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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analyzed the scientific substance of the work, nor has it examined the strategy of research support or reviewed current unpublished research.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	3,910	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 1981[a] Amount	%
Cannabis	4,106	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	1,495	4	1,000	3
Hallucinogens	316	1	729	2	1,572	5	1,515	5	2,358	6	2,865	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	2,778	7	3,277	8	4,000	10
Volatiles/solvents	158	1	363	1	496	2	556	2	294	1	278	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	6,723	22	12,286	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

[a]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 critical areas. Without this new information, the present level of public 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-T5); 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	3,118	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		
Elinson and Josephson	Students from 3 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	5,423	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 10 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: 8 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	3	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	376	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	1[illegible]		
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
Smart	(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 course	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 freshmen	1971 1972 1973	1974 1974 1974	4 3 2	6 months: 1-T2; 1 year; T2-T3, 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	183	Household interviews	Marijuana, ups, downs, psychedelics, heroin
	(2) Mothers	30-45 yrs					284	183		
Brunswick	Representative community sample of Harlem youth	16-17 years old	1969-1970	1975-1976	2	6 years	664	536	Household interviews	Alcohol, marijuana, asphetamines, barbiturates, acid, cocaine, heroin, glue
Sieber	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=1,810, 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	786	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 socio-economic schools	Grades 7-9	1976	1980[2]	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 1964 and 1954 inclusive, who registered with Selective Service upon age 18	20-30 years old	1974-1975	1982	2	6-7 years	650	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 1964-66 c) 3 cohorts born 1961-63 d) 3 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 interviews -self-administered questionnaires -behavioral tests -blood sample -psychological test -medical exams Telephone contacts: -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	[illegible]	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 non-medical 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
Bandel	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 Independant School District	Grade 7	1971	1981-1982	4	1 year 1 year 9-11 years	9,300	Not yet completed	T1-T3--Self-administered questionnaires T4--Adult follow-up--Household interview	Marijuana/hashish, barbiturates, inhalants, hallucinogens, amphetamines, tranquilizers, heroin, other narcotics, quaaludes, cocaine
Lauer 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 6 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, tranquillizers, 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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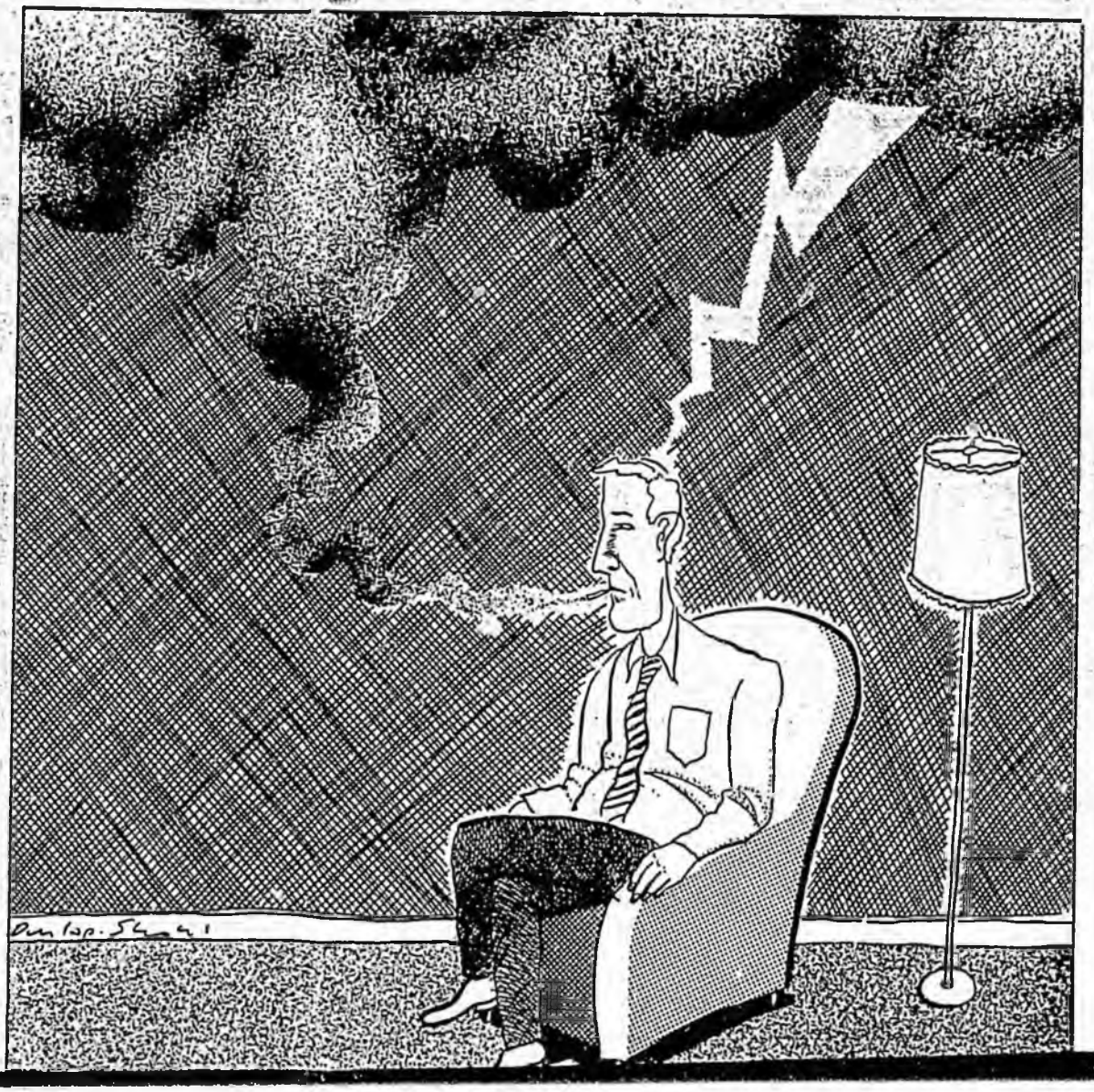
SB

32

(FILE 2)

Q. 'Should marijuana be recriminalized?'



A. Making it against the law won't work

I have a question for all of the adults of Alaska: everyone, politicians, priests, police officers, lawyers, judges, teachers, businessmen, doctors. Would you be willing to give up that beer after work, sacrifice the wine at dinner or forego your martini lunch to help save some poor alcoholic from getting a drink?

Prohibition never worked, and never will. Recriminalizing marijuana won't work either. If you drink or smoke cigarettes and are in favor of recriminalizing marijuana, then you are a hypocrite and need to take a moment to think about what your real objectives are.

— Rick Kinsey

A. There are other ways to fight abuse

Sen. Fischer's proposal to recriminalize marijuana reminds me of a dog, nailed in the face by a porcupine, that keeps going back for more. Are we so blind to the history of prohibition? Anti-drug laws have failed universally to discourage abuse and succeeded in making organized crime rich and powerful beyond belief.

Chemical dependency and abuse can be fought responsibly through education and supportive behavior towards young people. Over regulating every aspect of life conveys the message to our youth that individual responsibility is not respected by our leaders.

From an economic standpoint, anti-drug laws keep the rewards of the trade so high that traditional enforcement techniques are doomed to failure from the start. The taxpaying citizen then foots the bill for enforcement, the judiciary and incarceration — and as victim, for the big bucks to support a habit must come from somewhere.

— Richard Tandlich

A. Smokers and dopers should be segregated

Recriminalize marijuana for condo and apartment dwellers and their children. All apartments should be either for smokers or for non-smokers in an area. Those who do not smoke anything have the right not to be [illegible]

— *Richard Tandlich*

A. Smokers and dopers should be segregated

Recriminalize marijuana for condo and apartment dwellers and their children. All apartments should be either for smokers or for non-smokers in an area. Those who do not smoke anything have the right not to be force fed.

A lady of the evening moved in under me, chain smoked cigarettes and used pot. My circulation was so impaired from what came up around kitchen and bathroom pipes, I was hospitalized. If my window was open and she opened hers, her poisons were dumped up into my apartment, depriving me of having fresh air in my own home. It would be better for clean apartment dwellers if their neighbors just boozed it up, and left the nicotine and pot alone.

I want my rights to privacy of smoke and pot free air in my home. That privacy has again been intruded upon for the first time in about four years. My health had improved so much in four years. Now within six months my circulation has decreased. I have developed sinusitis, bronchitis, dulled thinking, poor circulation, sleeping problems, loss of energy — all because new tenants who use nicotine and pot moved under me again. They invade the privacy of my home with their addictions and I have no way of escape. I want a law that causes dopers to stop dumping their dope into my home.

— *Elizabeth Montgomery*

A. Others issues facing us are more pressing

A bill to recriminalize the possession of marijuana in one's own home should not be passed. To do so would put many otherwise law-abiding citizens in a position contrary to the law.

When legislation was passed to decriminalize the possession of marijuana in the privacy of one's home, it reflected the pioneer spirit of Alaskans, and showed respect for the privacy and independent judgment of the individual.

Those who argue that marijuana in the home may adversely influence children may be right. If a parent is irresponsible enough to abuse such a substance in the company of a child, it could be considered a form of child abuse. But there is just as much of a potential for the abuse of many things in the home, from aspirin to alcohol.

In light of the state's current fiscal predicament, and considering a limited legislative session, I think our lawmakers would do well concentrating on the more pressing issues facing Alaska rather than squelching the independence of its citizens.

— *Chas Jones*

A. Alaska's youth appear to back recriminalization

I recently advised the state legislature what Public Safety Commissioner Bob Sundberg said at my Senate hearing last year:

"Only in Alaska can one sit at home and smoke marijuana secure in the knowledge that you are breaking federal law with the blessing of the State Supreme Court."

No one wants to see changes in our laws that take away our right to privacy. But the right of a mature individual to exercise free choice is one thing ... and a law that puts pot in the hands of 9-year-olds is another.

As an Alaskan, I'll be pleased when we change our drug law. If our choice is between a dubious argument that we endanger certain privacy rights on the one hand, or the well-being of Alaska's youth on the other, I don't think there's a choice at all.

I know that young Alaskans have recognized the double standard. Last October, the executive board of the Alaska Association of School Governments — made up of students from all over Alaska — unanimously adopted a resolution calling for the recriminalization of marijuana. They felt that the state's marijuana law was making the fight against drug abuse in their schools more difficult.

We need to listen to the voices of young Alaskans.

— *Frank H. Murkowski*
United States Senator

A. THC least harmful of intoxicants

Of all the intoxicants that are legal in our society, (such as alcohol and nicotine), THC, the active ingredient in marijuana, is the least harmful. Rarely does violence occur with its use, and physical dependence has yet to be proved.

A totally drug-free society is without doubt the ideal, but in reality I doubt this will happen. Society would be a lot better off to totally legalize marijuana and recriminalize alcohol but then the lesson of America's criminalization of alcohol should apply to the recriminalization of marijuana.

— *John Byrd*

A. Legalizing marijuana was a mistake

Yes, marijuana should be recriminalized without delay. Marijuana is one more ill that is sinking our nation.

Debate this with any doper and you'll get the same argument every time: "It's no worse than alcohol." That may be true, and while we need to work harder on all forms of alcohol abuse, two wrongs don't make a right. Why add to our problems? Besides, alcohol is sold by legal, licensed and monitered stores.

"I can do what I want in the privacy of my home." OK, but how does most marijuana get there? Not by home-grown plant — but by drug dealers. By allowing marijuana in homes, we're creating a large market for drug dealers to get rich. These nice people don't just sell marijuana, but other more deadly drugs that people are willing to kill or steal to get.

At a time when most people are trying to get the message out that drugs kill, our legislators need to do their part and correct the mistake that was made by legalizing marijuana. Do it for our children. Do it for society. Recriminalize now!

— *Richard D. Rhyner*

A. No amount in the home should be illegal

I do not smoke, drink or use drugs. However, what one does in his or her own house is his or her business. Is being drunk in private legal? Alcohol does far more damage physically, environmentally, and socially than pot. No amount of marijuana possession at home should be illegal. The last cop murdered in Anchorage was killed by an admitted drunk. The latest murder trial involved a killing committed by two drunks in Spenard. Need I say more?

— *Paul Purtle*

A. Making it illegal is unenforceable

If a person engages in an activity in private that does not harm another person, should the government have the right to prohibit that activity? This is the fragile cornerstone of our society: not our representative form of government, but our freedom. The alleged harm to society from smoking marijuana is not substantiated and is exaggerated by exploiting our emotional reactions to the information we do receive.

Making an activity illegal will not necessarily stop a person from engaging in that activity. A person will choose to stop smoking marijuana in private only if the unpleasant consequences outweigh the pleasure it provides and if the consequences are relatively certain.

In fact, there is no way to stop a person from smoking marijuana in private that is not an unacceptable intrusion of privacy and extremely expensive. It really doesn't matter whether our legislators "recriminalize" the possession of marijuana or not, the law is just as unenforceable here as it is anywhere else in the U.S.A.

— *Ann Riley*

A. Marijuana not a 'rung' on the ladder to addiction

Have I missed a large crime wave committed by the cursed potheads or have we concocted a new reason to overcrowd our already over-capacity jails? We haven't the resources to attack the enormity of users as their numbers have reached many millions. Besides, most of the crime associated with marijuana use is the result of trying to obtain it. If it was legal and sold under regulations like alcohol and other controlled substances for a fair market price the large profit motive would be eliminated and with it the host of greedy vampires who control the market now.

For too long people have falsely believed that marijuana was a rung on the ladder to heroin use and nowadays to cocaine addiction and that by eliminating this rung we could save people from addiction. But in reality those people will become addicted anyway. So long as mind-numbing substances such as heroin and cocaine are available and so long as our society continues to abuse so many of its citizens, some will seek to escape their pain in this way!

For too long we have heard how we should "ask not what your country can do for you, ask what can you do for your country" and not enough about what is America doing for its growing multitudes of poor, homeless, and hopeless citizens. If America is so great why are so many Americans so damn unhappy!

— *Gerald Hudspeth*

A. Other more harmful things remain legal

Why shouldn't the legislature take away the right to smoke cigarettes and have drinks in one's own home, to buy our own toilet paper and food while they're at it? Communists see life much the same way.

If marijuana is a health issue, shouldn't premarital sex be outlawed? It's a health hazard now.

Marijuana is not addictive like alcohol, coffee, and cigarettes, which are legal!

If a person 21 and over is legally responsible for their own actions, does the legislature have the right to tell them what they can smoke? They've already told us where we can or cannot smoke, now it's what we can or cannot smoke! How petty!

The law won't stop people from smoking it, it will only crowd the already overcrowded jails and cost taxpayers more in drug enforcement.

Not that it's OK to smoke and drive or perform any other public service. It should be punished just as severely as drunk drivers.

But to grow small amounts at home for personal use, who is it really affecting? The people or the legislature because they can't use it for a scapegoat for other more serious issues at hand?

— *Chris Hayden*

More responses next Saturday

Next Saturday's People's Forum page will carry additional responses to the question: "Should marijuana be recriminalized?"

Alaska State Legislature

Senator Mike Szymanski

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APR 21 1987

MEMORANDUM

TO: Senator Jay Kerttula, Chairman, Senate Judiciary

FROM: Senator Mike Szymanski

DATE: April 16, 1987

13 attc

SUBJ: Literature on SB 32 "The Marijuana Bill"

Attached is a copy of some studies and other literature sent to me by my constituent, Chris Hamre, which I though would be of interest to you and your committee members.

Chris H. Hamre
15851 Clarks Rd.
Anchorage, Alaska 99516

APR 15 1987

April 11, 1987

Senator Jalmar Kerttula
Senate Judiciary Committee
Pouch "V"
Juneau, Alaska 99811

Dear Senator Kerttula:

I would like to take this opportunity to introduce myself as a resident of district "E" and to register my opposition to SB 32 "The Marijuana Legislation." I am also enclosing some studies and literature for your information that relates to this issue. As my representative to the State Senate it is important for me to know that you have been provided with reasonably balanced information drawn from credible sources.

The information is provided in as much text as feasible. I am not trying to skew materials out of context, as I have seen done by proponents of this legislation. (enclosure #2)

Enclosure #1 is a point by point rebuttal to the bill that many of us feel much more accurately represents the issues raised in SB 32. It also sites the sources that we have drawn from to come to our conclusions.

Enclosure #3 is "AN ANALYSIS OF MARIJUANA POLICY" performed by the National Research Council and published in 1982 (under the Regan administration.) It reviews many studies of marijuana consumption rates before and after decriminalization. It found that increase in use was "equal to or less" than in non decriminalized states. The studies showed this to be true with High School Students as well as the population as a whole. The NRC extensively studied a "Regulated" Marijuana Market (what we have now) and the "Prohibited" Marijuana Market (what SB 32 proposes.) Their recommendation completely in favor of the "Regulated" system we now employ due to the high social and economic costs of the "Prohibited" system.

The economic impact of a prohibited market was demonstrated with a study conducted by the State of California. This study showed a 74% savings in what the state had been spending for the enforcement of marijuana laws before decriminalization in the range of $35 to $100 million. The areas cited were criminal custody, booking and pretrial incarceration. No mention was made of the cost of investigation, prosecution and court costs. These are costs that the Alaska Legislature will be accountable for.

Enclosure #4 is a copy of the Statutes that the Alaska Legislature passed to define Marijuana as a Controlled Substance. I was concerned that some Senators may be under the impression

that the courts had legislated the terms of Marijuana as a controlled substance. Present laws restrictively regulate this substance as follows:

No one may possess any amount of Marijuana:
Under 19 years of age
In a propelled vehicle (car, boat or snow machine)
In any public place or establishment
No one may manufacture for sale or sell
No one may possess any amount in excess of four ounce

The Alaska State Supreme Court, did find that under Section 22 of the "Declaration of Rights of the Constitution of the State of Alaska" that right of personal consumption of marijuana by individuals in the privacy of their own home is protected. Enclosure #5 shows some of the text of the "Raven Decision" and in all the times I have requested information from Sen. Fischer and Rep. Martin, they have not shown any studies that even closely meet the tests proscribed by the courts for this type of invasion of privacy in the home.

It disturbs me to hear people say "Alaskans want Marijuana recriminalized." Alaskans do not want Marijuana recriminalized. Alaskans do not want additional, unnecessary and costly restrictions on their rights. More specifically though, the Senate HESS committee hearings on this bill showed a pretty even split in the comments. In two sets of hearings were 16 people speaking for the bill 12 against. At the next hearing there were 27 for 22 against. This does not show a clear mandate particularly when noting Sen. Fisher solicited testimony and gave preferential treatment to proponents of his bill. Further, the Anchorage Daily News requested letters about people views on this legislation. Overwhelmingly the responses was against this bill.

I am a board member of the Home and Land Owners Association (HALO) of Area "G" in South Anchorage. I am a member of the Bear Valley Community Council that works hard for road improvements, water quality and parks in our neighborhood. I am a businessman that contracts with government agencies and I employ 20 people annually. It is distressing to be side tracked from these issues and have to rejustify my right to privacy at home. It is discouraging to see that the net value of my contributions in the community could warrant incarceration if this bill is passed.

Jay, please take a few minutes to review these studies and this issue carefully. This bill carries great impacts to our community both in dollars and in the resources. Alienation from the rule of law in a democratic society may be the most serious cost of this proposed legislation.

Sincerely:

C. H. Hamre

Chris H. Hamre

ENCLOSURE #1

FINDINGS ON SENATE BILL #32 & HOUSE BILL #55

I have examined the findings reported in House Bill #55 and Senate Bill #32 of the Alaskan Legislature and have found them flawed and inaccurate. Here is a point by point rebuttal of the findings. Beginning sentences in apostrophies are direct quotes from the bills. References to the National Academy of Sciences refer to their publication Marijuana and Health which reports their 1982 study of marijuana related research. I have also enclosed other materials which are pertinent to the topic of recriminalization.

1) "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;"

Actually, THC is broken down by the body soon after ingestion. It's metabolites stay in the body for up to 30 days, but these metabolites are non-psychoactive. Any toxicologist can confirm this. Urine testing advocates exploit the confusion between THC which is the active ingredient and is metabolized relatively quickly, and its metabolites (chiefly 9-carboxy-THC) which have no psychoactive effect but linger in the body for a month or so.

The following quote is from a recent article by Chemical & Engineering News (6/2/86). "Marijuana is the most commonly abused drug and the kinetics of its metabolism have been studied extensively. It is also an unusual drug in that it can be detected in urine for a long time. Very little of the original drug, Delta-9-tetrahydrocannabinol or THC, goes into the urine. The chemical is absorbed from the blood into body fat tissue where it is eliminated as it is slowly metabolized. . . (metabolites) can be found in urine for longer than a month . . ."

The following quote is from a Center for Disease Control MMWR Report (9/16/83). "Studies involving humans indicate that 80% - 90% of the total dose of Delta-9-THC is excreted within 5 days - approximately 20% in urine and 65% in feces."

Most experts claim that the metabolites disappear 10 to 14 days after ingestion in most cases. Urine tests detect these metabolites, which is why the manufacturers are required to point out that they are tests to indicate recent use, not intoxication or impairment. If THC remained in the system for 30 days, and remained active, the urine tests would be marketed as a way to indicate impairment. They aren't.

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, and initiative, as well as moodiness and depression;"

The "buildup of THC" is actually tolerance to the drug, a physiological response humans and animals have to any drug. It occurs not because of the THC buildup, but because of other complex biological factors.

The symptoms mentioned accompany cessation of marijuana use in some individuals, not the buildup in the body. A majority of marijuana smokers experience no side-effects from cessation of use. If these symptoms indicate anything, they indicate the relative lack of serious side-effects from cessation of use. unlike those associated with alcohol and opiate withdrawal.

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;"

There is no record of anyone ever dying from an overdose of marijuana. It is one of the least toxic drugs known to man.

Raphael Mechoulam, who isolated the main ingredient of marijuana (THC) has edited Cannabinoids as Therapeutic Agents which includes an article by Mark Segal on Marijuana's potential as an analgesic. He reports that marijuana has promise as a pain killer because it is non-addictive and does not depress the respiratory tract (unlike opiods.) Marijuana's promise as a pain-killer is reported by the National Academy of Sciences, and by Roger Roffman in the book Marijuana as Medicine; its promise rests on the fact that finding #3 is essentially false.

Marijuana is a mild intoxicant, and as such should not be used in conjunction with other intoxicants. Whether marijuana increases the effects of alcohol, or complicates them, or just how one would subjectively describe the effects of mixing the two, is beside the point that multiple drug use provides multiple safety concerns. Marijuana, though, has far less severe cross-reaction with alcohol that barbituates or tranquilizers such as valium. Once again, a good toxicologist can provide confirmation of these points.

4) "the THC content of a marijuana cigarette 10 years ago was one percent, but is as high as 10 percent per cigarette today;"

Proponents of jailing people for marijuana use have been using this argument as if to suggest that marijuana is ten times more dangerous than it used to be. The premise that an increase in potency demonstrates an increase in danger is logically unsound. As with alcohol, consumers compensate for higher potency by consuming smaller doses. Anyone who counsels alcoholics will confirm that beer is no less dangerous than whiskey simply because it has a lesser potency.

The government has been trying to sell the increased potency argument for some time. The enclosed press release refers to a New York Times report in 1986 that marijuana had increased to an average potency of 3.5%, and that this was an alarming increase over the seventies. However, in 1980, The Times ran a similar story, only at that time they claimed that marijuana had an average potency of 4%. So, marijuana has actually decreased in potency, if you believe The Times.

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;"

There is no clinical evidence that marijuana causes schizophrenia. The National Academy of Sciences found that drug abuse was more often than not a symptom rather than a cause of mental problems. Illusions and hallucinations are often subjective phenomena influenced by an individuals mental state and the power of suggestion. Individuals succeptible to lapses in their grasp of reality will compound their mental problems with the use of alcohol, marijuana, or other drugs.

Marijuana users do not hallucinate. They do experience an alteration of their space perception, and an apparent enhancement of colors. These, combined with impairment of motor coordination, are reasons why marijuana should not be used while driving a motor vehicle. However, to call these effects of marijuana "hallucinations" is misleading if not untruthful. Individuals who take LSD hallucinate. Individuals detoxifying from alcohol addiction hallucinate. Hallucinate means the individual sees something that isn't there. Marijuana users do not hallucinate.

The National Institute on Drug Abuse's pamphlet, "Marijuana", is far from being the best source on marijuana's effects. However, it's claims are based far more on actual research than popular myths. It makes no mention of hallucinations, illusions, or schizophrenia resulting from marijuana use.

Marijuana's promise as a pain killer is referenced above. However, the dose required to render an individual oblivious to body signals such as pain far exceeds standard levels of use. A sufficient dose to accomplish this would also put the subject to sleep. It is unlikely that this presents any danger to the individual or to society.

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;"

Marijuana is used daily by over 6 million Americans, according to the National Institute of Drug Abuse. Marijuana has been a popular recreational drug used by a large percentage of young Americans since 1965. There is no record of case histories to document this finding. If this finding were true, we would have millions of case histories of young individuals with lung cancer from marijuana use. The case histories don't exist because the statement is false.

The National Academy of Sciences decided that marijuana smoking and tobacco smoking can not be compared because the methods of ingestion differ so greatly. Marijuana smokers smoke far less materials a day than tobacco smokers (up to 2 cigarettes a day compared to 20 - 60), but they inhale the smoke far deeper into the lungs. On the other hand, many marijuana smokers use a waterpipe (or "bong") which filters out many, but not all, of the tars that contribute to lung cancer.

Claims that marijuana is more carcinogenic than tobacco are compelled by a logic that dictates that because marijuana is illegal (except in Alaska) it has to be more dangerous than tobacco (or in other cases, than alcohol). The claims are based on the undisputed fact that marijuana contains more tar than tobacco, but ignore the differences in ingestion and dosage that make comparisons inaccurate. Marijuana smoke is bad for the lungs, it does

contribute to the formation of lung cancer, and I am convinced that by the year 2000 we will begin to hear of case studies of individuals who have lung cancer as a result of long term marijuana use.

Nonetheless, it is not true that a marijuana cigarette a day for three years will cause lung cancer. I offer my own lungs and continued health as proof.

7) "THC affects eggs, sperm, sexual hormones, and the development of a fetus, and marijuana use may result in deformed or undersized offspring;"

There are no documented cases of marijuana use causing a genetic deformity. I challenge anyone to provide one.

In April, 1984 Ralph Hingson delivered a paper at a NORML conference on "Effects of Marijuana Use on Pregnant Women". Dr. Hingson's conclusion was that marijuana use during pregnancy may result in a smaller birth weight for the fetus, but in an allowable range (similar to the smaller birth weight for babies from nicotine or alcohol using mothers.) NORML has been publicizing this since 1984. We regularly hear, though, from mothers who used marijuana during pregnancy who delivered babies of normal weight.

Laboratory tests have indicated that under some conditions, large doses of THC affect the eggs, sperm, and sexual hormones of rats and other animals. There is evidence that THC inhibits sperm mobility. However, the effects of marijuana on fertility seem to be negligible - as millions of marijuana smoking parents will attest to.

The National Academy of Sciences report affirmed that marijuana use has no effect on chromosomes or fertility.

8) "other physical reactions to marijuana include irreversible changes in the brain, sinusitis, pharyngitis, bronchitis, emphysema, increased heart rate, and decreased blood circulation;"

Marijuana use does not cause brain damage. NIDA recently announced proof that it does. My office contacted the researcher. His data actually suggested that a does of 50 marijuana cigarettes a day for 30 years would not cause brain damage. What NIDA based their comments on was his finding that 136 marijuana cigarettes for 30 years would cause slight premature senilia. An individual would have to smoke a marijuana cigarette every 8 minutes for 16 hours a day, for thirty years, to suffer any brain damage - if this study is conclusive. The enclosed NORML press release cited above re: marijuana potency contains more details of this study.

Smoking contributes to lung and sinus problems, and marijuana smoking is no different. Marijuana does increase the heart rate and/or blood pressure in some individuals; NORML cautions against marijuana use by individuals with cardiovascular problems.

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."

People use marijuana because they enjoy the mild impairment of the senses marijuana contributes to. This impairment is short term, and wears off two-to three hours after ingestion. There is no evidence of prolonged impairment from marijuana use. The effects described above up to but not including anxiety are the short-term effects desired by the marijuana user.

The danger of teenage marijuana use is that many teens are prone to mix relaxation and studying, meaning they think it is okay to study while high on marijuana or while drinking beer. Impairment limits the ability to learn, especially the acquisition of learning skills. This is why it is essential to deter adolescents from marijuana use, and a primary reason why NORML advocates legalizing marijuana for adults (and shutting down the black market that will sell to students.) However 90% of marijuana smokers are adults whose learning skills are unimpaired by their occasional, moderate marijuana use.

Marijuana produces a condition similar to stress on the human body (for example, the increase in heart rate.) Most users find this pleasurable (ironically even the ones who claim they use marijuana to alleviate stress), some first time users do not. This is what accounts to reports of anxiety attacks by new or inexperienced users of marijuana. Not everybody who tries marijuana likes it, nor does everyone who uses it does so without ill-effect. People with pre-existing mental problems, as mentioned above, are succeptible to drug abuse. They are the source of reports of panic, paranoia, and psychosis resulting from marijuana use.

The issue of psychological dependence has been hotly debated for twenty years. Obviously, millions and millions of Americans use marijuana regularly. I contend they do so because they enjoy using marijuana. Whether they are psychologically dependent or not is a moot point. Marijuana is not an addictive drug, nor a dangerous one. Psychological reactions to it are cultural, not medical or biological. Once again, to belabor the point, some people with psychological problems abuse marijuana and other drugs. As with anxiety, panic, paranoia and psychosis, psychological dependence is not an observed side-effect in the overwhelmingly majority of marijuana users.

Additional Comments

To be to the point, these findings at best constitute horrible distortions and exaggerations of existing research findings. At worst, they are deceptive lies and half-truths designed to mislead the legislature of Alaska. The bulk of the rebuttal information presented here deals with health issues becuase of the logic of the bills.

Other valid arguments against the bill include the fact that Alaskans generally don't like the government interfering in their personal lives. This is the reason for the right to privacy clause in the state constitution. Also, the Alaskan police have better things to do with their time and your tax money than arrest marijuana offenders. Also, if this bill passes, it will likely be challenged in court as a violation of Ravin vs. State.

The National and International Drug Law Enforcement Strategy of the National Drug Enforcement Policy Board (NDEPB) (Jan. 1987) states that "because the decriminalization of marijuana possession undermines the standard

of the unacceptability of drug use, the 11 states (which includes Alaska) that have decriminalized marijuana possession should recriminalize this offense." This document indicates that the Attorney General, i.e. the federal government, is in the forefront to change Alaska's laws.

Many of the claims represented in the above findings replicate claims in the NDEPB's Analysis of the Domestic Cannabis Problem and the Federal Response, (8/86). The source cited was a Drug Enforcement Administration report "The Health Implications of Marijuana Use." It is rift with phrases such as "research suggests," "have been observed," "marijuana may," and other cautious terminology which avoids making a direct conclusion. It is my opinion after studying these claims that the represent law enforcement's best attempt to justify the laws which they are obligated to enforce.

Social bias often interferes with sound scientific reasoning. The notion that marijuana is illegal so it must be dangerous is the driving rationale behind the ludicrous comments about marijuana above. The strategy of the NDEPB is to justify their increasing budget requests by turning drug education programs into law enforcement propaganda.

ENCLOSURE #2

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.

ENCLOSURE #5

National Academy Press

The National Academy Press was created by the National Academy of Sciences to publish the reports issued by the Academy and by the National Academy of Engineering, the Institute of Medicine, and the National Research Council, all operating under the charter granted to the National Academy of Sciences by the Congress of the United States.

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

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.

Available from:

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NATIONAL RESEARCH COUNCIL

2101 CONSTITUTION AVENUE WASHINGTON, D C 20418

OFFICE 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 he 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.

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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 of 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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