., 1976b).

Ideally, the synthesis of a preparation that could be applied topically to the eye would be most desirable for humans, because this would allow for self-administration. However, initial studies in humans with a topical preparation of Δ-9-THC have not shown a consistent effect on intraocular pressure (Merritt et al., 1981). More work needs to be done on this possibility.

Animal Studies

While animal studies have supported the observation that Δ-9-THC lowers intraocular pressure after oral and topical administration in rabbits (Green et al., 1977a,b; 1978), and after intravenous administration in the cat (Innemee et al., 1979), the reduction in intraocular pressure is not completely understood. It may result in part from a central nervous system effect, and in part through action on the adrenergic system in the eye, probably mediated by the neurotransmitter norepinephrine.

Side-Effects

Marijuana and Δ-9-THC given orally, intravenously, or in cigarettes to control glaucoma cause systemic side-effects, such as increase in heart rate, decrease in blood pressure, and psychotropic effects. Some of these side-effects are significant enough to pose problems, particularly in patients with glaucoma, who are usually elderly. But

on the other hand, some of these effects may disappear as tolerance (decreased response with repeated use) develops.

Tolerance to the Intraocular Pressure Reducing Effect

No tolerance was detected to the ocular effects of cannabis in rabbits after 1 year's topical instillation of the synthetic cannabinoids SP-1, SP-106, and SP-204 (Green and Kim, 1977; Green et al., 1977b). Hepler et al. (1976b) noted a ceiling effect in humans, in that the smoking of 22 cannabis cigarettes did not result in a significant decrease in eyeball pressure as compared with a subject who smoked only 2 cigarettes. The area of tolerance will need further study, especially if a cannabinoid preparation with a satisfactorily high ratio of therapeutic to side-effects can be found.

Summary

Cannabis, Δ-9-THC, other cannabinoid derivatives, and their synthetics, reduce intraocular pressure in humans when smoked, or given intravenously or orally. However, there are systemic side-effects as well as psychotropic effects that are of concern. It is not yet clear whether an effective topical preparation can be developed that will not have these side-effects. Future work should determine whether synthetic cannabinoids or cannabinoid analogues can be found that will be effective in treating glaucoma without causing side-effects.

ANTIEMETIC ACTION

Certain cancer chemotherapeutic agents regularly produce nausea and vomiting after oral or intravenous administration. Those that are most severe in that respect are cisplatin, actinomycin D, adriamycin, cyclophosphamide, methotrexate, and the nitrosoureas. Other anticancer compounds may produce nausea less regularly or in less marked fashion.

Because cancer chemotherapy now can produce increased survival in patients with some neoplasms (recurrent or metastatic breast cancer, small cell carcinoma of the lung, ovarian cancer, and others) and substantial cure rates in several (acute lymphoblastic leukemia, Hodgkins disease, germ cell tumors of the testis, etc.) nausea and vomiting that interfere with patients' willingness to continue therapy can be a life-threatening side-effect. Even for those willing to endure the symptoms, they can be extremely unpleasant and debilitating.

Established antiemetics (prochlorperazine and other phenothiazines) are not very effective against drug-induced emesis, and there is a need for new and more reliable antiemetic agents. Metoclopramide, a derivative of procainamide, has recently been shown to be

more effective than prochlorperazine in certain situations and seems promising (Gralla et al., 1981).

The suggestion that cannabis might have some useful antiemetic activity in this setting arose about 1973, when patients receiving intensive chemotherapy for acute leukemia observed that their "social" use of cannabis appeared to reduce their customary nausea and vomiting.

Clinical Investigations

Several controlled studies have been reported. In one of the early ones (Sallan et al., 1975), Δ-9-THC in 15- or 20-mg doses by mouth was compared with a placebo in a randomized double-blind crossover trial in 22 patients whose nausea and vomiting had been shown refractory to other antiemetics. In 14 of 20 courses of treatment, patients obtained "complete or partial relief" with Δ-9-THC; in none of 22 courses did patients report benefit with the placebo. It was observed that the antiemetic effect of Δ-9-THC occurred only in association with the "high," and it was necessary to maintain the "high" in order to maintain the antiemetic effect.

In another controlled trial (Chang et al., 1979), 14 of 15 patients with osteogenic sarcoma treated with high-dose methotrexate had less nausea and vomiting with Δ-9-THC than with the placebo. In that study, patients with other tumors being treated with cytoxan and adriamycin did not respond as well. That report and others like it suggested that the antiemetic effect of Δ-9-THC against those chemotherapeutic agents that are moderate in their emetic potential (e.g., methotrexate) was pronounced, but that Δ-9-THC was less effective against those agents with severe emetic properties. In a similar study (Lucas and Laszlo, 1980), 38 of 53 patients with nausea and vomiting refractory to other antiemetics reported good results with Δ-9-THC. Among the failures were those treated with cisplatin, which has been characterized as one of the most emetic agents used in cancer chemotherapy.

In comparison with prochlorperazine, Δ-9-THC has also been reported to be more effective in preventing nausea and vomiting (Ekert et al., 1979; Sallan et al., 1980).

In a larger study (Frytak et al., 1979), of 116 patients treated with 5-fluouracil and methyl-CCNU, Δ-9-THC was said to be no more effective than prochlorperazine. In that study, in which nearly all patients were older than those in the other reported trials, the majority of patients considered the other side-effects of Δ-9-THC so unpleasant that they preferred either prochlorparazine or the placebo.

Another cannabinoid, a synthetic, nabilone, has been provided to several investigators for evaluation an an antiemetic agent; it has been licensed for use in Canada for treatment of nausea associated with cancer treatment. In the largest clinical study to date (Herman et al., 1979), nabilone was compared with prochlorperazine in a double-blind crossover trial. It was found more effective than

prochlorperazine. The patients in that study preferred nabilone to prochlorperazine; the predominant side-effects were somnolence, dry mouth, and dizziness. Hallucinations occurred in a few patients. Euphoria of the type associated with cannabis was infrequent in that study. However, a study in dogs has revealed previously unrecognized late neurologic effects of nabilone at high doses (Archer et al., 1981). Monkeys and rats did not show similar toxic effects with long-term administration of nabilone (Archer et al., 1981), and further studies will be necessary to clarify the safety of this new agent.

Levonantradol is yet another synthetic cannabinoid, related to Δ-9-THC, which has been shown in preliminary clinical studies to have antiemetic action in patients with refractory chemotherapy-induced emesis (Diasio et al., 1981).

Uncontrolled Use of Δ-9-THC

In response to public and political pressures, the National Cancer Institute, the United States Drug Enforcement Agency, and the Food and Drug Administration have agreed to a program whereby the National Cancer Institute is making Δ-9-THC available through the pharmacies of approximately 500 teaching hospitals and cancer centers to physicians who wish to use Δ-9-THC in treating the nausea and vomiting of patients receiving cancer chemotherapy. This broad, uncontrolled program, in which no data other than the reporting of severe reactions are to be collected, may make it extremely difficult to obtain continuing valid evaluations of the effectiveness of Δ-9-THC in the management of nausea and vomiting due to cancer chemotherapy. Although the extent of use of Δ-9-THC under this program is difficult to evaluate, informal communication with the National Cancer Institute indicates that Δ-9-THC has been supplied in substantial quantities to several hundred hospital pharmacies. The problem is further complicated by the fact that the legislatures of 23 states have authorized the use of cannabis by any physician for the management of nausea and vomiting due to cancer chemotherapy. It is expected that little reliable information will be derived from such use.

Summary

There seems little doubt that Δ-9-THC and other cannabinoids are active against the severe nausea and vomiting produced by cancer chemotherapeutic agents. The extent of this activity, its relation to other antiemetics, and its relation to the other effects of the cannabinoids have not yet been accurately determined.

Cannabis leaf, smoked or eaten, is also antiemetic but its activity has been even less well determined than that of Δ-9-THC. Studies with other synthetic cannabinoids have barely begun and much remains to be learned in this field.

APPETITE STIMULANT

It has been stated by "social" users that the smoking of cannabis increases appetite. On that basis, there have been sporadic attempts to use it in patients with advanced cancer to overcome their customary debilitating weight loss.

In several of the studies in which Δ-9-THC was used as an antiemetic in patients receiving cancer chemotherapy, they were reported to have increased appetite and food intake. At this time, it is not certain whether that increase was due merely to relief of nausea and vomiting or to stimulation of appetite. One comparison of habitual marijuana users and controls matched for age and educational background showed increased caloric intake and weight gain among the users (Greenberg, et al., 1976). Furthermore, a double-blind controlled study (Hollister, 1971) of smokers of cannabis or placebo cigarettes provided with unlimited quantities of a high-caloric beverage indicated an increase in caloric consumption in those using cannabis compared with those using the placebo; however, the variability was very large and there was some question that cannabis could be considered a clinically significant appetite stimulant.

In another study of the psychological effects of Δ-9-THC in patients with advanced cancer, it was observed that Δ-9-THC appeared to stimulate appetite and retard weight loss (Regelson et al., 1976). In that study many patients refused to complete the 2-week trial because of unacceptable side-effects from Δ-9-THC.

The evidence to date suggests that there may be some influence of cannabis on appetite. However, it is not possible to separate that from the effect on nausea and vomiting. Further studies are in progress in cancer patients whose course is not complicated by nausea and vomiting.

ANTICONVULSANT ACTION

A large number of animal studies have been conducted using cannabis as an anticonvulsant. These can be divided into several categories. The first to be discussed will be maximal electroshock seizures (MES)* both in the rat and mouse (Loewe and Goodman, 1947; Sofia et al., 1971; Fujimoto, 1972; Consroe and Man, 1973; Karler et al., 1973; Chesher and Jackson, 1974; Karler et al., 1974; McCaughran et al., 1974; Karler and Turkanis, 1976; Consroe and Wolkin, 1977; Turkanis et al., 1977). In these studies there is a clear dose-response effect in the protection to MES conferred by cannabinol (CBN) and cannabidiol (CBD). Tolerance to the effect has frequently been reported. However, the tolerance noted with cannabinoids is similar to that seen with phenytoin (DPH). Further, even though tolerance to phenytoin develops with MES, this has not been shown to

*Electrical shock of maximum intensity to cause a major seizure.

be a clinically significant phenomenon. In these studies it is generally found that CBN is less effective against MES and against audiogenic seizures, the latter produced in rodents by loud noise, than CBD. In addition, Turkanis et al. (1977) have emphasized the fact that CBD acts more like DPH than other anticonvulsants and hence would be expected to be effective against major seizures rather than against minor seizures.

There is also extensive animal literature that CBN and CBD will protect against electrically induced, minimal (kindling) seizures (Corcoran et al., 1973; Fried and McIntyre, 1973; Izquierdo et al., 1973; Turkanis et al., 1977, 1979). Reduction of seizures produced by subcortical electrical stimulation in the cat has been reported (Wada et al., 1973). There appears to be much less effect on pentylenetetrazol-induced seizures (Consroe and Man, 1973; Turkanis et al., 1979). Any effect of CBN and CBD on such seizures occurs with maximal toxic doses (Turkanis et al., 1974). Protection against audiogenic seizures (Consroe et al., 1973) and against reflex seizures in the gerbil (Cox et al., 1975) have been reported.

Human studies are largely anecdotal and conflicting. There is one study by Cunha et al. (1980) in which 15 patients suffering from partial complex epilepsy with a temporal focus were randomly divided into two groups. Each patient received, in a double-blind procedure, 200-300 mg of CBD or placebo daily. The drugs were administered for as long as 4 1/2 months. Throughout the study, clinical and laboratory examinations, electroencephalograms, and electrocardiograms were performed at 15- to 30-day intervals. The patients continued their anticonvulsant medications taken before entering the study, on which all them had previously experienced uncontrolled seizures. All patients tolerated CBD well, and there were no signs of toxicity or serious side-effects. Four of the 8 CBD subjects remained nearly free of convulsions during CBD treatment and 3 other patients demonstrated partial improvement in their clinical condition. Cannabidiol was ineffective in 1 patient. The placebo group showed no alteration of seizure frequency. A series of 8 healthy volunteers given CBD showed no effects of the drug.

Summary

There is substantial evidence from animal studies to indicate that cannabinoids are effective in blocking both kindling seizures and MES, and this is particularly true for CBD. MES is a standard testing procedure for evaluation of anticonvulsant drugs. This is strong support for further investigation into the utility of CBD in human epilepsy. The one available carefully controlled human study is in accord with this review.

MUSCLE RELAXANT ACTION

There are widespread, anecdotal reports that cannabis is effective in relieving muscle spasm or spasticity. Petro (1980) has reported such effects in two cases and has carried out a double-blind study of the administration of Δ-9-THC on spasticity (Petro and Ellenberger, 1981). They reported that 10 mg of Δ-9-THC significantly reduced spasticity by clinical measurement and that quadriceps electromyograms demonstrated a decrease in interference pattern in four patients with primarily extensor spasticity. These are preliminary observations, but they suggest that further and more rigorous investigations of the use of cannabinoids in spasticity should be suggested to test their therapeutic effectiveness.

ANTIASTHMATIC EFFECT

Intensive, chronic smoking of concentrated cannabis produces several adverse effects on the airways, including mild bronchoconstriction. But acute smoking of cannabis as well as the ingestion of Δ-9-THC produces bronchodilation in normals and in subjects with chronic, clinically stable bronchial asthma of minimal to moderate severity (Tashkin et al., 1974). These bronchodilator effects were also investigated in individuals in whom an asthmatic attack was induced experimentally by exercise or methalcholine (Tashkin et al., 1975). Immediately after the development of bronchospasm, subjects smoked a cigarette containing 500 mg of cannabis assayed at either 1 or 2 percent Δ-9-THC.

Methalcholine inhalation promptly caused significant bronchoconstriction (an average decrease in airway conductance of 40-55 percent) and significant hyperinflation (mean increases in thoracic gas volume of 35-43 percent). After placebo smoking or saline inhalation, airway conductance increased only modestly, remaining significantly less than initial control values for 30 to 60 minutes, and thoracic gas volume decreased only gradually, remaining significantly increased for 15 minutes. However, after 2 percent cannabis, and after isoproterenol, there was a prompt return of airway conductance and thoracic gas volume to control values.

Exercise in the asthma-prone individual resulted in average decreases in airway conductance of 30-39 percent and average increase in thoracic gas volume of 25-35 percent. After placebo or saline, there was only a gradual return to control values during 30-60 minutes, but after cannabis, airway conductance and thoracic gas volume returned promptly to preexercise values. Four of the subjects who had previously used cannabis could detect pleasurable sensations after smoking cannabis, which distinguished these effects from those of the placebo cigarette. In that sense these experiments were not strictly blind. The four subjects who had no previous experience with cannabis did not experience any central nervous system effects but did note mild somolence or light-headedness after cannabis. The results of this study suggest that any bronchial irritant effects of

placebo cannabis smoke were not sufficient to aggravate or perpetuate existing acute bronchospasm to an extent greater than that which might result from the irritant effect of inhaled saline. The results also demonstrate that inhaled Δ-9-THC causes a prompt and complete sustained reversal of methacholine-induced bronchospasm and correction of the associated hyperinflation. These effects were not significantly different from those observed after isoproterenol, although there was a tendency toward a greater degree of bronchial dilation after isoproterenol. Similarly, after inhalation of Δ-9-THC, there was a prompt return of airway conductance and thoracic gas volume during exercise-induced bronchospasm to the preexercise value. After exercise the effects of 10 mg Δ-9-THC was not as efficacious as 1.25 mg isoproterenol.

The way in which Δ-9-THC induces bronchial dilation has not been determined, but previous studies have shown that this effect is not mediated by beta-adrenergic stimulation or inhibition of muscarine receptors (Shapiro et al., 1973). A vagolytic mechanism is possible, as suggested by other studies carried out on the dog salivary gland (Cavero et al., 1972) and on guinea pig ileum (Gill et al., 1970).

Although ingestion of Δ-9-THC in a sesame oil vehicle has produced bronchodilation in asthmatic patients (Tashkin et al., 1974), less dilation was noted than after smaller doses of Δ-9-THC delivered by smoking. Its significant bronchodilator effect notwithstanding, Δ-9-THC does not appear to be suitable for that therapeutic use, because of its psychotropic effects and possibly other side-effects. However, other cannabinoid compounds such as cannabinol and cannabidiol do not produce the central nervous system effects of tachycardia characteristic of cannabis (Hollister, 1973) and deserve further investigation for possible bronchodilator activity.

ANTIANXIETY EFFECT

Users of cannabis have often reported that the drug produces feelings of relaxation and calmness, and some have reported its use to reduce anxiety. A problem with evaluating cannabis as an antianxiety drug, however, is that some subjects report increased anxiety or panic after using cannabis (see Chapter 6). For example, Regelson et al. (1976) found less tension and apprehension in cancer patients after cannabis use; but 6 of 50 subjects receiving Δ-9-THC reported such side-effects as severe dizziness, confused thinking, dissociation, and concern over loss of sanity. In normals, Pillard et al. (1974) found no effects of cannabis on experimentally induced anxiety. Nabilone, a synthetic cannabinoid, was found to reduce experimentally induced anxiety in normal volunteers but it was less effective than diazepam (Nakano et al., 1978). Nabilone was found to be more effective than placebo in patients with psychoneurotic anxiety (Fabre et al., 1978).

There are very few studies of cannabis effects on anxiety. There is no indication at this time that cannabis or nabilone are

more effective or reliable than currently available antianxiety medication.

ANTIDEPRESSANT EFFECT

Regelson et al. (1976) reported a significant reduction in self-rated depressive symptoms in cancer patients treated with Δ-9-THC. However, in a carefully controlled trial with four bipolar and four unpolar depressed patients, Kotin et al. (1973) found no antidepressant activity.

ANALGESIC ACTION

Several animal models have been used to show analgesic effects of cannabis and its analogues (for example, Grunfeld and Edery, 1969; Sofia et al., 1973). Human studies have been conflicting. Milstein et al. (1975) found increase in tolerance to experimentally induced pain after smoking cannabis, while Hill et al. (1974) were unable to detect effects using a different kind of experimental pain. Noyes et al. (1976) found a reduction in pain reports by cancer patients given oral Δ-9-THC; Regelson et al. (1976) also studied cancer patients and found no significant changes in pain after Δ-9-THC.

Those subjects who show analgesic effects of cannabis also show other pharmacological effects such as mental clouding. The literature does not indicate a specific effect of cannabis on pain pathways nor does it suggest that cannabis is likely to be more effective than currently available analgesics.

ALCOHOLISM

Cannabis has been proposed as a treatment for alcoholism (Scher, 1971) based upon case reports and on the observation that cannabis and alcohol were generally not used together. A systematic evaluation (Rosenberg et al., 1978) failed to find cannabis useful in alcoholism. Moreover, recent surveys (see Chapter 2) indicate that currently the abuse of cannabis and alcohol are frequently combined.

OPIATE WITHDRAWAL

Early clinical reports suggested that cannabis might be useful in suppressing the symptoms of opiate withdrawal (Birch, 1889; Thompson and Proctor, 1953). Recently a series of animal studies (Hine et al., 1975a,b; Bhargava, 1976) have found that Δ-9-THC suppresses many of the behavioral manifestations of withdrawal precipitated by naloxone in morphine dependent rodents. This effect is enhanced by cannabidiol (CBD) (Hine et al., 1975a,b), but CBD is not effective alone.

There are no reports of systematic evaluations of cannabis as a treatment of opiate withdrawal in human beings. The animal studies do not present evidence that cannabis is likely to be more effective than currently available treatments for opiate withdrawal.

ANTITUMOR ACTION

There is very little information about the effects of cannabis on neoplasms. In one study (Harris et al., 1976), minor effects were seen on the Lewis Lung Tumor but not in L1210 leukemia. In another study (White et al., 1976), it was found that Δ-9-THC inhibited tumor DNA replication somewhat. In that same study, cannabidiol appeared to have a growth enhancing effect on the Lewis Lung Tumor. These limited studies do not support a view that Δ-9-THC has a useful effect in inhibiting tumor growth.

SUMMARY

Cannabis and its derivatives have shown promise in the treatment of a variety of disorders. The evidence is most impressive in glaucoma, where their mechanism of action appears to be different from the standard drugs; in asthma, where they approach isoproterenol in effectiveness; and in the nausea and vomiting of cancer chemotherapy, where they compare favorably with phenothiazines. Smaller trials have suggested cannabis might also be useful in seizures, spasticity, and other nervous system disorders. Effective doses usually produce psychotropic and cardiovascular effects and can be troublesome, particularly in older patients.

Although marijuana has not been shown unequivocally superior to any existing therapy for any of these conditions, several important aspects of its therapeutic potential should be appreciated. First, its mechanisms of action and its toxicity in several diseases are different from those of drugs now being used to treat those conditions; thus, combined use with other drugs might allow greater therapeutic efficacy without cumulative toxicity. Second, the differences in action suggest new approaches to understanding both the diseases and the drugs used to treat them. Last, there may be an opportunity to synthesize derivatives of marijuana that offer better therapeutic ratios than marijuana itself.

RECOMMENDATIONS FOR RESEARCH

The committee believes that the therapeutic potential of cannabis and its derivatives and synthetic analogues warrants further research along the lines described in this chapter. There also may be significant heuristic benefits to be derived from the study of the biological mechanisms by which these compounds act.

Some therapeutic promise seems to be offered by synthetic cannabinoid analogues. The committee recommends that particular attention be paid to the treatment of chemotherapy-induced nausea and vomiting in cancer patients because current management of this important and widespread problem is inadequate and preliminary studies suggest that cannabinoids may have some special advantage. Cannabinoids or their analogues also may find a place in the management of resistant glaucoma, of severe intractable asthma, and of certain forms of seizures that are resistant to standard therapy. Continued carefully contracted clinical trials in these areas seem worthwhile at this time, as do studies of the usefulness of cannabinoids in the treatment of muscle spasticity.

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8

FEDERAL SUPPORT OF RESEARCH ON MARIJUANA

PRESENT SOURCES AND AMOUNTS OF SUPPORT

In this chapter the committee has examined sources and amounts of federal support for research on cannabis and the areas of research support. The committee has not analyzed the scientific substance of the work, nor has it examined the strategy of research support or reviewed current unpublished research.

The overall federal support for research on cannabis for the fiscal years 1977, 1978, and 1979 has averaged slightly more than $4 million per year in real dollars (Table 4). During these years, 11 federal agencies allocated funds for this purpose. Of these, the National Institute on Drug Abuse (NIDA) has been the principal agency, accounting for over four-fifths of the total, therefore, our analysis will focus primarily on this agency.

For fiscal years 1975 through 1980, NIDA's support of research on cannabis amounted to $4.5, $2.9, $3.9, $3.6, $3.5, and $3.8 million, respectively, in real dollars, but in constant 1981 dollars, corrected by the GNP deflator, the same figures were $7.0, $4.2, $5.4 $4.6, $4.2, and $4.1 (Table 5). Although the total research budget of this agency for those years increased by approximately $12 million (real dollars), the percent spent on cannabis declined from 14.2 to 8.2 (Table 5). During the same period, the total number of projects on cannabis supported by NIDA was reduced by approximately 50 percent; however, the cost per project increased from $42,700 to $71,400 (real dollars). This increased cost per project is still somewhat lower than the mean cost of all projects funded by the National Institutes of Health in 1980 (Leventhal, 1981).

Table 6 shows the NIDA extramural research programs for fiscal years 1975 through 1981, allocated according to the type of drug being studied. In FY 1975 research on cannabis was allocated only 13 percent of the total extramural budget, whereas narcotics and narcotic antagonists received more than 40 percent. Thereafter, the percentage devoted to cannabis declined, to a low of 8 percent in FY 1979, but started to rise again slightly in FY 1980 and FY 1981. In the last year, an estimated 11 percent of the budget was spent on cannabis research. The percent of the budget allocated to narcotics and narcotic antagonists has declined steadily, while the percentages

TABLE 4 Cannabis Research by Federal Agency: FY 1977-1979 (real dollars in thousands)

	Total (77) No. of grants	Funds	Percent	Total (78) No. of grants	Funds	Percent	Total (79) No. of grants	Funds	Percent
ADAMHA[b]									
NIDA	75	3,940	90	64	3,596	88	65	3,536	84
NIMH	8	167	4	8	214	5	7	207	5
NIAAA	2	8	[a]	5	85	2	6	122	3
NIH									
NCI	4	91	2	2	80	2	2	85	2
NEI	--	--	0	3	68	2	1	36	1
NICHD	--	--	0	1	13	[a]	1	15	[a]
NIRR	--	--	0	2	26	0	--	--	0
NIGMS	--	--	0	--	--	0	1	9	[a]
OTHER AGENCIES									
VA	7	52	1	6	26	1	8	25	1
DOT	5	55	1	1	--	[a]	2	104	2
USDA	1	41	1	-	--	0	1	85	2
TOTAL	102	4,354		92	4,106		94	4,202	

[a] less than 1 percent.

[b]

ADAMHA Alcohol, Drug Abuse and Mental Health Administration
DHHS Department of Health and Human Services
DOT Department of Transportation
NCI National Cancer Institute
NEI National Eye Institute
NIAAA National Institute on Alcohol Abuse and Alcoholism
NICHD National Institute of Child Health and Human Development
NIDA National Institute on Drug Abuse
NIGMS National Institute of General Medical Sciences
NIH National Institutes of Health
NIMH National Institute of Mental Health
NIRR National Institute of Research Resources
VA Veterans Administration
USDA Department of Agriculture

Source: Adapted from information provided by NIDA.

TABLE 5 Total Research and Research on Cannabis in NIDA Budget

	FY '73	FY '74	FY '75	FY '76	FY '77	FY '78	FY '79	FY '80	FY '81
Total NIDA research budget (real dollars, thousands)	31,600	34,000	34,046	33,760	33,994	33,986	42,930	45,972	40,400
Total NIDA research budget (constant 1981 dollars, thousands)	58,500	58,700	53,500	49,600	46,800	43,800	51,000	50,300	40,400
Cannabis research budget (real dollars, thousands)	[a]	[a]	4,483	2,853	3,940	3,596	3,536	3,788	[a]
Cannabis research budget (constant 1981 dollars, thousands)	[a]	[a]	7,043	4,191	5,421	4,636	4,201	4,144	[a]
Percent cannabis research	[a]	[a]	14.2	9.1	11.6	10.6	8.2	8.2	[a]
Total cannabis projects (real dollars, thousands)	[a]	[a]	105	82	75	64	65	53	[a]
Mean cannabis project cost (real dollars, thousands)	[a]	[a]	42.70	34.8	52.5	56.2	54.4	71.5[b]	[a]
Mean cannabis project cost (constant 1981 dollars, thousands)	[a]	[a]	67.1	51.1	72.3	72.5	64.6	78.2	[a]

[a]Data unavailable at present time.
[b]Mean NIH Project Cost (1980) was 105.

Source: Adapted from information provided by NIDA.

TABLE 6 NIDA Extramural Research Program, Distribution by Drug (real dollars in thousands)

Drug Class	FY 1975 Amount	%	FY 1976 Amount	%	FY 1977 Amount	%	FY 1978 Amount	%	FY 1979 Amount	%	FY 1980 Amount	%	FY 1981E Amount	%
Cannabis	4,104	13	3,694	12	3,532	11	3,114	10	3,263	8	3,683	9	4,500	11
Depressants	1,642	5	1,527	5	1,976	6	1,557	5	1,123	3	1,695	4	1,000	3
Hallucinogens	316	1	729	2	1,572	5	1,515	5	2,358	6	2,065	7	3,000	7
Narcotics	9,787	31	11,298	36	11,766	37	9,341	30	8,947	23	10,667	25	10,000	25
Narcotic antagonists	3,473	11	3,061	10	3,017	10	3,526	11	3,879	10	2,304	5	2,800	7
Stimulants	1,926	6	2,360	8	2,291	7	2,535	8	2,770	7	3,277	8	4,000	10
Volatiles/solvents	158	1	363	1	496	2	556	2	294	1	270	1	500	1
Tobacco	--	--	--	--	110	0	934	3	1,130	3	2,973	7	3,200	8
Endogenous substances	--	--	--	--	--	--	1,337	4	2,717	7	2,607	6	3,400	8
Polydrug, unspecified, other	10,169	32	8,166	26	6,731	22	6,721	22	12,206	32	11,875	28	8,008	20
TOTAL	31,575	100	31,198	100	31,491	100	31,138	100	38,775	100	42,024	100	40,408	100

Estimate.

Source: Adapted from information provided by NIDA.

devoted to hallucinogens, stimulants, and "endogenous substances" have increased.

In FY '80, only $3,683,000 (9 percent) of the extramural budget was devoted to cannabis research. Almost as much was spent that year by NIDA on stimulants and on tobacco. For comparison, the National Cancer Institute's budget for its program "Smoking and Health" was $13.2 million in FY '80, of which $3.9 million was allocated for tobacco research (Little, 1981). The National Heart, Lung, and Blood Institute allocated $8.2 million to study the effects of cigarette smoking on the cardiovascular repiratory system (Hurd, 1981).

AREAS OF RESEARCH SUPPORT

Cannabis research essentially began in the late 1960s with a National Institute of Mental Health program to produce "pedigreed" cannabis for research investigators. NIDA, which was created in 1972, started with an extramural budget of $29.6 million and an intramural budget of $4.0 million for fiscal year 1973 (Ludford, 1981). In the early 1970s, NIDA's major thrusts were (a) supplying (to researchers) standardized marijuana of a known concentration of Δ-9-THC and of known genetic stock, (b) facilitating administrative mechanisms, and (c) attempting to understand the problem of drug abuse, e.g., how many people use the drug, what are the acute effects, and what are its implications (Petersen, 1981).

Recently, NIDA's emphasis has shifted to studying certain groups, e.g., children, adolescents, and pregnant women, especially with respect to the long-term effects of cannabis on these groups (Petersen, 1981). The NIDA program plan for fiscal year 1982 stresses that chronic and acute studies need to be conducted on the effects of cannabis and other drugs of abuse on women and adolescents, with a special emphasis on: (a) in-depth behavioral and biological studies of the amotivational syndrome ("burn-out"), and (b) the development of approaches to treatment. Also specifically targeted are studies of the effects on brain function and structure.

Table 7 presents the NIDA projects on cannabis for fiscal years 1978, 1979, and 1980 stratified by research goal. These research goals are defined in the footnote to the table. For fiscal years 1978, 1979, and 1980, most of the money devoted to research on cannabis (approximately $3 million annually) was spent in three areas: (1) hazards of cannabis use, (2) basic research, and (3) research support. This last goal includes the growth, processing, packaging, and distribution of cannabis, as well as the development of the Δ-9-THC capsule. It is instructive to compare this distribution of cannabis funds with the distribution of the total research funds of NIDA. In FY '80, research on hazards took only 12 percent of the total NIDA research budget, basic research 42 percent, and research support 19 percent (Pollin, 1981).

The allocation of funds, by research topic, for fiscal years 1978, 1979, and 1980 is presented in Table 8. The largest proportion of the funds has been allocated to two research topics: (1) drug

TABLE 7 NIDA Cannabis Projects by Research Goal: FY 1978-1980
(real dollars in thousands)

Goals	FY 1978	FY 1979	FY 1980
1. Epidemiology	238	54	61
2. Etiology	145	133	136
3. Prevention	77		48
4. Hazards	916	990	1,236
5. Therapeutic uses of cannabis	43	49	50
6. Treatment of cannabis abuse	11	2	82
7. Basic research	972	1,295	1,036
8. General research support	1,194	1,013	1,139
TOTAL	3,596	3,536	3,788

1. Epidemiology--to determine the incidence, prevalence, trends, and distribution of drug abuse by sex, race, geographic origin, and other special characteristics.

2. Etiology--to determine the etiologic factors associated with drug abuse, including those combinations of biological, psychological, and societal factors most associated with increased risk for misuse and/or abuse of drugs.

3. Prevention--to develop and test new strategies and methods which might decrease, postpone, or modify drug-abusing behavior

4. Hazards--to determine the hazards of drug abuse to the physical and mental health of the individual and its adverse effects on society.

5. Therapeutic uses--to study the effectiveness and safety of cannabis in the treatment of various medical conditions.

6. Treatment--to determine the most effective therapeutic procedures for reducing drug abuse including new and innovative treatment methods and development of more effective drugs to be used in treatment.

7. Basic research--to advance basic knowledge of the pharmacology, biochemistry, and neurophysiology of drugs, the basic mechanisms involved in drug tolerance, and dependence and the underlying processes involved in addictive and/or habitual behaviors.

8. Research support--to develop the methodological and support resources required to further drug abuse research; to provide for the publication and evaluation of research results, the analysis and supply of controlled substances, and the development of chemical methods to detect and assay drugs.

Source: Adapted from information provided by NIDA.

TABLE 8 NIDA Cannabinoid Projects by Research Topic: FY 1978-1980 (real dollars in thousands)

	FY 1978	FY 1979	FY 1980
Assay and models	482	302	268
Drug development, synthesis, and distribution	706	756	950
Psychophysiology	54	76	16
Performance (esp. driving)	193	111	76
Reproduction and development	491	864	849
Behavioral studies	124	62	15
Other drug effects/toxicity	397	347	440
Metabolism and pharmacokinetics	261	446	259
Immunology	69	85	--
Drug interactions	--	64	97
Chemistry	67	58	103
Mechanism of tolerance and dependence	285	174	134
Cultural/ethnic	195	45	69
Patterns and lifestyle	57	80	127
Crime/law	137	66	337
Abuse liability	76	--	48
TOTAL	3,594[a]	3,536	3,788

[a]Due to rounding of numbers, the total value is not exactly the same as in Table 7.

Source: Adapted from information provided by NIDA.

development, synthesis, and distribution; and (2) drug effects on reproduction and development.

Grants, Contracts, and Intramural Projects

Tables 9 through 11 compare the number of grants, contracts, and intramural projects on cannabis, as well as the funds expended by each agency for fiscal years 1977, 1978, and 1979. In each of these years, most of the extramural awards and most of the money involved investigator-initiated research grants. The ratio of grant to contract funds rose during this period from approximately 1.5 in FY '77 to almost 3.0 in FY '79. For NIDA as a whole, that ratio has consistently been much higher; in FY '79, for example, the funding of grants was more than five times that of contracts.

Support of investigator-initiated research grants requires that grant applications be approved by a peer review committee. In the peer review process, each approved grant is given a priority score based on scientific merit of the proposal (scaled from 100 to 500, with 100 the highest). This priority score determines the order in which available funds are dispersed. The award rate for all drug research supported by NIDA is shown in Table 12. The percentage of grants recommended for approval has increased slightly over recent years, as has the total number of grant applications. However, the percent of approved grants that has been funded has gone down sharply, as shown in the table. For FY '81 it is estimated that only 25 percent of all applicants were ultimately funded. The priority score at the 90th percentile of funded applications has also been declining, and in 1981 was estimated at 190. These data suggest that there has been no decline in the quality of funded grants--if anything, the quality has risen during the past few years.

The number of investigator-initiated projects has decreased slightly but still exceeds the number of contracts and intramural projects. Grants generally are for a period of 3 years (renewable on a year-to-year basis), with a maximum period of 5 years (Petersen, 1981). Contract projects are funded on a year-to-year basis and are mainly concerned with the growth, processing, packaging, and distribution of cannabis, as well as with the development of the Δ-9-THC capsule.* A few studies are conducted on toxicology and pharmacokinetics (Petersen, 1981). For fiscal years 1977, 1978, and 1979, the number of contracts has declined: 16, 14, and 10, respectively. However, the requests for proposals for fiscal years 1980 and 1981 have increased to 12 and 14, respectively (Ludford, 1981).

Intramural projects account for a small portion of the budget; for fiscal years 1977, 1978, and 1979, they have been declining.

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*NIDA has requested that the NIH take over the cost and distribution of the drugs for clinical studies (Snyder, 1981).

TABLE 9 Cannabinoid Research by Agency: FY 1977
(real dollars in thousands)

	Grants		Contracts		Intramural		Total	
	No.	Funds	No.	Funds	No.	Funds	No.	Funds
ADAMHA								
NIDA	55	2,267	16	1,629	4	44	75	3,940
NIMH	8	167	--	--	--	--	8	167
NIAAA	2	8	--	--	--	--	2	8
NIH								
NCI	4	91	--	--	--	--	4	91
NEI	--	--	--	--	--	--	--	--
NCHD	--	--	--	--	--	--	--	--
NIRR	--	--	--	--	--	--	--	--
NIGMS	--	--	--	--	--	--	--	--
OTHER AGENCIES								
VA	--	--	--	--	7	52	7	52
DOT	--	--	2	55	--	--	2	55
USDA	--	--	--	--	1	41	1	41
TOTAL	69	2,533	18	1,684	12	137	99	4,354

Source: Adapted from information provided by NIDA.

SUMMARY OF FINDINGS

Total federal support for research on cannabis has been declining in real dollars over the past 3 years. Most of that support comes from the NIDA research budget, which allocates approximately 10 percent of its resources to this purpose. The current level of funding, under 4 million dollars, supports only about 50 extramural projects and represents only one-tenth of the total research program of NIDA. This decline in support has inexplicably occurred during a period when the concern of the public and of all levels of government seems to be rising. It cannot be explained by lack of interest in the field, for research grant applications have risen; neither can it be

TABLE 10 Cannabinoid Research By Agency: FY 1978
(real dollars in thousands)

	Grants		Contracts		Intramural		Total	
	No.	Funds	No.	Funds	No.	Funds	No.	Funds
ADAMHA								
NIDA	47	2,104	14	1,460	3	30	64	3,594
NIMH	5	158	--	--	3	56	8	214
NIAAA	5	85	--	--	--	--	5	85
NIH								
NCI	2	80	--	--	--	--	2	80
NEI	3	68	--	--	--	--	3	68
NCHD	1	13	--	--	--	--	1	13
NIRR	2	26	--	--	--	--	2	26
NIGMS	--	--	--	--	--	--	--	--
OTHER AGENCIES								
VA	--	--	--	--	6	26	6	26
DOT	--	--	1	[a]	--	--	1	[a]
USDA	--	--	--	--	--	--	--	--
TOTAL	65	2,534	15	1,460	12	112	92	4,106

[a]Indicates a funding level of less than $1000.

Source: Adapted from information provided by NIDA.

attributed to lack of scientific opportunity; for every area we have studied, the committee has identified important questions that seem amenable to new research efforts. (Many of these have been enumerated in the preceding chapters.)

In FY '80, NIDA spent a nearly equal amount on stimulant drugs and more than four times as much on narcotics and narcotic antagonists. Most of the cannabis research is devoted to three areas in approximately equal amounts: (1) growth, processing and distribution; (2) hazards of cannabis use; and (3) basic research. Three quarters of all the federal research money devoted to cannabis goes to

TABLE 11 Cannabinoid Research by Agency: FY 1979
(real dollars in thousands)

	Grants		Contracts[a]		Intramural		Total	
	No.	Funds	No.	Funds	No.	Funds	No.	Funds
ADAMHA								
NIDA	54	2,608	10	925	1	3	65	3,536
NIMH	4	145	--	--	3	62	7	207
NIAAA	6	122	--	--	--	--	6	122
NIH								
NCI	2	85	--	--	--	--	2	85
NEI	1	36	--	--	--	--	1	36
NICHD	1	15	--	--	--	--	1	15
NIRR	--	--	--	--	--	--	--	--
NIGMS	1	9	--	--	--	--	1	9
OTHER AGENCIES								
VA	--	--	--	--	8	25	8	25
DOT	--	--	2	104	--	--	2	104
USDA	--	--	1	85	--	--	1	85
TOTAL	69	3,020	13	1,114	12	90	94	4,224

[a]FY '80: RFP 12
FY '81: RFP 14

Source: Adapted from information provided by NIDA.

investigator-initiated extramural research grants, and most of the rest to extramural contracts. There is relatively little intramural research. The fraction of NIDA grants approved is about 60 percent, but the fraction funded is slightly more than half of that. The total number of cannabis research grants is declining steadily as support (in constant dollars) continues to fall and the average cost of a project (in constant dollars) goes up.

The committee believes that the magnitude of the problem, and the extent and depth of public concern about the consequences of marijuana use warrant more support of research in this field.

TABLE 12 Drug Abuse Research Grant Award Rates and Priority Scores

	1979 Actual	1980 Actual	1981 Estimate	1982 Estimate
Applicants received (number)	359	369	382	360
Percent recommended for approval	59	62	63	62
Percent funded of those approved during year	63	57	40	27
Percent funded of all applicants	37	35	25	20
90 percent priority score	244	230	190	170

Source: Adapted from information provided by NIDA.

Emphasis should be on studies of human beings and other primates, and investigator-initiated research grants should continue to be the primary vehicle of support.

RECOMMENDATIONS

In view of the demonstrated high potential of risk to human health that has been associated with the use of cannabis, the existing funds allocated to such research are not appropriate. The committee's recommendations to federal agencies regarding support of cannabis-related research are:

- More support of cannabis research is needed. Properly allocated, it could pay large dividends in new knowledge and could help to dispel present ignorance in many areas. Without this new information, the present level of anxiety and controversy over the use of marijuana is not likely to be resolved in the forseeable future. Furthermore, we are not likely to improve our present slow progress in developing information about possible therapeutic uses of cannabis and its analogues without the stimulus of increased research grant support. At the end of each of the chapters, we have pointed out opportunities or problems that are ripe at this time.
- A larger proportion of NIDA resources could justifiably be allocated to cannabis research. Without wishing to minimize the value of any of the other drug research programs now supported by NIDA, we believe that the magnitude and social urgency of the marijuana problem warrant a higher priority for cannabis research

than it has apparently received to date. A drug that is currently used by about a third of all American high school seniors, and daily by about one in eleven, deserves more study than we currently are giving it. No other illicit drug is used as widely by our youth, and yet NIDA spent only 9 percent of its research budget on it in FY '80.

- NIDA would be advised to continue its recent policy of reducing the relative proportion of contracts and emphasizing grants. Although we believe that there is need for federal initiatives in stimulating work in neglected areas of current concern, the bulk of research suport should continue to go to investigator-initiated projects.
- The duration for investigator-initiated research should be lengthened beyond the average 3-year period in order to attract and hold good researchers.
- Other agencies should contribute funds for the production, processing, and distribution of cannabis.
- A scientific advisory group should be formed to assist in providing scientific evidence and guidance to the director of NIDA.
- An increased interagency effort targeted toward specific problems not readily addressed by other approaches is required. These would include, for example, human long-term studies, as well as studies in epidemiology, prevention, and treatment. Funds should be contributed by all agencies.
- Research on human beings and other primates should be encouraged, particularly studies in the young. There is a special need at this time for good epidemiological studies that follow identifiable cohorts of marijuana users over a period of time.

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Appendix

A

WORK OF THE COMMITTEE

To conduct this study, the Institute of Medicine established a committee of experts drawn from relevant disciplines, including clinical medicine, epidemiology, pharmacology, psychiatry, and toxicology. This steering committee's expertise was augmented by consultants, as well as by many other persons serving as panel members. Six panels, each chaired by a committee member, were formed to carry out a detailed analysis of such special issues as the effects of cannabis use on behavioral and psychosocial development, on reproductive and fetal biology, on cardiovascular and respiratory systems, and to consider neurobiologic, genetic, oncogenic, and cytogenetic issues, and cell biology, including pharmacologic and immunologic aspects. During the early months of the study, the panels met to apportion writing responsibilities, and established the scope and focus of each panel's undertaking. The chronology of the panel meetings follows.

February 3, 1981: Panel on Behavioral and Psychosocial Issues met in Washington
February 18, 1981: Panel on Neurobiological Issues met in Washington
February 26, 1981: Panel on Cardiovascular and Respiratory Issues met in New York City
February 27, 1981: Panel on Genetic/Oncogenic/Cytogenetic Issues met in Washington
March 11, 1981: Panel on Reproductive and Fetal Issues met in Boston
March 16, 1981: Subpanel on Intrapersonal Variables and Social Behavior of the Panel on Behavioral and Psychosocial Issues met in Los Angeles
March 23, 1981: Panel on Cell Biology/Pharmacological and Immunological Issues met in Boston
April 14, 1981: Panel on Behavioral and Psychosocial Issues met in Washington

The steering committee, in the meantime, nominated additional candidates for membership on the panels and committee at its first meeting on December 1, 1980. Subsequently, four more meetings were

held, on April 15, 1981, June 2-3, 1981, August 31-September 1, 1981, and October 26, 1981. The first two were held in Washington, the third meeting was held in Woods Hole, Massachusetts, and the final meeting was held in Washington.

The committee made full use of research in other countries as well as the United States. A special effort was made to coordinate activities with the staff of the Addiction Research Foundation/World Health Organization Conference on Adverse Health and Behavioral Consequences of Cannabis Use. The group's draft report and working papers were made available to the IOM committee. The mandate of this group was to consider the scientific, clinical, and epidemiological information about potential and actual hazards to health.

Because of widespread public interest in the IOM study, a notice was placed in the February 24, 1981, Federal Register to solicit information from the public and from professional groups on the health-related effects of cannabis use. Approximately 90 responses were received from professional organizations, lawyers, medical doctors, scientists, other professionals, and parents. The responses can be divided into three categories:

1. The dangers of marijuana. The majority of responses came from people and groups opposed to cannabis use. Many parents of cannabis smokers (and ex-cannabis smokers) submitted statements about their personal experiences and observations. Included among the groups that responded are the National Federation of Parents for Drug Free Youth, Georgia Congress of Parents and Teachers, the American Lung Association, Drug Information Program of the Crusade Against Crime, the Committees of Correspondence, Phoenix House Foundation, and Pride.

2. The therapeutic potential of marijuana. Responses were received from medical doctors, as well as individuals or their parents, reporting that cannabis had alleviated pain from various medical problems—rheumatoid arthritis, migraine headaches, multiple sclerosis—and had in some cases lessened the side-effects of drugs used in chemotherapy. In most cases the marijuana had to be obtained by unauthorized means, making many of the victims and their families uncomfortable. Several respondents were from the State of Michigan, where a cannabis therapeutic research program has recently been authorized by the state legislature. Responses were also received from the Alliance for Cannabis Therapeutics and the American Medical Association.

3. Support of general use and legalization of marijuana. Responses in this regard were received from lawyers and other individuals, as well as the following organizations: the Ethiopian Zion Coptic Church, the Cannabis Institute of America, the National Organization for the Reform of Marijuana Laws, and the publication High Times. One writer contended that perhaps more people would submit statements if their anonymity were assured.

Appendix

B

ACCESS TO Δ-9-THC AND MARIJUANA FOR RESEARCH AND TREATMENT

The investigational use in human subjects of Δ-9-THC and marijuana are controlled by the Federal Food, Drug, and Cosmetic Act and the Investigational New Drug Regulations issued under that Act. In addition, Δ-9-THC and marijuana are controlled under the provisions of the Controlled Substances Act and currently are controlled in Schedule I of the Controlled Substances Act. Schedule I drugs are those that have: (1) high potential for abuse, (2) no currently accepted medical use in treatment in the United States, and (3) lack of accepted safety for use under medical supervision.

Basically two agencies work together for enforcing the controls of the Act: the Food and Drug Administration (FDA) in the Department of Health and Human Services and the Drug Enforcement Administration (DEA) in the Department of Justice. The Department of Justice was petitioned to reconsider the rescheduling of Δ-9-THC and marijuana in 1972, but to date there has been no change. However, DEA and FDA are now under court order to reconsider this situation. An FDA advisory meeting, held in June 1981, considered the scheduling status of the Δ-9-THC capsule only (Federal Register, 1981). The committee recommended that the Δ-9-THC capsule be changed from Schedule I to Schedule II status when a new drug application for Δ-9-THC is approved by FDA. Schedule II drugs are those that have: (1) a high potential for abuse, (2) a currently accepted medical use in treatment in the United States or a currently accepted medical use with severe restrictions, and (3) abuse that may lead to severe psychological or physical dependence.

Complaints and concerns were expressed to the study committee about the supply and distribution of marijuana and Δ-9-THC for treating chemotherapy side-effects in cancer patients. On the one hand, physicians said that there was poor cooperation from federal agencies engaged in controlling and supplying the drug (Koller, 1981; Monsma, 1981), particularly with respect to (1) potency of Δ-9-THC received (concentrations were too low to be effective), and (2) uncertainty and irregularity of the shipments of the drug. On the other hand, some clinicians felt that it was premature to release Δ-9-THC for use in cancer patients (Moertel, 1981; Cook, 1981) because:

- specific indications have not been established, in that the way in which chemotherapeutic agents cause nausea and vomiting is not known;
- specific populations of patients have not been established;
- effective dose schedules have not been established;
- safety of treatment at doses effective for antiemetic purposes remains in question;
- reported peer-reviewed experience is contradictory and still fragmentary; and
- controlled, randomized, prospective studies have not been conducted.

Depending upon the use of the drug, two different agencies are in charge of supplying marijuana cigarettes and Δ-9-THC capsules; the National Institute on Drug Abuse (NIDA) controls the supply of marijuana cigarettes and/or Δ-9-THC capsules for basic research, and the National Cancer Institute (NCI) controls the supply of Δ-9-THC capsules for cancer treatment. The processes of obtaining supplies from each agency (or for each purpose) differ.

OBTAINING THE MARIJUANA CIGARETTES*

To obtain marijuana cigarettes for basic research,† an investigator must register with DEA (apply for a license), file a Notice of Claimed Investigation Exemption for a New Drug (IND)†† with FDA, and submit an order for drug substance to NIDA. The agencies suggest that all the paperwork be filed concurrently in order not to unnecessarily delay the process. FDA analyzes the scientific protocol and determines if the project has scientific merit, if the researcher is qualified, and if IND requirements are satisfied. DEA sends an agent to supply the order forms, to determine from local police records whether the investigator has a drug trafficking record, and to see if the investigator has provisions for keeping the drug secure from theft. On notification of approval by FDA and DEA, NIDA will supply the drug. The entire process is supposed to take from 30 days to 6 months, including the visit from the DEA (Tocus, 1981). However, some investigators have contended it can take longer.

To obtain marijuana cigarettes (or Δ-9-THC capsules) for investigational treatment of glaucoma, multiple sclerosis, or

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*Concentrations of Δ-9-THC range between 0.5 and 2.8 percent; the marijuana cigarettes contain other cannabinoids, as well as other chemicals.

†DEA and FDA do not fund research. Federal agencies that have supported cannabis research in FY 1979 (in order of percent cannabinoid research) are: NIDA (84), NIMH (5), NIAA (3), NCI (2), DOT (2), USDA (2), NEI (1), NICHG and NIGMS (less than 1).

††Twelve states hold their own IND as of September 1981.

anorexia, the physician must go through the basic research route. In view of the possible contaminant problems with aspergillus and salmonella, it may be necessary to provide sterilized marijuana cigarettes to patients.

OBTAINING THE Δ-9-THC CAPSULES*

As a Schedule I drug, Δ-9-THC can only be used for investigational purposes. However, some cancer patients undergoing chemotherapy treatment and resistant to standard antiemetic drugs benefit from the antiemetic properties of Δ-9-THC. Therefore, a system has been established for the distribution of Δ-9-THC capsules to chemotherapy patients within the guidelines of the Schedule I restrictions.

A physician who wants to dispense Δ-9-THC capsules to his cancer patients does so under NCI Group C distribution system (Group C Guidelines, 1980). The physician sends an FDA registration form to a DEA-approved hospital pharmacy. The pharmacy forwards the application to NCI, which holds its own IND. NCI evaluates the credentials of the physician, and, if approving, informs the pharmacy to supply the physician. This process, under emergency situations, can take as little as 24 hours (Abraham, 1981). A physician may also obtain marijuana cigarettes for cancer patients in an NCI-approved treatment program. More than 500 hospitals have been invited to participate (Abraham, 1981), and about 300 have clearance from DEA (Gunby, 1981). Shipments began late last fall (Gunby, 1981). More than 1,500 physicians have applied, and 1,000 have been approved by DEA (Gunby, 1981). The doses available in capsule form are 2.5 and 5 mg.

At least one company has submitted a New Drug Application (NDA) to the FDA for manufacture of a synthetic Δ-9-THC capsule to treat cancer patients (Federal Register, 1981; Tocus, 1981). If an NDA for Δ-9-THC is approved, a Schedule I status will no longer be appropriate. In fact, the Drug Abuse Advisory Committee† recommended that the Δ-9-THC capsule be changed from Schedule I to a Schedule II status when an NDA is approved by FDA.

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*Purity of Δ-9-THC capsules is better than 96 percent (97-98 percent, C. Turner, 1981, and 100 percent, D. Abraham, 1981).

†The committee advises the Commissioner of Food and Drugs regarding the scientific and medical evaluation of all information gathered by the Department of Health and Human Services and the Department of Justice with regard to safety, efficacy, and abuse potential of drugs and other substances and recommends action to be taken by the Department of Health and Human Services with regard to the marketing, investigation, and control of such drugs or other substances.

SUPPLIERS OF MARIJUANA CIGARETTES AND Δ-9-THC CAPSULES

Marijuana cigarettes are supplied to NIDA by Research Triangle Institute, which stores and distributes them (Davignon, 1981).

Many contractors are engaged in the synthesis, storage, and distribution of Δ-9-THC capsules to NCI. Manufacture is done by Aerojet Propulsion Labs (large scale) and Arthur D. Little (small scale). Stanford Research Institute assays Δ-9-THC. Banner Gelatin encapsulates it. Flow Laboratories stores and ships Δ-9-THC to DEA-approved hospital pharmacies.

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Appendix

C

LONGITUDINAL STUDIES

Appendix C is a review of prospective longitudinal studies of drug use in normal populations listed by completion status, type of sample (school sample, community sample), age of respondents, and year of first contact. Some of the studies are ongoing.

Characteristics of Longitudinal Studies of Drug Use in Normal Populations Listed by Completion Status, Type of Sample, Age of Respondents, and Year of First Contact.

Part 1. Completed Studies: School Samples

Principal Investigators	Population Characteristics	Grade/Age at T1 of Sample Eligible for Panel	Year of First Contact	Year of Last Contact	Total Number of Contacts	Interval Between Contacts	Size of Sample T1 Eligible for Panel	Size of Matched Panel	Methods of Data Collection[a]	Drugs Inquired About
Kellam	All entering public and parochial school first-grade children in a black community in Chicago with low income and high unemployment	Grade 1	1966	1975-1976	5	3 times during first grade 2 years 7 years	1,241	705	Home interviews; school tests (IQ, achievement) and grades; ratings by teacher, clinician, mother (T1-T3); police records, questionnaires (T5)	Cigarettes, beer or wine, hard liquor, marijuana, LSD, other psychedelics, uppers, downers, tranquilizers, cocaine, heroin and other opiates, glue, cough syrup
Smith	Students from grades 4-12 in 6 school systems in greater Boston area, predominantly white and middle-class	Grades 4-11	1969	1973	2-5	1 year	12,000 (approx.)	Variable	Self-administered questionnaires in classrooms; school records; peers' ratings of students' personalities	Cigarettes, liquor, marijuana, ups, downs, psychedelics opiates, inhalants, nonprescription drug store products
Kaplan	Seventh grade students from 18 of 36 junior high schools of the Houston Independent School District	Grade 7	1971	1973	3	1 year	7,620	3,148	Self-administered questionnaires in classrooms	Beer or wine, liquor, marijuana, narcotics
Jessor and Jessor	High school study: random sample of students from grades 7-12 of 3 junior and 3 senior high schools in a small city in the Rocky Mountains, almost all of Anglo-American, middle-class background	Grades 7-9	1969	1972	4	1 year	589	483	Self-administered questionnaires outside of class, school records	Beer or wine, hard liquor, marijuana, amphetamines, LSD, other psychedelics, cocaine, and heroin
		Grades 10-11	1969	1972	2-3	1 year	262	Variable		
Blinson and Josephson	Students from 5 junior and 18 senior high schools purposefully selected to represent varied regions, community sizes, socioeconomic levels, and racial compositions but not to represent the United States	Grades 7-10	1971	1973	2	2 years	18,363	8,136	Self-administered questionnaires in classrooms	Cigarettes, beer or wine, hard liquor, marijuana or hashish, amphetamines, methedrine, barbiturates, LSD, other psychedelics, cocaine, heroin, inhalants

Annis and Watson	Students of 3 public high schools in a northern Ontario city and dropouts from same classes	Grade 9	(Not Given)	(Not Given)	2	13 months	915	886	Self-administered questionnaires in class; interviews with dropouts at T2	Alcohol, marijuana, tobacco, solvents, hallucinogens, barbiturates, opiates
Kandel	(1) Multistage random sample of New York State public secondary school students from 18 schools and data from mothers or fathers; best school friend in subsample of 5 schools	Grades 9-12	1971	1972	2	6 months	8,206	5,623	Self-administered questionnaires in classrooms (adolescents). Mailed questionnaires (parents)	Cigarettes, beer or wine, hard liquor, marijauna, hashish, amphetamines, methedrine, barbiturates, tranquilizers, LSD, other psychedelics, cocaine, heroin, other narcotics, inhalants, cough syrup
	(2) 1972 Senior class (Third wave)	Grade 12	1971	1973	3	7-12 months	2,386	1,635	Self-administered questionnaires (T1, T2); mailed questionnaires (T3)	Same
Johnston	Youth in Transition cohort--A national random sample of boys in 87 public high schools in continental United States in 1966; drug components added in 1970 and 1974	Grade 10	1966	1974	5	2 years 1 year 1 year 4 years	2,213	1,608	Interviews (T1, T2,T4); self-administered questionnaires (T1-T4); mailed questionnaires (T5); ability tests (T1)	Cigarettes, beer, wine, hard liquor marijuana, amphetamines, barbiturates, hallucinogens, methaqualone, cocaine, heroin
Britt and Campbell	North Carolina high school seniors who expressed an intention to attend college in fall	Grade 12	1961	1962	2	1 year	2,300	1,420	Self-administered questionnaires, (unclear whether in or out of class)	Alcohol
Gulas and King	Seniors at Dartmouth College matched retrospectively to their freshman-year records	College freshmen	Not Given (prior to 1976)	Not Given	2	4 years	90	90	Mailed questionnaires	Marijuana, amphetamines, barbiturates, hallucinogens
Haagen	College juniors at Wesleyan University matched retrospectively to their freshman-and-sophomore-year records	College freshmen	1965	1968	2	3 years	70	70	Self-administered questionnaires; test data on file at Office of Psychological Service	Tobacco, alcohol, marijuana, hallucinogens
Garfield and Garfield	Random sample at large private suburban residential western university	College students	1966-1967	1970-1971	4	1 year	300	T2-100 T3-201 T4-100	Personally administered questionnaires	Alcohol, marijuana, hashish, LSD, mescaline

[a]The same methods were used in all waves of data collection of a study, unless specific times are indicated.

Characteristics of Longitudinal Studies of Drug Use in Normal Populations Listed by Completion Status, Type of Sample, Age of Respondents, and Year of First Contact.

Part 1. Completed Studies: School Samples

Principal Investigators	Population Characteristics	Grade/Age at T1 of Sample Eligible for Panel	Year of First Contact	Year of Last Contact	Total Number of Contacts	Interval Between Contacts	Size of Sample T1 Eligible for Panel	Size of Matched Panel	Methods of Data Collection	Drugs Inquired About
Grupp	Random sample of 1% of students at Illinois State University not reporting marijuana use	College undergraduates and graduate students	1969	1973	3	2 years	127	T2-120 T3-103	Personal interviews at T1, T2; mailed questionnaires for those out of area at T2, and for everyone at T3	Marijuana
Goldstein	Students enrolled at Carnegie-Mellon University (class of 1972)	College freshmen	1968	1972	4	Approx: 9 months 16 months 20 months	770	417	Self-administered questionnaires, outside of class (mail technique preserving anonymity)	Beer, hard liquor, marijuana (incl. hashish), tranquilizers and barbiturates, amphetamines, hallucinogens, narcotics, tobacco
Groves	Full-time students at predominantly white nonspecialized colleges with projected enrollment of over 1,000 (1970)	College freshmen and juniors	1970	1971	2	1 year	7,948	3,961	Mailed questionnaires	Caffeine, alcohol, marijuana, hashish methedrine, other amphetamines, barbiturates, sedatives, tranquilizers, LSD, other psychedelics, cocaine, opium, heroin, other narcotics, cough syrups
Mellinger	(1) Probability sample of male freshmen of University of California at Berkeley in Fall 1970	College freshmen	1970	1973	2	2 1/2 years	960	834	Personal interviews and self-administered forms; school records; mailed questionnaires	Tobacco, alcohol, marijuana or hashish, amphetamines, barbiturates, sedatives, psychedelics, cocaine, heroin, opium, other opiates, inhalants
	(2) Probability sample of senior men in class of 1971	College seniors	1971	1973	2	2 1/2 years	986	821	Same	Same
Jessor and Jessor	College study--random sample of arts and science university students in a small Rocky Mountain city	College freshmen	1970	1973	4	1 year	276	226	Self-administered questionnaires; school records	Beer or wine, hard liquor, marijuana, amphetamines, LSD, other psychedelics, cocaine, heroin

Schuckit	Random samples of incoming freshmen at:									
	(1) Washington University in St. Louis	College freshmen	1970	1974	4	1 year	158	Not Given	Semistructured interviews: mailed questionnaires to nonresidents	Tobacco, alcohol, marijuana, hashish, amphetamines, speed, LSD, mescaline, psilocybin, STP, MDA, opiates, medicinal drugs
	(2) University of California at San Diego	College freshmen	1971	1975	4	1 year	222	188		
Ginsberg and Greenley	Students enrolled at University of Wisconsin-Madison 1971-1974	College freshmen and sophomores	1971	1974	2	2 years	319	274	Mailed questionnaires	Marijuana
Sadava	(1) College freshmen in an English-language Roman Catholic college in province of Quebec	College freshmen	Not Given (prior to 1973)	Not Given	2	6 months	358	319	Self-administered questionnaires in classrooms	Cannabis, psychedelics, amphetamines, alcohol
	(2) Undergraduates at a small Ontario university in introductory psychology courses	College freshmen and sophomores	1972	1973	2	6 months	467	374	Self-administered questionnaires	Alcohol, tobacco, marijuana and other illicit drugs
Kay	Random sample of male students entering Lehigh University	College freshman	1971 1972 1973	1974 1974 1974	4 3 2	6 months: 1-T2; 1 year; T2-T1, T1-T4	130 124 112	68 85 98	Self-administered questionnaires, adjective check list, California Psychological Inventory	Marijuana
Moos	Entering classes of two universities	College freshmen	Not Given	Not Given	3	9 months 3 years	1,296	T2-886 T3-567	Self-administered questionnaires, outside class	Alcohol

Characteristics of Longitudinal Studies of Drug Use in Normal Populations Listed by Completion Status, Type of Sample, Age of Respondents, and Year of First Contact.

Part 2. Completed Studies: Community Samples

Principal Investigators	Population Characteristics	Grade/Age at T1 of Sample Eligible for Panel	Year of First Contact	Year of Last Contact	Total Number of Contacts	Interval Between Contacts	Size of Sample T1 Eligible for Panel	Size of Matched Panel	Methods of Data Collection	Drugs Inquired About
Lukoff and Brook	Samples of ghetto community stratified for ethnicity, social class, and contiguity with deviance:									
	(1) Children	13-17 yrs	1973	1975-1976	2	3 years	403	181	Household interviews	Marijuana, dope, downs, psychedelics, heroin
	(2) Mothers	30-65 yrs					284	183		
Brunswick	Representative community sample of Harlem youth	16-17 years old	1969-1970	1975-1976	2	6 years	664	516	Household interviews	Alcohol, marijuana, amphetamines, barbiturates, acid, cocaine, heroin, glue
Bieber	19 year old conscripts born in canton of Zurich who report some alcohol/drug use at initial contact	19 years	1971	1974	2	3 years	1,413	841	Self-administered questionnaires T1; mailed questionnaires T2	Alcohol, tobacco, marijuana
Robins	(1) Vietnam veterans random sample of army enlisted males who returned from Vietnam to the United States in September 1971, and a supplementary random sample from all men returning that month whose urine had been detected as positive for morphine prior to leaving Vietnam. T2 sampled from reduced T1 target population restricted to men inducted since 1969 and from the 25 more populous states	20 years (mean)	1972	1974 1975	2	2 years	605	571	Interviews; urine samples; military and Veterans' Administration records	Cigarettes, alcohol, marijuana, amphetamines, barbiturates, tranquilizers, hallucinogens, cocaine, narcotics

	(2) Control group at T2--sample of non-veterans matched on Selective Service Board, draft eligibility, age, and education	Matched to veterans	1974-1975	--	1	--	302	284	Interviews; urine samples; Selective Service Records	Same
Cahalan et al.	(1) National probability sample of United States adult population; (T2) sampled from reduced T1 target population N=1,610, with abstainers and very infrequent drinkers subsampled at a lesser rate	21 and over	1964-1965	1967	2	2 years	1,810	1,359	Household interviews (T1); mail questionnaires	Drinking patterns, practices, and problems
	(2) National probability sample of white males aged 21-59, with oversampling of urban areas	21-59 years old	1969	1973	2	4 years	978	725	Same	Same
	(3) Probability sample of white males, aged 21-59, in San Francisco	21-59 years old	1967-1968	1972	2	4 years	796	615	Same	Same

Characteristics of Longitudinal Studies of Drug Use in Normal Populations Listed by Completion Status, Type of Sample, Age of Respondents, and Year of First Contact.

Part 3. Ongoing Studies: A--Within Adolescence, Adulthood

Principal Investigators	Population Characteristics	Grade/Age at T1 of Sample Eligible for Panel	Year of First Contact	Year of Last Contact	Total Number of Contacts	Interval Between Contacts	Size of Sample T1 Eligible for Panel	Size of Matched Panel	Methods of Data Collection	Drugs Inquired About
Huba and Bentler	Students in the greater Los Angeles area with oversampling of lower socioeconomic schools	Grades 7-9	1976	1980[1]	4	1 year 2 years 1 year	1,634	768	Self-administered questionnaires from the students, parents (T1,T4) and peers (T1,T2)	Cigarettes, beer, wine, liquor, marijuana, hashish, coffee, minor and major tranquilizers, barbiturates, sedatives, antidepressants, amphetamines, non-amphetamines, uppers, LSD, other psychedelics, sniffing stuff, amyl nitrate, nonprescription: sleeping pills, stimulants, cough medicine, cold medicine, cocaine, heroin, other narcotics, PCP, coca paste
Lukoff and Brook	Quota sample from 6 states (Connecticut, Kansas, New Jersey, New York, Ohio, and South Carolina). Approximately equal numbers of males and females, blacks and whites of middle socioeconomic status	Grades 9-10	1979	1981	2	2 years	932	Not yet completed	Self administered questionnaires	Alcohol, cigarettes, marijuana, amphetamines, barbiturates, LSD, other psychedelics, heroin, other narcotics, tranquilizers, quaaludes, cocaine, inhalants
Clayton and Voss	Nationally representative sample of men born between 1944 and 1954 inclusive, who registered with Selective Service upon age 18	20-30 years old	1974-1975	1982	2	6-7 years	450	Not yet completed	Personal interviews	Cigarettes, alcohol, marijuana, psychedelics, stimulants, sedatives, heroin, other opiates, cocaine, tranquilizers, inhalants

Carpenter, Lester, Pandina, and Labouvie	Cohort-sequential design--Random samples of New Jersey adolescents-- a) 9 cohorts born 1967-75 b) 3 cohorts born 1966-66 c) 3 cohorts born 1961-63 d) 5 control groups at T4	a) 12 years b) 15 years c) 18 years	1979	ongoing	14 telephone 8 onsite	1 year 3 years until age 24; 6 years after age 24	a) 1,350 b) 450 c) 450 d) 150	Not yet completed	On-site: -personal interview -self-administered questionnaires -behavioral tests -blood sample -psychological test -medical exams Telephone contact: -major life events -alcohol and drug taking outcomes	Alcohol, cigarettes, marijuana, amphetamines, barbiturates, LSD, other psychedelics, heroin, other narcotics, tranquilizers, quaaludes, cocaine, inhalants, PCP, amyl and butyl nitrates, over-the-counter psychotherapeutics, caffeine
Elliott	National Youth Survey-National probability multistage cluster sample of dwellings	11-17 years	1976	1980	5	1 year	1,725	T2-1655 T3-1626 T4-1543 T5-1494	Personal structured interviews	Tobacco, beer, wine, liquor, marijuana, hallucinogens, cocaine, heroin, medical and nonmedical use of amphetamines, barbiturates
Jessor, Jessor, and Donovan	Young adult follow-up. High school sample--random sample of students from grades 7-9 of 3 junior high schools in a small city in the Rocky Mountains, almost all of Anglo-American, middle class background	Grades 7-9	1969	1981[a]	6	1 year 1 year 1 year 7 years 2 years	432	Not yet completed	T1-T4--Self-administered questionnaires in school (high school sample) in small groups (college sample)	Beer, wine, hard liquor, marijuana, LSD, amphetamines, cocaine, heroin, tranquilizers, barbiturates, morphine
	College sample--random sample of freshman class arts and science university students in a small Rocky Mountain city	College freshman	1970	1981[a]	6	1 year 1 year 1 year 6 years 2 years	205	not yet completed	T5,T6--Adult follow-ups: mailed self-administered questionnaires	

[a]Future contacts planned, if funds available.

Characteristics of Longitudinal Studies of Drug Use in Normal Populations Listed by Completion Status, Type of Sample, Age of Respondents, and Year of First Contact.

Part 3. Ongoing Studies: B--From Adolescence to Young Adulthood

Principal Investigators	Population Characteristics	Grade/Age at T1 of Sample Eligible for Panel	Year of First Contact	Year of Last Contact	Total Number of Contacts	Interval Between Contacts	Size of Sample T1 Eligible for Panel	Size of Matched Panel	Methods of Data Collection	Drugs Inquired About
Johnston and Bachman	Monitoring the Future--cohort sequential design. Successive nationally representative cohorts of high school seniors from 115 public and 15 private high schools; repeated annually; entire senior classes in schools with 300 seniors, and subsamples (n=300) in larger schools	Grade 12	1975-ongoing	ongoing	11 for each cohort	1 year for each cohort (2 yrs for each cohort 1/2 sample)	2,400 (target for each cohort; 1,200 for each cohort 1/2 sample)	Not yet completed	T1--Self-administered questionnaires in classrooms T2, adult follow-ups -- Mailed questionnaires	Alcohol, cigarettes, marijuana, amphetamines, barbiturates, LSD, other psychedelics, heroin, other narcotics, tranquilizers, quaaludes, cocaine, inhalants, PCP, amyl and butyl nitrates, over-the-counter psychotherapeutics, caffeine
Kandel	Multistage random sample of adolescents enrolled in New York public secondary school selected from 18 schools a) regular students b) absentees	Grades 10-11	1971	1980[a]	3	6 months 9 years	a) 1,321 b) 330	1,081 244	T1,T2--Self-administered questionnaires in classrooms T3--Adult follow-up--Household interviews	Cigarettes, beer or wine, hard liquor, marijuana, hashish, methedrine, LSD, other psychedelics, cocaine, heroin, other narcotics, inhalants, cough syrup, stimulants, sedatives and tranquilizers (medical and non-medical use)

Kaplan	Seventh grade students enrolled in 18 of 36 junior high schools of the Houston Independent School District	Grade 7	1971	1981-1982	4	1 year ½ year 9-11 years	9,300	Not yet completed	T1-T3--Self-administered questionnaires T4--Adult follow-up--Household interviews	Marijuana/hashish, barbiturates, inhalents, hallucinogens, amphetamines, tranquilizers, heroin, other narcotics, quaaludes, cocaine
Lewer and Akers	All students in 2 junior high schools, 1 senior high school in small Iowa city	7-12	1980	1984	5	1 year	2,194	Not yet completed	Self-administered questionnaires in classroom Saliva test	Cigarettes, chewing tobacco, snuff, cigars/pipe
Schlegel	Random sample of students in 2 school boards (urban, rural) in southern Ontario	9-12	1974	1980[a]	7	4 months 4 months 4 months 1 year 2 years 2 years	1,781	918	(T1-T4) Self-administered questionnaires in classroom. (T5-T7) Mailed self-administered questionnaires	Beer, wine, liquor, cigarettes, amphetamines, barbiturates, marijuana, hallucinogens, tranquilizers, heroin, glue
Smith	Students and former students in middle-class predominantly white school district in the greater Boston area	Grades 8-10	1969	1981	4-6	1 year 1 year 1 year 1 year 8 years	1,935	Not yet completed	T1-T5--Self-administered questionnaires, peer ratings of personality, school records T6--Adult follow-up - Mailed questionnaires	Cigarettes, beer, wine, liquor, marijuana, hashish, ups, downs, tripping stuff, cocaine, heroin and other opiates, drug store medicine, sniffing stuff, combination drugs

[a]Future contacts planned, if funds available.

Appendix

D

PARAQUAT ISSUE

Paraquat is a herbicide that is used throughout the world. It is available in an aerosol form, granules, and a water-soluble concentrate. As a result of accidental or suicidal swallowing of the water-soluble concentrate, more than 500 human fatalities have occurred (Harley et al., 1977). In contrast, neither inhalation of the spray nor ingestion of paraquat granules has been shown to be of clinical importance (Fairshter and Wilson, 1975).

About 60 percent of the marijuana consumed in the United States is grown in Mexico. Since 1975, in the attempt to reduce the illegal production of marijuana, the Mexican government has been spraying marijuana fields from airplanes. The herbicide kills the treated plants within 1 or 2 days. Marijuana producers have resorted to harvesting the plants soon after spraying, minimizing exposure to sunshine, so that they are not destroyed. The paraquat persists on the dried leaves. Samples of marijuana confiscated at the U.S.-Mexico border have disclosed that about 21 percent of the confiscated marijuana was contaminated with paraquat in varying concentrations.

Paraquat damages the lungs, heart, kidneys, adrenal glands, central nervous system, liver, skeletal muscle, and spleen. In general, all effects but those on the lungs are transitory. The changes in the lungs of humans after ingestion appear to be dose-related: small amounts of the swallowed chemical may cause modest and reversible lung damage; in contrast, larger quantities cause lethal pulmonary fibrosis. An important element in paraquat toxicity is the fact that it is concentrated in the lungs where it does particular damage to the alveolar lining. In many respects, probably including the mechanism by which it damages the lungs, its effects resemble those of oxygen toxicity but seem to be less reversible (Smith and Heath, 1976).

With respect to marijuana, the use of paraquat as a herbicide entails the possibility of risk to two populations: (1) those who spray the paraquat and the workers in the fields who are exposed to an environment containing the paraquat spray, and (2) the marijuana smoker. To date, no toxic effects attributable to paraquat, per se, have been proved in either population. However, the observations thus far relate to the acute hazards of paraquat inhalation and do

not provide any assurance about the long-term effects. Indeed, observations on other inhaled toxins suggest that exposure for many years may be prerequisite for the development of clinical disability.

An important question with respect to the toxic effects of paraquat on the lungs is how much of the paraquat survives combustion and is transferred in the smoke to the gas-exchanging surfaces of the lungs. Studies conducted by NIDA indicate that as much as 0.2 percent of the paraquat in a marijuana cigarette appeared in a condensate of smoke prepared under laboratory conditions. The results suggested that a typical marijuana cigarette contaminated at approximately 500 ppm--a reasonable degree of contamination--would produce smoke containing up to 1 mg of paraquat. This experimental evidence has led to the prediction that a human smoker of five marijuana cigarettes per day would expose the lungs to approximately 5 mg of paraquat. Laboratory evidence derived from hamsters suggests the possibility of damaging the distal part of the airways (the bronchioles and the proximal alveolar ducts) by this exposure. These experiments and predictions suggest that an individual who continued to smoke paraquat-contaminated cigarettes would be a candidate for serious lung injury. The prospect probably would be greatly heightened by the toxic effects of the combusted marijuana.

There are only a few observations of experimental animals that bear directly on the effects of inhaled paraquat (Kimbrough and Gaines, 1970; Zavala and Rhodes, 1978). These suggest that similar lesions are produced by ingested paraquat and by paraquat introduced into the airways. For example, the introduction of minute quantities of paraquat dichloride intrabronchially, in concentrations ranging from 10 mg to 100 mg, elicited focal pulmonary edema, hemorrhage, and fibrosis (Zavala and Rhodes, 1978). The smaller doses are within the range to which a smoker of marijuana contaminated by paraquat might be exposed. However, the experimental evidence is not entirely relevant on several accounts: (1) paraquat arriving at the lung surfaces by inhalation from contaminated air or after smoking must be carried in the form of smoke, gas, or small droplets, because larger droplets, such as the aerosols used in agriculture, are apt to precipitate out in proximal airways, which are protected by cilia and mucus; (2) the intrabronchial installation of paraquat in a solution provides a different pattern of access to the gas-exchanging surfaces of the lungs than does inhalation of smoke, gas, or droplets; (3) because of its water solubility, paraquat that escapes pyrolyzation during smoking would be expected to be taken up by the tracheal bronchial tree and its branches before reaching the alveoli unless carried in the form of smoke, gas, or small droplets.

In essence, the evidence concerning the injurious effects of paraquat inhaled after either spraying or smoking is too meager for conclusions. The observations available since 1975 have not proved that paraquat, per se, is harmful to the lungs. On the other hand, the clinical experience to date, coupled with the increasing understanding of the biochemical basis for paraquat toxicity, raises the serious possibility that continued exposure to inhaled paraquat is likely to be harmful to the lungs, that the predominant effect

will be diffuse interstitial fibrosis, and that if exposure is sufficiently intense over years, respiratory insufficiency, disability, and death may reasonably be expected to ensue.

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Position Statements

ALASKA PEACE OFFICERS ASSOCIATION

Concerning Legislative Proposals

before the

Fifteenth Alaska Legislature

March 1987

ALASKA PEACE OFFICERS ASSOCIATION

DDC Coordinator
P.O. Box 240106
Anchorage, AK
99524-0106
(907) 376-9177



State APOA Office
P.O. Box 240106
Anchorage, AK
99524-0106
(907) 376-9177

March 12, 1987

The Alaska State Legislature
Pouch V
Juneau, Alaska 99811

Dear Members of the Alaska State Legislature:

The Alaska Peace Officers Association, comprised of over 1000 members within the criminal justice system in Alaska, is pleased to forward our position with respect to several legislative proposals. Each has been discussed in detail by the Board of Directors at our meeting last month in Juneau.

We consider these proposals as priority measures for the improvement of the justice system. Several have cost savings potential. We would be pleased to provide additional information needed and to arrange for personal testimony as these measures proceed through the legislative process.

Please don't hesitate to contact me at 694-6712 or our legislative liaison, Steve Kalwara of the Juneau Police Department.

Thank you for your consideration of our view on the following bills.

Sincerely yours,

Rollie Port

Rollie Port
President

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SB 32 (Fischer and Faiks) and
HB 55 (Martin) Identical measures, relating to the recriminalization of marijuana.

APOA strongly supports recriminalizing marijuana.

Alaska is the only state to have, in effect, legalized small amounts of marijuana - up to four ounces - for personal use. No other state has adopted a similar law. Using small amounts of marijuana legally stimulates trafficking of the drug which is illegal. The existing statute, in effect, promotes illegal activity.

Possession of any quantity of marijuana is against federal law while state law permits possession of small amounts. This creates confusion in the minds of the public. This dichotomy of federal law vs. state law tends to breed disrespect for the law. As the Baltimore Sun editorialized in early 1984, "Only in Alaska can you sit at home and smoke marijuana, secure in the knowledge that you are breaking federal law with the blessing of the State Supreme Court."

Alaska's tolerance of marijuana has also inhibited the efforts of the U.S. to obtain agreements by foreign countries to crack down upon illicit drugs in their country. According to the Undersecretary for International Narcotics Affairs, Department of State, in a recent address in Anchorage, several foreign countries have questioned the sincerity of the U.S. regarding suppression of illicit drugs by calling attention to Alaska's legalization of small amounts of marijuana. This is significant

since the U.S. is a signatory nation to two international conventions concerning control of narcotics - the Single Convention on Narcotic Drugs of 1961 and the Psychotropic Substances Act of 1971, which include outlawing marijuana.

APOA considers the contradiction of federal and state law regarding marijuana, the increasingly effective health campaigns against smoking, and the public's proclaimed respect for the law, with state law permitting marijuana use, to be sending mixed signals to our youth. Either society condones drug use and smoking or it does not. Our collective position should be clear to our young people.

The Ravin decision leading to legalizing marijuana was based in part upon the finding that the state could show no clear and convincing public need to ban marijuana. Since then, more and more information from around the country shows increasing concern about the health aspects of smoking in general and marijuana in particular. The APOA believes that a clear and convincing health issue can now be made to support a ban upon marijuana use.

The APOA knows of no police department that would undertake an intensive enforcement effort against persons possessing small amounts of marijuana, if possession would be recriminalized. Frankly, there are more urgent needs to be addressed. Therefore, we would support a citation, mail-in bail approach, as is now used for most traffic infractions.

The APOA is more interested in consistency of our laws, clear and concise positions about marijuana for our youth, and other

advantages of recriminalization than in a tough, unyielding enforcement program.

Anchorage Chamber of Commerce

Crime Commission

February 25, 1987

Representative Terry Martin
Alaska House of Representatives
Pouch V
Juneau, Alaska 99811

Dear Terry:

The Anchorage Crime Commission has endorsed the recriminalization of marijuana as one of its 1987 goals. The Commission enthusiastically supports your previously stated position on this issue.

The Commission's Public Opinion survey, conducted in the Anchorage area, indicated that there was a strong desire by the general public to change the present law.

This correspondence is to reiterate our strong support of this issue and request your continued support and endorsement of HB 55. We believe the passage of this legislation will be beneficial to Alaska and its citizenry.

We further request your support in enlisting other members of the State Legislature to help assure passage of this bill into law.

If the Anchorage Crime Commission can be of further assistance in this matter please contact me.

Thank you for your support.

Sincerely,

Harold C. Heinze

Harold C. Heinze
Chairman

A Committee of the
Anchorage Chamber
of Commerce

415 F Street
Anchorage AK 99501
(907) 272-2401

City of Galena
Antoski Hall • P.O. Box 149 • Galena, Alaska 99741 • Telephone (907) 656-1301

February 25, 1987

Representative Alyce Hanley
PO Box V, MS 3100
Juneau, AK 99811

Dear Representative Hanley:

On behalf of the Galena Drug Task Force, a group of people representing law enforcement agencies, education, the community, city and religious group initially appointed by the Galena City Council, would like to make you aware that there is a real drug problem on the Yukon River and especially here in Galena.

Further, we would like to encourage you to support legislation that would criminalize the possession of any amount of marijuana and legislation which will help make it possible to prosecute and convict dealers not only of marijuana but all controlled substance.

Your help and support will be most appreciated.

Sincerely,

Harry E. Purdy
Chairperson
Galena Drug Task Force

cc: Pat Myers, City Manager

HP/tw

BILL NO: HB 55
TITLE: "An Act relating to marijuana; and providing for an effective date"
DATE: 3/4/87

The Juneau Police Department is supportive of this legislation.

The purpose of HB 55 is to recriminalize the possession of any amount of marijuana. By achieving this end a number of purposes will be served.

Increasingly it has been shown that the long term consumption of marijuana poses a health hazard of serious consequence. A number of medical studies substantiate this fact. It is necessary to reflect that the possession of any amount of marijuana will not be tolerated so as to reinforce the concept that health hazards do exist when marijuana is used. Marijuana has been targeted as the single best predicator of other future illegal drug use.

The present conflict that exists between current state and federal law tends to create confusion in the mind of the public. This conflict creates apathy on the part of the public and flies in the face of the need for consistency in the law. Disregard and apathy are most readily apparent in the minds of the young people of the community. This conflict also creates impediments in the discharge of local police responsibilities in addressing the problem of drug traffickers.

The relaxed attitude toward marijuana in Alaska creates in the minds of people that this is a state that condones this and other types of drug usage. It creates a marked place for a substance that is legal here but illegal in all other states.

The recriminalization of marijuana would not, as some sources are concerned, create a large scale impact on the criminal justice system. The primary focus is and will continue to be on interception, interdiction and prosecution of drug sources. This is a demonstrated philosophy that provides cost effective results for resources expended.

Michael S. Gelston
Chief of Police
Juneau Police Department

MSG/ps6

BILL NO: HB 55 DATE: 1/21/87

TITLE: "An Act relating to marijuana; and providing for an effective date.

CONTACT: Maj. Walter J. Gilmour
Acting Director

The Division of Alaska State Troopers is neutral on this legislation.

Many individuals and groups in Alaska feel that the use of marijuana is harmful to public health and welfare. The purpose of this legislation is to recriminalize the possession of any amount of marijuana.

Presently the state law allows up to four ounces of marijuana for personal use. This is in direct conflict with the existing Federal law. This in effect encourages the violation of Federal law.

The existing conflict of Federal and State law is confusing in the mind of the public. The public expects consistency rather than diversity in the law. Such diversity tends to breed disrespect for the law in general, especially upon the impressionable minds of our youth.

Alaska's lenient attitude toward marijuana in effect creates a legal market for a substance that is illegally grown in other states.

Alaska's legalization of small amounts of marijuana directly contravenes the terms of the Single Narcotics Convention, the international treaty which outlaws marijuana and other controlled substances. The United States is one of numerous countries which are signators to the convention.

Recriminalizing marijuana would not, as some fear, result in wholesale arrest of individuals possessing small amounts of marijuana. The present drug enforcement philosophy of source interdiction recognizes the far greater cost-effectiveness of striking against high-level distributors, and sadly, there is no lack of high-level drug dealers in Alaska to occupy the enforcement efforts of narcotics officers.

William R. Nix
Acting Commissioner

DEPARTMENT OF PUBLIC SAFETY

STATE OF ALASKA 1987 LEGISLATIVE SESSION
FISCAL NOTE

Bill Version: HB 55
Publish Date:

REQUEST
Revision Date:
Title: "An Act relating to marijuana; and providing for an effective date."
Sponsor: Rep. Martin
Requestor: H HESS/FN

Agency Affected: Public Safety
BRU: Alaska State Troopers
Components: Detachments & C.I.B. Narcotics

EXPENDITURES/REVENUES: (Thousands of Dollars)

	FY 87	FY 88	FY 89	FY 90	FY 91	FY 92
OPERATING						
PERSONAL SERVICES						
TRAVEL						
CONTRACTUAL						
SUPPLIES						
EQUIPMENT						
LAND & STRUCTURES						
GRANTS, CLAIMS						
MISCELLANEOUS						
TOTAL OPERATING	0	0	0	0	0	0
CAPITAL						
REVENUE						

FUNDING: (Thousands of Dollars)

GENERAL FUNDS						
FEDERAL FUNDS						
OTHER						
TOTAL	0	0	0	0	0	0

POSITIONS:

FULL-TIME	0	0	0	0	0	0
PART-TIME						
TEMPORARY						

ANALYSIS: (Attach a separate page if necessary)

No additional enforcement activities are anticipated and thus no fiscal impact is anticipated.

G.C.A.

JNR 1/23/87

Prepared by: Francis C. Allan
Division: Alaska State Troopers
Phone: 269-5691
Date: 1/21/87

Approved by Commissioner:
Date: 1/23/87
Agency: Public Safety

Distribution (by preparer):
Legislative Finance
Legislative Sponsor
Requestor
Office of Management and Budget
Impacted Agency(ies)
Senate Secretary

ANCHORAGE POLICE DEPARTMENT

4501 SOUTH BRAGAW STREET • ANCHORAGE, ALASKA 99507-1599
TELEPHONE (907) 786-8500

TONY KNOWLES
MAYOR

RONALD L. OTTE
CHIEF

March 13, 1987

MAR 18 1987

Senator Paul Fischer
Chairman, H.E.S.S. Committee
Alaska State Legislature
Pouch V (MS 3100)
Juneau, Alaska 99811

Dear Senator Fischer,

The purpose of this letter is to inform you of our support for Senate Bill 32 addressing the recriminalization of marijuana.

We believe that recent research may indicate that marijuana is more of a health hazard than originally thought. We believe that the legislature of the State of Alaska should take a serious look at recriminalization and hold hearings regarding its potential medical effects upon the populace. In addition, we believe that the youth of Alaska receive a mixed signal regarding the appropriateness of drug usage when marijuana is essentially legal in this state. In addition to that, we feel that the populace develops a scoff law attitude when the possession of marijuana is legal, but the purchase of and transportation of is illegal.

We urge that the recriminalization of marijuana be brought from the committee and addressed on the floor of the State Legislature.

If we can be of any further assistance regarding this issue or any other law enforcement related issue that you wish to call upon us for, feel free to do so.

Sincerely,

Del Smith

Del Smith
Deputy Chief of Operations

DS:dl

Galena Police Department
P.O. Box 208 • Galena, Alaska 99741 • Telephone (907) 656-1303

February 24, 1987

The Honorable Terry Martin
Hess Committee
Pouch V
Juneau, Alaska 99811

Re: Recriminalization of Marijuana, Senate Bill 32

Dear Mr. Martin:

I am writing this letter to formally advise you that this Department thoroughly supports the above-captioned Senate bill pertaining to the recriminalization of marijuana; and to also solicit your support of the same, for the following reasons:

First, let me begin by stating that proper drug abuse education is probably one of our most effective overall means of combating the abuse of controlled substances. Our Youth and others are being taught that marijuana is a controlled substance which can produce harmful effects. To confuse this issue, the State of Alaska, first defines marijuana as a controlled substance, pursuant to Title 11 of the Alaska Statutes (Criminal Code); and then, within the same breath of the law, condones the possession of up to four (4) ounces of marijuana by a person within their own residence for their own consumption. How are our youth and others suppose to respond to what they are being taught, when they see others using marijuana in what is supposedly a lawful manner. This is not only contradictive, but also counterproductive.

Secondly, Law Enforcement has a difficult enough job attempting to deal with controlled substance abuse which involves those drugs that are strictly illicit. To interject a decriminalization law into the Controlled Substance Act, only serves to make their work that much more difficult and confusing. After attempting to deal with the same, certain Law Enforcement factions may begin to develop a disinterested attitude toward the enforcement of marijuana abuse, thinking if the State of Alaska doesn't care, why should we. Additionally, State Prosecutors are justifiably less than enthusiastic about prosecuting cases involving marijuana.

Finally, the State of Alaska has been receiving nationwide recognition through television talk shows where marijuana is the topic of discussion. On one such show, a guest emphasized several times that marijuana has been "LEGALIZED" in Alaska. The word: DECRIMINALIZATION" was never mentioned. That little advertisement should give our tourist industry quite a boost.

In closing, this Department will appreciate any effort you may put forth in guiding Senate Bill 32 out of committee and to the floor of both the Senate and House for a vote.

Respectfully Submitted,

Robert A. Harrington
Chief of Police

san/RAH

FBI National Academy Associates
Alaska Chapter

February 9, 1987

Representative Terry Martin
Alaska State Legislature
P.O. Box V, State Capitol
Juneau, AK 99811

Dear Terry:

I received your letter of February 5, 1987, concerning the teleconference hearing on Senator Paul Fischer's bill to recriminalize marijuana and to be held on February 18, 1987.

Unfortunately, I will be out of the state, attending an Energy Security Conference and will be unable to personally testify. I have been very interested in this particular subject for a number of years and, as you are aware, I served as Vice Chairman of the Anchorage Crime Commission in 1984-85. This subject was one of our priorities then and it is still a current priority of the present Crime Commission members.

In 1985, we prepared an extensive review of information developed since 1976, when the existing law was passed. I was rather taken back that the Director of the State Office of Drug and Alcohol Abuse stated that there had been no new scientific information gathered since 1976 which would support the changing of the law. Obviously, this particular individual has not done the research that I have and I'm confident that there is substantial scientific evidence to support the health problem created by the use of marijuana.

One of the major arguments used to state that the law should remain the same is the amount of manpower and commitment that would be necessary in order to enforce any changes in the law. In my opinion, this is not an issue--the issue is the health problem created by the continuous use of marijuana and, equally important if not more so, the illusion it gives to our young people that marijuana in Alaska is legal and, therefore, its usage must <u>not be harmful</u>.

FBINA
1986 Officers
Executive Board

Pat Wellington, 75th, President

President
1835 South Bragaw Street, MS 540 S
Anchorage, Alaska 99512
(907) 265-8362

Secretary
PO Box 53
Willow, Alaska 99688
(907) 495-6413

Dean Bivins, 90th, Vice President, South Central
Dale Florian, 98th, Vice President, Northern
Ben Neff, 94th, Vice President, Southeast
Turk Mayfield, 49th, Secretary-Treasurer

If we do nothing other than stomp out this false illusion by recriminalizing marijuana, then, in my personal and professional opinion, we have done a great service to the young people of our state and those that are coming along.

I realize that you and the other members of the legislature who support the recriminalization of marijuana have an uphill battle, but I know that you are dedicated to this particular legislation. I commend you and the other members who, throughout the years, have diligently pursued the effort to recriminalize marijuana. I believe you will be successful someday; however, tremendous effort from involved citizens and members of the legislature will be required.

I shall contact various individuals whom I feel should take advantage of the teleconference testimony and, hopefully, we'll be able to present a professional, rational discussion on why the law should be changed.

Again, I emphasize that my personal and professional opinion is that our current statute is creating a wrong impression for our young people and, if for no other reason than to correct this misunderstanding and misconception, the law should be changed.

Incidentally, Terry, the FBI National Academy Associates, which is made up of local, state, and federal officers who have attended the FBI National Academy since its inception in 1935, unanimously support the recriminalization of marijuana in Alaska. Please feel free to use this information as you see fit.

If I can be of further assistance to you or other members of the legislature on this or other matters of mutual concern and interest, please contact me.

Sincerely yours,

Pat Wellington
President, Alaska Chapter

nm

cc: Senator Paul Fischer
Mr. Harold Heinze, Chairman, Anchorage Chamber of Commerce Crime Commission
Chief Pat Shely, Valdez Police Department, President, Alaska Chiefs of Police
Deputy Chief Del Smith, Anchorage Police Department, Vice President, Alaska Chiefs of Police
Sgt. Rollie Port, State President, Alaska Peace Officers Association

Alaska Association Chiefs of Police

625 C Street • Anchorage, Alaska 99501

March 26, 1985

Mr. George N. Nelson
Anchorage Crime Commission
415 F Street
Anchorage, Alaska 99501

Dear Mr. Nelson,

Our Association conducted its annual meeting on March 22, 1985 in Anchorage.

Legislation pending before the Alaska State Legislature was extensively discussed. The Association has identified several pieces of legislation that it feels merit support. Among those bills we will be commenting on to the Governor and individual legislators are four that we understand have been identified as priority legislation by your Commission.

These bills are as follows:

HB 178	Conspiracy
HB 179	Hearsay
HB 205	Juvenile Waiver
SB ~~163~~ 32	Recriminalization of Marijuana

As stated previously, these bills were thoroughly discussed by the Association membership. The consensus was a directive to relay our strong support for passage of the legislation.

I understand that members of your Commission will be going to Juneau shortly to meet with legislators. Please feel free to make those legislators aware of our support for your legislative priorities.

If we can be of any additional assistance please do not hesitate to contact us.

Sincerely,

Del Smith

Del Smith
Secretary-Treasurer, ACOP

WILLIAM G KLEIN
CHIEF OF POLICE
106TH SESSION

WRANGELL POLICE DEPARTMENT

CITY OF WRANGELL, ALASKA
POST OFFICE BOX 531 • WRANGELL, ALASKA 99929
(907) 874-3304

March 4, 1987

MAR 5 1987

Senator Paul Fisher
Hess Committee Chairman
P.O. Box V
Juneau, Alaska 99811 (Mail Stop 3100)

Dear Senator Fisher:

On behalf of this department and the concerned members of this community, I sincerely urge that all possible efforts and support be afforded to Senate Bill 32, Recriminalization of Marijuana, in order that said bill be brought to the floor of the Senate and House for a vote.

As an Alaska law enforcement officer for the past 21 years I can state without reservation that one of the greatest errors consumated by a legislative body was the decriminalization of marijuana. Not only is it in violation of Federal Law, its usage among the youth of this state has escalated like a malignant growth.

In all frankness, I must state that the time is long overdue for positive action on behalf of our elected officials to combat and control this statewide problem. Give law enforcement in the State of Alaska the weapons, in the form of realistic and effective laws, and we will do our part.

Respectfully submitted,

William G. Klein
Chief of Police

WGK:rrk

cc: Representative Terry Martin
Senator Lloyd Jones
Representative Robin Taylor
Representative John Sund

ALASKANS FOR
DRUG-FREE YOUTH
P.O. BOX 8515
KETCHIKAN, ALASKA 99901
PHONE 247-CARE
In Alaska, Call Toll Free:
(800) 478-CARE

January 19, 1988

Marijuana Resolution

Whereas- We, the citizens of the state of Alaska are concerned about the prevalent use and abuse of the drug Marijuana.

Whereas- Adults may now possess 4 oz. of Marijuana for their own personal use in their home, even though in these homes may reside children.

Whereas-Research has demonstrated that Marijuana usage is occuring more frequently in earlier age groups.

Whereas- Marijuana has been found to be harmful both mentally and physically, to be addictive, to build tolerance and may be 10 times more potent than 10 years ago, significantly increasing health risks.

Whereas-Marijuana has been found to impair motor skills, making it dangerous to operate any mechanical equipment.

Whereas- Marijuana remains in the body up to 30 days, being stored in the body's fat cells.

Whereas- Marijuana is a "gateway" drug". The use of it introduces the "high" experience and may lead to users seeking stronger drugs.

Whereas- The state of Alaska statutes pertaining to Marijuana are not in conformity with National and International laws.

Whereas- The Supreme Court of Alaska has stated that "no one has the right to do things in their own home which will affect others adversely." *

Whereas- The Supreme Court of Alaska further stated "when there is a substantial doubt as to the safety of a substance or situation of Public Health, controls to obviate the danger will usually be upheld." *

Therefore be it resolved that ALASKANS FOR DRUG-FREE YOUTH respectfully urge our public officials in the State Government including the legislature to make the possession of any amount of Marijuana illegal- by all appropriate and lawful means.

Support the modernization of Alaska's Marijuana laws by recriminalization of Marijuana in Alaska and urge the Alaska legislature to pass SB 32 and HB 55 followed by support of the Governor.

* Reference- Raven Case 1975

ALASKANS FOR DRUG-FREE YOUTH

P.O. Box 8515 Ketchikan, Alaska 99901

APR 30 1987

Box 8515
Ketchikan,Alaska 99901
April 24, 1987

Senator Paul Fischer
Alaska State Legislature
P.O. Box V [MS 3100]
Juneau, Alaska 99811

Dear Senator Fischer:

Enclosed you will find about 1650 signatures in support of S.B.32. Since we are active in S.E. Alaska, most of the signatures are from Ketchikan, Wrangell and Petersburg.

Please see that the Senate Judiciary committee sees these when they consider S.B. 32. I understand that will be on Tuesday, April 28.

I hope tha you will keep these in your file and pass them on wherever they are needed as long as the bill is alive. I do have copies in my files.

Sincerely,

Betty J. Wilson
Alaskans for Drug Free Youth

cc/Senate Judiciary Committee
Jones, Taylor,Sund

Marijuana Resolution

Whereas- We, the citizens of the state of Alaska are concerned about the prevalent use and abuse of the drug Marijuana.

Whereas- Adults may now possess 4 oz. of Marijuana for their own personal use in their home, even though in these homes may reside children.

Whereas- Research has demonstrated that Marijuana usage is occuring more frequently in earlier age groups.

Whereas- Marijuana has been found to be harmful both mentally and physically, to be addictive, to build tolerance and may be 10 times more potent than 10 years ago, significantly increasing health risks.

Whereas- Marijuana has been found to impair motor skills, making it dangerous to operate any mechanical equipment.

Whereas Marijuana remains in the body up to 30 days, being stored in the body's fat cells.

Whereas- Marijuana is considered a "gateway drug" the use of it introduces the "high" experience and may lead to users seeking stronger drugs.

Whereas- The state of Alaska statutes pertaining to Marijuana are not in conformity with National and International laws.

Whereas- The Supreme Court of Alaska has stated that "no one has the right to do things in their own home which will affect others adversely." *

Whereas- The Supreme Court of Alaska further stated "when there is a substantial doubt as to the safety of a substance or situation of Public Health, controls to obviate the danger will usually be upheld." *

Therefore be it resolved that- We the citizens of Alaska respectfully urge our public offical's in the State Goverment including the legislature to make the possession of any amount of Marijuana illegal- by all appropriate and lawful means.

* Reference- Raven Case 1975

Alaskans for Drug Free Youth

Box 8515, Ketchikan, Alaska, 99901

Prepared by Betty Wilson

Signatures for Marijuana Decriminalization

Anchorage - 91
Bethel 47
Kenai 15
Ketchikan 985
Mekoryuk 33
Nelliabetia 34
Petersburg 175
Seward - 65
Sitka - 8
Wrangell - 201

Total = 1657

DRUG-FREE YOUTH



WILL MAKE
A STRONG AMERICA

Member of
National Federation of Parents for
Drug-Free Youth, Washington, D.C.

Alaskans For Drug-Free Youth

PREVENTION THROUGH EDUCATION AND COMMUNITY ACTION

"A child is a person who is going to carry on what you have started. He is going to sit where you are sitting, and when you are gone, attend to those things you think are important. You may adopt all of the policies you please, but how they are carried out depends on him. He will assume control of your cities, states, and nations. He is going to move in and take over your churches, schools, universities, and corporations. . . the fate of humanity is in his hands.". .

—Abraham Lincoln

P.O. Box 8515
Ketchikan, Alaska 99901

7760 Glacier Hwy.
Juneau, Alaska 99801

We Believe . . .

that strong, knowledgeable, caring families working in concert with schools, service and civic groups, religious groups, media, la enforcement, medical and drug-related agencies, is the best way to help our youth choose drug-free alternatives in their lives.

We Are . . .

volunteers representing the State of Alaska, who are educating, training, and networking communities, to create a drug free enviroment, strengthening youth and family potential.

We Can Help You . . .

- Form community awareness/prevention groups.
- Expand and supplement your school drug education programs.
- Cooperate with community groups to provide and distribute drug educational materials.
- Call on your law enforcement, juvenile justice agencies, and local government to establish plans of action regarding sales of drug paraphernalia, liquor sales to minors, teenage drinking, and other drug related issues.
- Assist with implementation of Just Say No Clubs, SAFE HOMES PROGRAMS, Operation Prom/Graduation, Red Ribbon Campaign and other national prevention programs.

Our Goals For The Future Are . . .

- Continue the expansion of our network and resources.
- Expand our Speakers Bureau.
- Continue preparing and implementing new community awareness programs.
- Influence pertinent legislation.

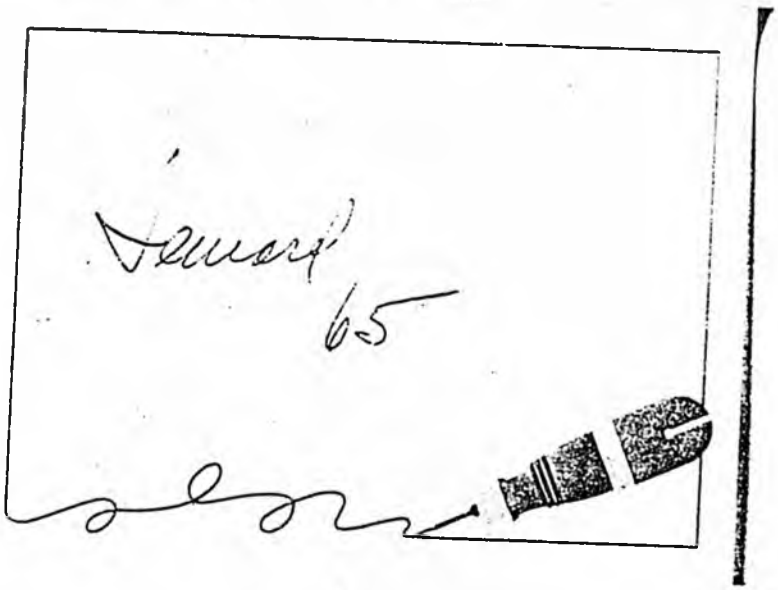
BUT. . . IN ORDER TO CONTINUE THESE EFFORTS, WE NEED YOUR FINANCIAL SUPPORT AND WILLING HANDS.



KETCHIKAN ELKS
DRUG AWARENESS EDUCATION
PROGRAM

The Elks are proud to be associated with and contribute to the efforts of parents to produce drug free youth.

Lind Printing, Inc.


Edward
65

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ALASKANS for Drug Free Youth - Support MARIJUANA Resolution

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Rose MacDevain	Box 1106 Seward AK 99664
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[illegible]	Box 551 Seward

ALASKANS for Drug Free Youth - Support MARIJUANA Resolution

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Hilda Sue Johnson	Bx 1214 Wrangell AK 99929
Vern Johnson	Bx 1214 Wrangell AK 99929
Judy L. Cotton	Box 1983 Wrangell AK 999
Richard B Hough	Box 711 Wrangell ak. 99
Charmaine Flaugher	Box 615 Wrangell ak 999
Danny Flaugher	Box 615 Wrangell ak 99929
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Norma Jorgensen	Box 348 Wrangell AK, 99
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Tony L Schmid	" " " "
Jan D Rathbe	Box 1617 " " "
Shirley Shevey	Box 977 " " "
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K. Mabel Reed	Box 1468 Wrangell AK
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Donna L Galla	Box 1349 Wrangell "
Ted Vancey	Box 1738 Wrangell " "
Liz Sherman	Box 1616 Wrangell
Delores E Harding	Box 1067 "
Patricia B Martin	BOX 1011 WRANGELL

26 (Wrangell Total (201))

1

ALASKANS for Drug Free Youth - support MARIJUANA Resolution

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[illegible]	Box 695 Wrangell
Phyllis Pace	Box 1785 Wrangell, AK
[illegible]	Box 1785 Wrangell, AK
[illegible]	Box 366 "
Glenda Gillen	Box 128 Wrangell
Tom Billings Sr.	" " "
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[illegible]	1012 Wrangell
[illegible]	Box 213 Wrangell
Ellen L Schirmer	Box 1110 - Wrangell
Hale E Wilcox	Box 529 - Wrangell
Chris L Hughes	Box 91 - Wrangell
Colleen E Russell	Box 1621 - Wrangell
Madge Gillen	Box 286 Wrangell AK
[illegible]	Box 1561 Wrangell AK
Alice Walker	Box 35 Wrangell Ak,
Carol Hay	Box 431 Wrangell, Ak.
Debra Lafler	Box 1979 Wrangell Ak
Bill Lafler	" " " "
[illegible]	
[illegible]	
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21 Vivian Mork	Box 6 Wrangell

ALASKANS for Drug Free Youth - support MARIJUANA Resolution

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Jami Voss	Box 1705 Wrangell
Darrence Kagee	Box 1752 "
Joe Eled	Box 1131, Wrangell
Linda Clark	Box 1131 Wrangell
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Jack Hale	
Glen McClurk	Box 925 Wrangell AK 9929
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Sharon Head	Box 96 WRG
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	Box 649 WRG AK 99929
Steve Aitken	Gen Del WRG AK 99929
Lisa M. Snyder	Box 1122 Wrg AK 99929
Mildred Brandt	Box 291 Wrangell Ak. 99929
Robert Sederlund	Box 271 WRANGELL AK 99929
Nadine M. Inco	Box 414 Haines AK 99929
Wm. R. Krupps	P.O. Box 733 WRANGELL 99929
Shirley Benson	Box 312 Wrg. AK 99929
Jack Watkins	Box 551 Wrg 99929
Lance K. Watkins	Box 551 Wrangell AK 99929
Jerry Brown	

25

ALASKANS for Drug Free Youth — report MARIJUANA Resolution

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Dorene Holland	Box 678 Wrangell
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Janet Ulleseit	Box 577 Wrangell AK
Dennis Dasco	Box 301 Wrangell Alaska
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Pat Ercolin	Box 1601 Wrangell AK
Barbara Ercolin	Box 906 Wrangell Ak
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David Wilson	Box 2 Wrangell Ak
Linda Bosen	Box 1635 Wrangell AK 99929

4

ALASKANS for Drug Free Youth - Support MARIJUANA Resolution

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Teresa B Nore	Box 1665 Wrangell Alaska
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ALASKANS for Drug Free Youth - Support MARIJUANA Resolution

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ALASKANS for Drug Free Youth - Support MARIJUANA Resolution

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Hamilton	Box 952 Wrangell Ak
Thomas H. Stuts	Box 535 Wrangell Ak
Donna Kuntz	Box 495 Wrg. AK.
Roberto Hayi	Box 709 Wrangell, AK
Kristine Lee	Box 1041 Wrangell, AK 99929
Virginia Gomez	Box 552 Wrangell AK. 9992
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Richard LaBarbera	PO Box 1976 Wrangell AK 992
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Lee Ann Hagen Tribble	P.O. Box 393 Wrangell Alaska 992
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Richard Peabody	P.O. Box 1643 "
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Barbara Allen	Box 423 Wrangell AK
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ALASKANS for Drug Free Youth - SUPPORT MARIJUANA Resolution

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Judy Mitchell	Box 2115 " "
Hilda L. Angerman	Box 928 Wrangell, Alaska
Dorothy Kunkel	Box 2124 Wrangell
Cynthia Karns	Box 439 Wrangell

ALASKANS for Drug Free Youth - support MARIJUANA Resolution

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Karl Brown	Box 5 Wrangell AK
Lisa Bolen	Box 1735 Wrangell AK.
E. R. Salmon	Box 1302 Wrangell, Alc. 9992
[illegible]	[illegible]
Patrick R. Ercol	Box 1001 Wrangell, AK 9992

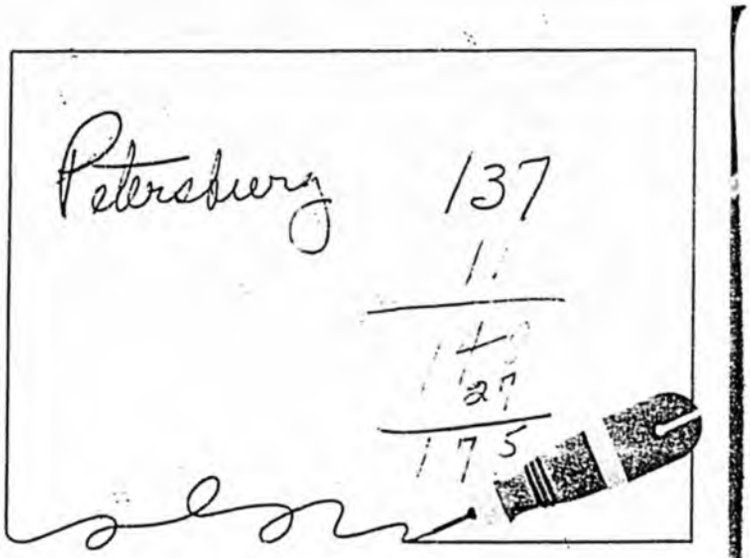
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ALASKANS for Drug Free Youth - support MARIJUANA Resolution

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NAME	Address
Hazel L Marlow	Box 1374 - Wrangell
Patty MacDonald	Box 1311 - Wrangell
Randy MacDonald	Box 1311 Wrangell
Tammy Sandberg	Box 623 Wrangell
John J Fletcher	Box 1212 Wrangell AK
Marlyn Fletcher	Box 1212 Wrangell, ak
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[illegible]	Box 1342 Wrangell AK
[illegible]	Box 896 [illegible]
Ian Roberts	Box # 111 WRANGELL, AK. 99929
Dick Stoke	Box 732 " " "
Barbara Angerman	Box 928 Wrangell Alaska


Petersburg 137
1.
1
27
175

ALASKANS FOR "DRUG FREE YOUTH" - SUPPORT MARIJUANA RESOLUTION
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27

(Petersburg Total = 175)

1

ALASKANS FOR "DRUG FREE YOUTH" - SUPPORT MARIJUANA RESOLUTION
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Alan	
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2

2

ALASKANS FOR "DRUG FREE YOUTH" - SUPPORT MARIJUANA RESOLUTION
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Betty Pickrell	
Lucian E. Shakal	Box 652 PSB
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Wanda Helmick	Box 913 Petersburg
Patricia Davis	Box 710 "
K. Davis	Box 24 Petersburg
[illegible]	Box 1153 Pbg
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2b

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Deborah M Williams	Box 768 Petersburg, AK 99833
Sarah Edgington	Box 333 Petersburg, AK 99833

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Sekla R. Lynn	Box 16 Petersburg, AK 99833
Albert Labanick Jr.	Box 772 Petersburg, AK 99833
Scott Clausen	Box 1002 " " "
Vernon Israelsen	Box 1444 " " "
D.W. Schultz	Box 715 " " "
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Ingrid Medalen	204 Vista - Box 352 Petersburg

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ALASKANS for Drug Free Youth - Support MARIJUANA Resolution

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Richard D. Hauke	Box 22 Petersburg, AK 99833
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ALASKANS for Drug Free Youth - Support MARIJUANA Resolution

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~~[illegible]~~	~~205~~

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NAME	ADDRESS
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Dana Winther	Box 863 Petersburg, AK 99833

ALASKANS FOR "DRUG FREE YOUTH" - SUPPORT MARIJUANA RESOLUTION
BOX 8515, KETCHIKAN, ALASKA 99901

NAME	ADDRESS
William E. Mulkey	1013 LAKE ST. BOX 990 Petersburg, AK
Judith Edenbergen	285 Mulkey Hwy Box 364 Petersburg, A.
Gary A. Thynes	Towne Trailer Pk #21 Box 354 Petersburg, A
Sharon Mulkey	1013 Lake St. Box 990 Petersburg, Ak 998
Vicki M. Borgen	1117 LAKE ST. BOX 1045 PETERSBURG, ALASKA 9983
[illegible]	285 Mulkey Hwy Box 364 " " "
Bill Natale	Box 1741 Petersburg AK 99833
Beth Richards	Box 944 " "
[illegible]	" " 9983
Marian Hubbard	Box 981 Petersburg AK 99833
[illegible]	Box 98[illegible]

ALASKANS FOR "DRUG FREE YOUTH" - SUPPORT MARIJUANA RESOLUTION
BOX 8515, KETCHIKAN, ALASKA 99901

NAME	ADDRESS
John R Halpin V	Box 349 Petersburg AK 99833
	Box [illegible]
[illegible]	Box [illegible] Wrangell AK
[illegible]	Box 225 [illegible]
[illegible]	PO 926 Petersburg
[illegible]	Box 258 Petersburg
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	Box 453 PSG
[illegible]	[illegible]
[illegible]	1194 Psg.
[illegible]	Box 5? [illegible]
[illegible]	[illegible]
[illegible]	Box 855 Petersburg AK
Rick Fleming	Box 1092 Psg. AK
[illegible]	Box 263
Kelly Hall	Box 18 PSG
[illegible]	Box 107 "
Tim Kaguen	Box 1324, PETERSBURG, AK.
[illegible]	BOX 689 - PETERSBURG AK.
[illegible]	Box 1410 - [illegible], AK
[illegible]	Box 43 [illegible] AK
[illegible]	Box 973 [illegible] AK.
[illegible]	Box 1614 PSG AK.
[illegible]	Box 1530 Petersburg AK
[illegible]	Box 1254 Petersburg AK.
[illegible]	Box 709 Petersburg AK
[illegible]	Petersburg

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ALASKANS for Drug Free Youth - support MARIJUANA Resolution

Box 8515 Ketchikan, AK 99901

NAME	Address
Robert A. Young	7818 Raymar Circle Anchorage AK 99518
Mattie K. Arden	7333 Bern St. Anchorage AK 99507
Nora Glass	8508 #6 Boundary Rd. 99504
[illegible]	605 W. Tudor Anchorage, AK 99503
[illegible]	7404 NATHAN DR ANCH. AK. 99502
Jane A. Arnold	2091 Dimond Dr Anch AK 99507
[illegible]	601 Abula, Anch. Ak 99516
Edna L McCrary	4915 E 6th Anch AK. 99508
Sandra McCrary	
Michael P McCrary	Po Box 874530 Wasilla Alaska 99687
Jan McCrary	P.O. Box 874530 Wasilla, Ak. 99687
Helen a Beal	7404 NATHAN DR ANCHORAGE AK 99502
Delores a Porter	2041 Campbell Pl Anch. AK. 99507
Gary W. [illegible]	2041 Campbell Pl. Anchorage, Ak 99507
Donald N Gay	7810 LINDA LN. ANCHORAGE, AK 99508
Darin V Gay	7810 Linda Ln anch. AK. 99518
Jane A Hasbaum	2080 Dimond Drive/Anch 99507
Dorothy Calbick	8807 West 30th #4 Anch AK 99517
Donald F Nusbaum	2080 Dimond Dr Anch 99507
Joseph P LoMonaco	6200 Downey Finch, Anch Ak 99516
Bev LoMonaco	Same
Robert M. Friedl	P.O. Box 200842, Anch. AK. 99520

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Total Anchorage — 91

6.5 = 97

Return by March 7

ALASKANS for Drug Free Youth - support MARIJUANA Resolution

Box 8515 Ketchikan, AK 99901

NAME	Address
Polly & Glovers	7818 Ragmar Circle Anchorage, AK 99518
Wabb Rhodes	7333 Bern St, Anchorage 99507
Kara Elam	5515 #6 Boundary Rd. 99504

Please return by March 7 Anchorage

Citizens for Equal Rights - support Municipal Resolution

Box 8615 Ketchikan, AK 99901

NAME	Address
Lionni Maup	7780 Maupur
Joyce Constance	3149 Raspberry #4 Anch.
Jane Lamm	3931 North Pt. Dr. Anch.
Fred Metcalf	P.O. Box 775273 EAGLE RIVER, AK 99577
Barbara Stuckart	404 Stewart St. Anch. 99508
Lamond Tew	2440 Laird Cir Anchorage AK 99517
Mark MacDonald	7744 BOUNDARY AVE ANCH AK 99504
Emelie Tadon	2800 LEIGHTON ST. ANCH. AK. 99517
Henry McGuire	PO 200572, Anch 99520
John Lowry	1312 W 15th #B Anchorage 99501
Judith Tyler	8412 Mitchell Trail 99502
S.L. Dawson	733 Sunset Drive, Anchorage 99502
Robert Mongelli	1326 1st Street Hol. AK 99501
Melva Reed	5300 E. 4th Ave. Apt #111 Anch. AK 99503
Diane Aiken	7011 Ferry Cir. Anch. AK. 99507
Lynn Moffatt	931 East 24th Apt A. Anchorage AK 99504
Grace West	P.O. Box 92577 Anch. AK. 99509
William Bratten	3565 Constellation #29 Anch. AK 99503
Curtis Holloway	4036 Cosmos Anch, AK 99517
Peggy Lee Gordon	PO Box 220116, Anchorage 99522
Richard M. Fisher	P.O. Box 772472, Eagle River, AK. 99577
Norman Maurer	1703 Richardson Circle, Anch. AK 99504

Anchorage

ALASKANS for Drug Free Youth - Support MARIJUANA Resolution

Box 8515 Ketchikan, AK 99901

NAME	Address
Elizabeth S. Lobdell	1666 Cranine St, Anchorage AK 9950
Brian G. Hoar	6821 Foothill Line, Anchorage, AK 99504
[illegible]	[illegible] AK 99504
[illegible]	4312 E. 6th Ave #B Anchorage AK 99508
[illegible]	3511 Bunnell St. Anchorage AK 995
[illegible]	3511 Bunnell St. Anch AK 995
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	6230 E. 13th Ave #3 Anch. AK 99504
[illegible]	[illegible] #10 Anch. AK 99503
[illegible]	4212 Arctic Dr Anch. AK 99504
[illegible]	8500 Hallett [illegible]
[illegible]	[illegible]
[illegible]	14715 [illegible]
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	3502 Moss Ct Anchorage AK 9950

(18)

Anchorage

ALASKANS for Drug Free Youth - support MARIJUANA Resolution

Box 8515 Ketchikan, AK 99901

NAME	Address
[illegible]	8701 Helvaag Ave Anchorage Alaska 99516
Steve Lee	3311 Telequana Dr Anch AK 99517
[illegible]	3251 E 42nd Ave Anch AK 99503
ARTHUR C PATCHIN	17928 TONSINA EAGLE RIVER, AK
[illegible]	203 Whitehorse Ct Anchorage AK
[illegible]	2517 Forsker Dr Anchorage 99517
[illegible]	2517 Forsker Dr Anchorage 99517
[illegible]	3605 [illegible] 99503
Carolyn Sloane	505 W. 2nd Anchorage 99501
Silvia W. Hunter	7216 Violet Pl. Anchorage 99502
Christine J. Reardon	6028 Prosperity Dr. Anchorage 99502
Margaret McGinnely	7315 Timothy Cir Anch 99502
[illegible]	[illegible]
[illegible]	3201 A E 42nd Ave Anchorage AK 99508
[illegible]	801 Richard Ave Anch AK 99516
[illegible]	4641 Caribou, West Anchorage
Pat Patchin	17928 Tonsina Ct. E. R. 99577
[illegible]	1911 I St Anch AK 99501
[illegible]	3130 E 46th St Anch AK 99507
Dan Ryan	1911 I St Anch AK 99501
[illegible]	[illegible]
[illegible]	6442 Lore Tree Circle Anch 99516
[illegible]	6442 Lore Tree Circle Anch 99516
[illegible]	[illegible]
[illegible]	2028 E 5th Ave Anch AK 99501
[illegible]	12500 Jamestown Circle Anch 99516

Anchorage

ALASKANS for Drug Free Youth - Support MAAIS WAIIA Resolution

Box 8515 Ketchikan, AK 99901

NAME	Address
[illegible]	Box 8 Metlakatla AK - 99926
[illegible]	Box 208 [illegible], 999[illegible]
[illegible]	Box 343 Metlakatla, Alaska
[illegible]	BOX 1, METLAKATLA, AK 99926
[illegible]	Box 161, METLAKATLA, AK 99926
Edward W. Tennyah	Box 265 METLAKATLA, AK 99926
[illegible]	P.O Box 544 " " 99926
[illegible]	Box 344 [illegible] 99926
[illegible]	Box 11 Metlakatla, AK 99926
[illegible]	Box 214 Metlakatla,
[illegible]	Box 98 [illegible], AK 9992[illegible]

the Above are Signatures of tribal Council of Metlakatla Indian Comm.

Total 34

11 - Metlakatla Tribal Council

ALASKANS for Drug Free Youth - Support MARIJUANA Resolution

Box 8515 Ketchikan, AK 99901

NAME	Address
Pauline Kramer	PO Box 163 Met AK 99926
Michele A Hyatt	Box 485 Met AK 99926
Weston Turner	Box 485 Met AK 99926
Shirley V. Turner	Box 485 Metlakatla AK 99926
Eleanor McClothlin	P.O. Box 616 Met AK 99926
Kristal A Hoff	PO Box 5066 Met AK 99926
Lorena J. Milne	P.O. Box 432 Metlakatla, AK 99926
Arlene W Nilson	Box 582 - Metlakatla, AK 99926

ALASKANS for Drug Free Youth - Support MARIJUANA Resolution

Box 8515 Ketchikan, AK 99901

NAME	Address
Larry de Hill	Box 563 Metlakatla AK 99926
Judi Hill	

ALASKANS for Drug Free Youth - Support MARIJUANA Resolution

Box 8515 Ketchikan, AK 99901

NAME	Address
Edward W. Hunyah	Box 265 METLAKATLA, AK 99926
Robert K. Dewson, Sr	Box 481 Metlakatla, AK 99926
Gregory Angel	Box 605 METLAKATLA, AK 99926
Clifford A. Hall	Box 122 Metlakatla, AK 99926
Marie A. Cook	Box 492 ✓ ✓ ✓
George Wilson	Box 62 ″ ″ ″
Judith A. Fawcett	Box 24 Metlakatla AK 99926
[illegible]	[illegible]
Barbara Kaiser	[illegible]
Ron Wilson	Box 247 Met. AK 99926
Paul Hoffman Sr.	Box 578 Metlakatla, Alaska 99926
Vernon B Dundas	Box 602 Metlakatla, AK 99926
Roberta E Atkinson	Box 162 Metlakatla, AK. 99926

Box 8[illegible]5 Ketchikan[illegible]AK 99901

NAME	Address
Raymond Atchak	Box 2062 Bethel, AK 99559
Julie Adams	Box 528 " " "
Katie Clark	Box 82 - " " "
Jonet Nicholai	Box 434 " " "
Margaret A. Chaney	PO BOX 1834 Bethel 99559
Jon Stair	Box 118 Bethel Alaska 99559
Addie B. Kashatok	Box 97 Bethel Ak 99559
Elizabeth Sennyboy	PO BOX 1568 Bethel 99559
Clara R. Tommy	Gen. Del. Bethel, AK 99559
KENNY HATCHER	P.O. Box 528 Bethel AK 99559
Chrystal L. Smith	P.O. Box 1028 Bethel, AK. 99559
Agnes Thomas - Hohman	P.O. BX 528 Bethel, AK 99559
Mary M. Lyons	Bx 393 Bethel, Ak 99559
Ester Davis	Bethel
James C. Polich	Box 528 Bethel AK 99559
Elizabeth A. McIntosh	Box 528 Bethel AK 99559
Ruth's Wassillie	PO 1258 Bethel AK
Elina P. Lincoln	Box 1975, Bethel, AK 99559
Ed [illegible]	Toksook Bay AK 99637
Violet Evan	Bx 1064 Bethel, Ak 99559
Wm Nanuk	Box 368 BETHEL, AK 99559
V. Andrew	PO Box 62 Bethel, AK 99559
Fred Pete Sr.	P.O. Box 44 Bethel, AK. 99559
[illegible]	Bx 528 Bethel 99559
Thomas P. Hoke	Box 1787, BETHEL, AK. 99559
N. Knight	Box 471 Bethel, AK 99559

8 1/2 = 45 + 2 (Bethel 17)

Alaskans for Drug free, Youth
Support Marijuana Resolution
Box 8515, Ketchikan AK 99901

NAME	Address
[signature]	Box 1551, Nome, AK 99762
Ronald J Gould MD	Rnald Gould 4558 CHS ROAD, FBKS AK 99712
Debra Caldera	Debra Caldera P.O. Box 1825, Bethel, AK 99559
M C Memmad	Box 2047, Bethel, AK 99559
Martha Attic	Box 528 Bethel, AK 99559
Bessie Wassillie	" 2267 " " "
Moore, Martha	" " "
Gene Nelson	Box 1228,
Anna Nicholas	Box 1985 Bethel, AK 99559
Georgiana Wesley	P.O. Box 1311 Bethel, Ak. 99559
	P.O. Box 66 Bethel AK 99559

Box 851S	Ketchikan, AK 99901
NAME	Address
Jeraine Beaver	Box 113, Bethel
Alvin I. Davis	Box 3107 Bethel
Barb a Miller	Box 3298 Bethel AK 99559
Mary A Kasayulie	Box 3107 Bethel, AK
Tonia M. Peterson	Box 782 Bethel AK 99559
Emily Kokrok	Box 113 Bethel, AK. 99559
Dismas Bell Peter	Box 1014 Bethel, AK. 99559
Sharon L Gloyd	P.O. Box 1757 Bethel, AK 9955
Sylvia R. Elliott	P.O. Box 1882 Bethel, AK 99559

Box 8515	Ketchikan, AK 99901
NAME	Address
Mary S. Alchak	P.O. Box 807, Bethel, Ak 99559
Minnie Fritts	PO Box 293 Bethel, AK 99559

BETHEL

ALASKANS for Drug Free Youth - support MARIJUANA Resolution

Box 8515 Ketchikan, AK 99901

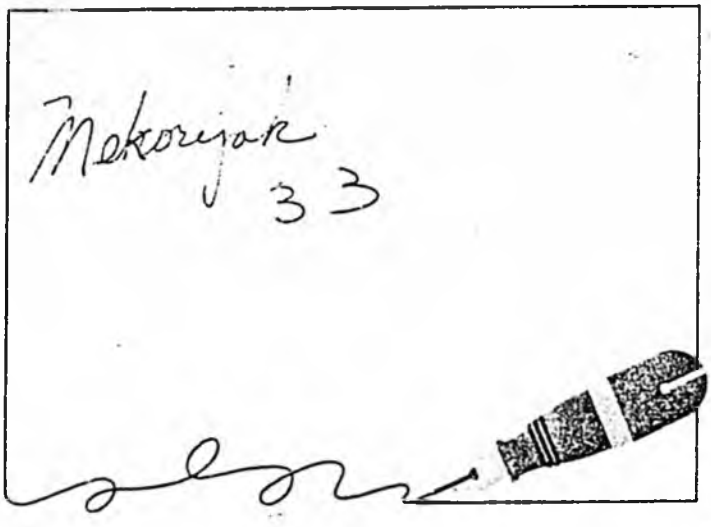
NAME	Address
Julia A. Smith	Box 909, Sitka, Ak. 99835
Michael G. Hanis	707 Sirstad Sitka AK. 99835
Jacqueline H DeArmond	105 Millakuttla " "
Arthur E. Northern	1104 Edgecumbe "
Roxanne Bush	P.O. Box 243 Sitka 99835
Randy Karlyon	Box 1602, SITKA
Cheryl Hobson	1104 Edgecumbe Dr. Sitka Ak 998
Connie Sloss	3552 K.O.P.R. Sitka, Ak. 9983

Returns by March 7-

ALASKANS for Drug Free Youth - support MARIJUANA Resolution

	Box 8515 Ketchikan, AK 99901
NAME	Address
Sharon Backhaus	P.O. Box 818 Kenai AK 99611
Helen Harrower	P.O. Box 3889 Kenai, AK 99611
Cathleen Fade	P.O. Box 3966 Kenai AK 99611
Myrna Yenrick	111 walnut Kenai, Alaska 99611
[illegible] Boyd	704 Cypress Kenai AK 99611
[illegible] Carlson	Box 33[illegible] Kenai 99611
Ray Heinrich	111 walnut Kenai AK 99611
[illegible] Bedard	Box 5303 Nikiski AK 99635
[illegible] Hillom	Kt. Box 1635 Kenai AK 99611
Brenda Bedard	Box 5303 Nikiski AK 99635
Jesse [illegible]	Box 3966 Kenai AK 99611
Victor H. Cook	Box 363, Kenai AK 99611
Marie Cook	P.O. Box 263, Kenai AK 99611

Kenai 15


Mekorijak
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ALASKANS OF KUSKOKWIM COUNTY SUPPORT NUNIVAK NATIVES

Box 8515 Ketchikan, AK 99901

NAME	Address
Samuel Smith	P.O. Box 54, Mekoryuk, AK. 99630
Edith Hoff	Box 64. Mekoryuk 99630
Howard Evans	206 2 Mekoryuk, AK. 99630
Simon Williams	P.O. Box 14, Mekoryuk, AK 99630
Lucien E. Weston	P.O Box 17 Mekoryuk, AK 99630
Elsie Williams	Box 4 Mekoryuk AK 99630
Norman A Williams	Box 91 Mekoryuk AK 99630
Selma A. Williams	Box 35 Mekoryuk, AK 99630
[illegible]	Box 81 Mekoryuk AK 99630
Jack U. Williams, Sr	Box 35 Mekoryuk, AK. 99630
Susie B. Williams	Box 81 Mekoryuk ak 99630
Edward M Williams	" 81 " " 99630
Martin C. Kaganak	Box 62 Mekoryuk, Alaska 99630
[illegible]	Box [illegible] Mekoryuk, AK 99630
[illegible]	P.O. Box 63 Mekoryuk AK
Flora S. Jack	P[illegible], Mekoryuk
Walter T. Amos	P.O. Box 4, Mekoryuk AK. 99630
John T Smith Jr	P.O. Box 25 Mekoryuk, AK 99630
Dorothy	[illegible] Box 17 Mekoryuk AK 99630
C Wilson	Box 15 Mekoryuk AK 99630
Jessie Williams	Box 14 Mekoryuk AK 99630
Alice M. Williams	Box 15 Mekoryuk, AK 99630
Muriel M. Amos	Box 12 Mekoryuk, AK 99630
Earl Evans Jr	Box 3 Mekoryuk, AK 99630
Will Wilson	Box 15 Mekoryuk AK 99630

(Cross do not mail)

Mekoryuk 33

1

NAME	Address
Box 8515	Ketchikan, AK 99901
Ida G. Amos	Box 34 Mekoryuk AK 99630
Johnny M. Smith	" 51 " " "
[illegible]	Mekoryuk Alaska AK 99630
Richard Davis	Mekoryuk Alaska 99630
Henry F. Ulmen IA	Mekoryuk. Alaska 99630
[illegible]	P.O. Box 06 Myn AK 99630
Not Me I'll die smoking	
Howard Fuller	mekoryuk, Alaska 99630
Sandra F. Fuller	mekoryuk, AK 99630

ALASKANS for Drug Free Youth - support MARIJUANA Resolution

NAME	Address
Box 8515	Ketchikan, AK 99901
Paul W Wagner	Box 5497 - Ketchikan
Robbie Stanton	1819 Second Ave. Ketchikan, AK
Linda G. Adams	Box 7171 Ketchikan, AK
Bill Sallison	659 Main St. Ketchikan AK
Gloria L. Taylor	Box 1441 Ketchikan
Debbie Selby	2533 2nd AVE KTN AK
	135 Dock - KTN
Helen Hendricks	214 Edmond - Box 5971 Ketchikan
David L. Ball	619 Mission
Bonnie E. Ball	619 Mission
[illegible]	[illegible]
[illegible]	[illegible]
John C Sund	Box 732 Ward Cove
Michael C. Smith	P.O. Box 5896 Ketchikan
Ruth E. Smith	Box 8896 Ketchikan
Roberta Minnick	433 Front St. Ketchikan
Evelyn I. Freeman	2840 3rd Ketchikan AK. 99901
Constance G. Enfield	2500 - 4th " "
Mary Lee Lindsey	364 Edmonds, Ketchikan, AK 99901
Ron Lil Lindsey	364 Edmonds " "
Earl Peters	2575 - 3rd Ave Ketchikan Alaska
Richard J. Thomas	822 Loren Ketchikan Alaska
Scott Ellard	1069 Tongass Ketchikan AK
EARL L [illegible]	301 Bawden - KETCHIKAN
Ella Benson	Rt. 2 Bx 393 Ketchikan
Dawn L. Thomas	729 Grant St Ketchikan, AK

(Ketchikan Total (988))

1 1

ALASKANS for Drug Free Youth - support MARIJUANA Resolution

Box 8515 Ketchikan, AK 99901

NAME	Address
Gemma Terry	P.O. Box 7755 Ket. Alaska 99901
Jo Ann Walker	Rt 2 Box 121 Ket Al.
Diane Enwright	Rt 1 Box 2040 Ket Al
Michele C. Hagen	P.O Box A-3 Ward Cove, Alaska
Marian N. Green	PO Box 8926 Ketchikan, AK 99901
Gladys Cutler	830 water St. Ketchikan AK 99901
Harry & Elisquette	652 PARK AVE #4 KETCH AK
Rollo E Bray	2221 Second Ave Ketchikan
Elkfrat J	4F4 Court
Lloyd L. Reed	2855 Tongass Ave Ketchikan AK
Jim Sattlemeyer	3.3 Mission rd Ket.
Archie Lafosse	137 STEDMAN KETCHIKAN AK. 99901
Willie Hillis	Box 7483 Ketchikan, Alaska
Lawrence A Hillis	Box 7483 Ketchikan, Alaska
Stephanie D Brinkley	P.O. BOX 7295 KTN, AK.
Reverend Gregory Jr.	BX 554 KETCHIKAN, AK.
Gertrude M. Johnson	757 Deermount
Peter R Johnson	757 Deermount
Helen L Erickson	1611 Water St. Ketchikan
Tim Erickson	" " " "
Janet Munroe	3826 Hillside
John F Munroe Jr	— — —
Jerry L Kiffer	9.5 mi North Tongass Ken. CR.
Linda Kincaid	Box 3178 Ketchikan AK 99901
Margaret M. Freidenbloom	2340 First Ave Ketchikan AK 99901
Betty Linton	P.O. Box 6612, Ketchikan, AK 99901

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ALASKANS for Drug Free Youth - support MARIJUANA Resolution

Box 8515 Ketchikan, AK 99901

NAME	Address
Tom Friesen	2031 2nd Ave KETCHIKAN
David K. Brown	Route 1 Box 900 Ketchikan
Mary Lou Friesen	2031 - 2nd Ave - Ketchikan
[illegible]	Box 6062 KTN
[illegible]	Box 7153 Ketchikan AK
David C. Nunn	846 WARREN Ketchikan, AK.
Theresa Early Newbern	932 Lincoln St Ktn.
Dan Lakip	415 Main St. Rm 201 Ketchikan, AK
Richard A. Roberts	Box 5964 KTN
Bill Beatty	Box 8556 - Ktn. 99901
Mark ZASTROW Mark Zastrow	PO Box 6984 KTN 99901
Ron Barnes	Box 553 KTN AK 99901
Sheryl Rice	Box 7772 - Ketchikan
[illegible]	Rt 2, Box 1144; Ktn, AK
JIM ELKINS	RT 1 Box 911 KTN, AK 99901
Jon Meader	Box 6435, Ketchikan 99901
[illegible]	[illegible]
[illegible]	[illegible]
Danita Elaine Enderud	2275 Tatko, Ketchikan, AK 9990
Kristen Dibb	933 Brown Deer, Ketchikan, AK
Jane M Johnson	1212 East 5th Ketchikan AK 99901
Jean E. Latham	P.O. 5595 KTN, AK, 99901

'ASKANS for Drug Free Youth - Support MARIJUANA Resolution

Box 3515 Ketchikan, AK 99901

NAME	Address
Eugene L. Witt Jr.	2415 Hemlock - No. 903
Ernest L. Anderson	Box 7456, KETCHIKAN, Alaska - 99901
Ann Graham	P.O. Box 5544 Ketchikan, Ak. 99901
Mary Ball	P.O. Box 5[illegible]
[illegible]	104 Schoenar [illegible] AK 1991
Linda E. K.[illegible]	PO Box 435
[illegible]	[illegible]
Esther U. Burns Sr	[illegible]
Darlene C. Lucey	"
[illegible] Mary Robins	616 Tongass Ave, Ketchikan, AK 99901
[illegible]	347 Main Street Ketchikan
[illegible]	PO Box 5737 Ketchikan AK 9990[illegible]
Lillian M. Smith	Box 5737 Ketchikan, AK 9990[illegible]
Ann L. Meader	Box 643 Ketchikan Ak 99901
Tina Meader	3328 Dale Lt Ketchikan AK
Diana Lee Lance	3301 Bagnell Dr Ketchikan, AK 99[illegible]
Ernest Ogard	Ketchikan Resident
Mildred Ritter	PO Box 6[illegible] 4115
Patricia Heaman	R2 Box 75 Ketchikan
[illegible]	[illegible] Ketchikan - Ketchikan AK 99901
Carol Heaman	R.T. 2. Box 75 Ketchikan AK 9990
Walter Eskenazi	3115 Baranof Ketchikan 99
Warren Robertson	3715 Bawden Ketchikan
Martha Hibbs	R.C. 2 Box 151 Ketchikan Ala 99
Kathy Lee [illegible]	Box No 3044 Ketchikan, Alaska
Ernest F. Moses	P.O. Box 1038 Ward Cove, AK. 9928
Erma Meade	2721 7th Ave. Ketchikan AK 9

IASKANS for Drug Free Youth - support MARIJUANA Resolution Box 8515	Ketchikan, AK 99901
NAME	Address
Minnie L Grant	RT 2 Bx 315 City
[illegible] Thompson	Bx 135 Wrn - 99901
Eileen Thompson	[illegible]
Ellen P.T.	2525 3rd Ct
Fran Peterson	RT 2 Box [illegible]
[illegible]	2720 Tongass Ave
Ellen McLean Hutson	RT 1 Box 813. KETCHIKAN ALASKA 99
James E. Carter	1043 Woodland Ketchikan Alaska 9990
Cheryl M. Lake	Box 3168 Ketchikan, Alaska 99901
Cathleen H. Hall	3329 2nd Ave Ketchikan
Rick Manning	PO Box [illegible] Ketchikan AK
Rick Hance	605 Park Ketchikan, Alaska
Michael Heinis	1306 Water Street Ketchikan Alaska 99901
Leo Michael Sr	530 Deermount Ketchikan Alaska
Lori J. Carter	P.O. Box 9452 Ketchikan
Erma Dodds	PO Box 5596 Ketchikan 99901
[illegible]	[illegible]
Mr Judith Myers	639 Deer Mt. Ketchikan
Patricia Hook	PO Box 923, Wood Cove, AK 9992
Joan Begaeka	3929 Tongass Ave City
[illegible] Dellamanchuk	RT 2 Box 408 KETCHIKAN AK
Dean Williams	1401 Martin Rd Juneau AK
Edna L. Williams	1401 Martin Rd, Juneau, AK
Joan Kaas	Box 8595 Ketchikan Ak. 99
Stanley Burks	Box 711, Ward Cove, AK 9992.
Betty Stensland	Box 3014 - Ketchikan Alt. 9990
Edna Minick	Box 5686 Ketchikan, Ak.

ALASKANS for Drug Free Youth - Support MARIJUANA Resolution

Box 8515 Ketchikan, AK 99901

NAME	Address
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[illegible]	2625 4th Ave 11
Candace Clardy-Perry	915 Park Ave. Ketchikan AK 99901
Gladys Riffey	R.T. Box 94 Ketchikan AK 99901
Colin A Burk	Box 5404, Ktn, AK
[illegible]	KTN Ketchikan
[illegible]	537 Tower Rd. KTN 99901
[illegible]	P.O. Box 6853 Ketchikan AK
[illegible]	P.O. Box 5657 Ketchikan, AK 99901
L.C. Kendall	P.O. Box 5156 Ketchikan AK 99901
Neil Kendall	P.C. Box 6175 Ketchikan Ak. 99901
[illegible]	2112 - 3rd - Ketchikan 99901
Gerald Zaremski	3343 Baranof Ave Ketchikan Alaska
Phyllis M Webb	PO Box 7483 Ketchikan AK 99
Alan Stathers	141 Bryant St. # 207 Ktn
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Dorie Tucker	Pioneer Home " " "
Donald A. MacMullen	615 Main St Ktn Ak.
Calvin Carlson	764 Main St
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ALASKANS for Drug Free Youth - support MARIJUANA Resolution

Box 8515 | Ketchikan, AK 99901

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Pat Dunbar	617 Mission #3 KTN 99901
Tammy Knudson	Box 7098 K. KAN AK 99901
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ALASKANS for Drug Free Youth - support MARIJUANA Resolution

Box 8515 | Ketchikan, AK 99901

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ALASKANS for Drug Free Youth - Support HJR15 and SJR18 Resolution

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Doris VOLZKE	Box 3089 Ktn, AK
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Linda K Watts for Demmert	1067B Woodland Ave 2724-4th Ave Ketchikan
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Martha N Demmert	2724-4th Ave Ketch AK 99901
Christine Sheldon	316 Knowles Rd Ketch 99901
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ALASKANS for Drug Free Youth - Support MARIJUANA RESOLUTION

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Alice J. Sheldon	316 Knowles Rd Ketch AK 99901
Celia Faucett	735 Deermount Ketchikan AK 99901
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Georgia Finau	1731 Fair View Ketchikan, AK
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ALASKANS for Drug Free Youth - support MARIJUANA Resolution

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Linda Gibson	3857 Fairview
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ALASKANS for Drug Free Youth - support MARIJUANA Resolution

Box 8515 | Ketchikan, AK 99901

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...ASKANS for Drug Free Youth - support MARIJUANA Resolution	
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Joseph D Poole	Box 5211 KTN AK 119 Austin #310
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ALASKANS for Drug Free Youth - support MARIJUANA Resolution

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Marijuana Recrim.

FOR Drug Free Youth

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FOR Drug Free Youth

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Earl Palmer	
ROBERT GORDER	Box 6337 KTN
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[illegible] 716 [illegible] St. Lt. 18

33

9560 KTN

Watson KTN

Cooke KTN

E SESAME KTN

Jackson KTN

6530 KTN

Box 7373 KTN.

7372 Ktn.

7914 KTN

120 x 5063 KTN

Box 9328 KTN

Box 5074 KTN

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Couch 4 Ktn

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For Drug free youth

Marijuana Reform.

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[illegible] Ktn AK	Name Tom Sloan address Box 8633
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