SCR

35

(7)

HOUSE COMMITTEE REPORT

4/13

Date referred: 3/24/88

FURTHER REFERRALS: Rules

DATE: 4-12-88

The Health, Education and Social Services Committee has considered CSSCR 35(SA)

Relating to Alcohol-Related Birth Defects Awareness Week.

RECOMMENDS:

[ ] replace with _____ [ ] the same title

[ ] attached amendment(s) [ ] a new title

[X] do pass

[ ] do not pass

[ ] no recommendation

[ ] individual recommendations

[ ] additional referral to the _____ Committee

ADOPTS: [ ] _____ letter of intent

ATTACHES NEW FISCAL NOTE(s):

[ ] fiscal impact

[ ] zero fiscal note

[ ] zero with analysis

[ ] same as previous fiscal note published _____

[ ] same as previous zero fiscal note published _____

SIGNING DO ~~PASS~~:

SIGNING OTHER RECOMMENDATIONS:

Co-Chairman's signature

Ideas For Community Activities
On The Prevention Of
Alcohol-Related Birth Defects
(ARBD)

* Make a written contract with pregnant client not to drink during the pregnancy.

* Offer pregnant clients a $100 off their total prenatal and delivery bill if they do not drink during the pregnancy.

* Offer pregnant clients a gift, such as an infant safety seat, if they do not drink during the pregnancy.

* Work with local taverns and restuarants to offer free non-alcoholic drinks to their pregnant customers.

* Work with local school board and teachers to incorporate a class on Alcohol-Related Birth Defects in junior and senior high schools. The class could be incorporated into a child development course, health course, science course.

* Work with schools to have special ARBD presentations made in the schools by the health aide, community health representative, public health nurse, or doctor.

* Arrange to have ARBD presentations made to the PTA.

* At local health fairs, have an ARBD display.

* Encourage Native Health Corporations, Indian Health Service and State Alcohol Programs to develop prevention and intervention programs for pregnant women.

* Launch an ARBD media campaign, including television, radio and newspapers, in your area.

* Contact local childbirth educators (LaMaze Childbirth Association) in hospitals and family planning clinics, and encourage and support their efforts by providing them with information on Alcohol-Related Birth Defects.

* Develop a one-hour ARBD presentation targeted to youth that can be presented to youth groups and clubs.

* Conduct ARBD presentation to women's groups in your community.

* Conduct ARBD presentation to men's groups in your community.

* Work with AA to have ARBD presentations made at regular AA meetings, and also at Al-Anon and Al-A-Teen meetings.

* Prepare educational display on ARBD for local clinic.

* Develop an ARBD prevention network in your own community/area by identifying persons who are interested in working to prevent Alcohol-Related Birth Defects.

* Adopt a pregnant woman and be her support person throughout the pregancy and postpartum period.

* Work with local government to develop ordinances regarding drinking while pregnant; displaying warning signs at point of purchase.

* Set up a support group for pregnant women that would not only provide prenatal, parenting, etc. education, but also social activities.

* Work with local stores to do promotional display on non-alcoholic beverages focusing on pregnant women.

* Conduct ARBD presentations at prematernal homes.

* Encourage your local Medical Association to promote education on ARBD for medical professionals.

* Sponsor a poster contest in the schools on the topic of prevention of ARBD.

RED SNAPPER - 1 serving

* 1 teaspoon lime juice
* 1 cup V-8 juice
* ½ teaspoon Worcestershire sauce
* ½ teaspoon salt
* dash ground pepper
* dash Tabasco

Mix ingredients and serve in a glass half full of ice. Decorate with a slice of lemon and a stick of celery.

NOT SO HIGHBALL - 1 serving

* 2 jiggers grape juice
* juice of 1 lemon
* ½ lime
* 1 jigger grenadine
* ginger ale to taste

Mix in highball or old-fashion glass filled with ice cubes.

MILD-MANNERED MARGARITA - 1 serving

* 1 cup bitter lemon or lime soda
* juice of 1 lime
* 2 teaspoons sugar
* salt to taste
* crushed ice

Pour soda in ice cube tray and freeze thoroughly. In blender add cubes of soda, lime juice and sugar and blend. Rub lime around rim of glass and dip in salt. Serve over crushed ice in the salted glass.

HOLIDAY HIGHLIGHT - 3 servings

* 1 16 oz bottle cranberry juice
* 1 pint and 2 ozs. (one can) pineapple juice
* lemon slices

Mix pineapple and cranberry juices in a large pitcher. Pour over crushed ice in tall glasses and garnish with lemon slices.

TOPS IN TONIC - 1 serving

* 3/4 cup quinine water or tonic
* ice cubes
* lime slices

Pour quinine water or tonic over ice cubes in glass. Squeeze juice from lime slice into drink and then add the slice.

ALASKA SURPRISE - 6 servings

* 3 cups apple juice, unsweetened
* 3 cups herb tea, cold
* ice cubes
* lemon wedges

Mix the apple juice and tea together. Put ice cubes in 6 glasses. Pour the juice/tea mixture over the ice and stir slightly. Add a lemon wedge to each glass.

NO NAME

Chilled sparkling cider or mineral water with a twist of lime or lemon.

OTHER TIPS FOR NON-ALCOHOLIC DRINKS

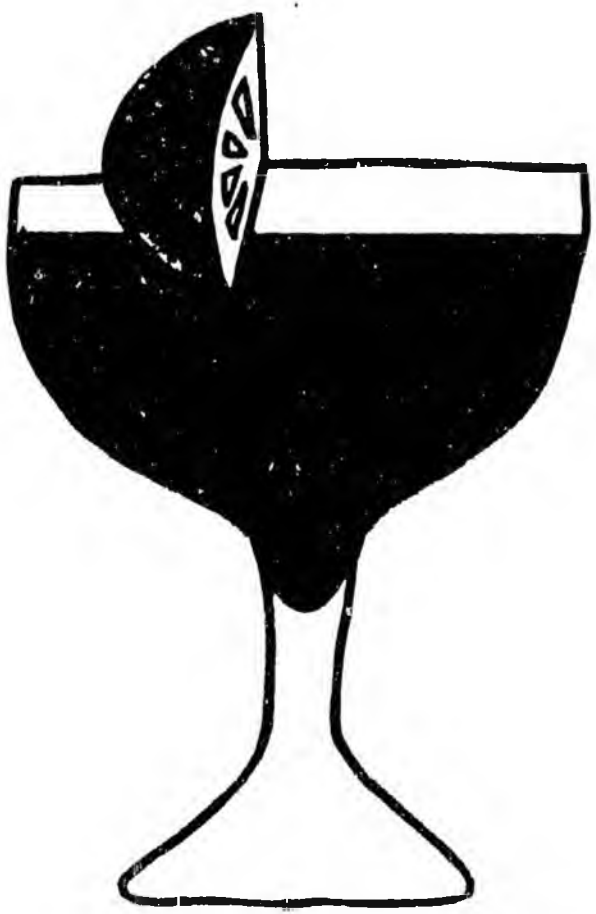
* Tasty and healthful fruit drinks can be made by combining cranberry, grape, orange, grapefruit, apple or pineapple juice with mixers like soda or ginger ale.

* Many mixed drinks can be ordered without alcohol. Margaritas, Pina Coladas, Bloody Mary and fruit Daiquiris.

* Non-alcoholic beer is available.

* Try these bubbly fruit drinks:

  Sparkling Apple Cider
  Sparkling Grape Juice
  White Grape Juice



ALASKA NATIVE HEALTH BOARD
Alaska Fetal Alcohol Syndrome (FAS)
Fact Sheet

* In 1985, all Alaskans consumed 4.35 gallons of absolute alcohol per capita.

* Alaska appears to have one of the highest recorded rates of FAS.

* The rate of FAS in Alaskan Natives is conservatively estimated at 4.2/1000 live births.

  How does this compare?

  France FAS rate - 1.6/1000 live births
  Seattle FAS rate - 1.7/1000 live births
  Navajo FAS rate - 2.0/1000 live births

* The rate of FAS in the Alaskan non-Native population is not yet known, but it is expected to also be high.

* A conservative estimate of new cases of FAS in Alaska is 10 per year.

* In the lower 48 it is estimated that for every child born with FAS, 10 are born with Fetal Alcohol Effects (FAE). FAE describes less severe damage due to alcohol. The extent of FAE in Alaska is not yet known.

* In Alaska, the dollar cost to care for one FAS child for his/her lifetime can be up to one million dollars or more.

* In Alaska, FAS may be the number one identifiable cause of mental retardation.

Alaska Native Health Board

Fetal Alcohol Syndrome - Cost Estimates
in Alaska

1.	Neonatal Intensive Care	$1,300-$2,000 per day x 7 days = $9,100-$14,000
2.	Heart Defects surgical procedures	99% are done outside $20,000 and up for uncomplicated/non-emergency $50,000 for and up complicated/emergency
3.	Cleft Palate Surgery	Usually 4 surgeries, plus dental work and orthodontics = $50,000 - $75,000
4.	Speech Therapy	Initial Diagnostic $200 2-3 sessions per wk. at $90-$135 per wk. x 1 yr.= $9,360 - $21,060
5.	Kidney Defects surgical procedures	Approximately $1,500 per procedure
6.	Vision Defects	Surgery for strabismis or ptosis average $1,500 Exams and glasses $300 and up
7.	Special Education	1 child for 1 year average - $9,000 Preschool - $15,000 Multi-handicapped - $22,000 Deaf/Vision Impaired - $24,000
8.	Foster Care	$14 - $30 per day, yearly cost $5,110 - $10,950
9.	Residential Care	$100 - $150 per day, average stay 12 - 13 months= $36,500 - $82,125
10.	Day Treatment	$55 per day, average length 6 - 8 months= $9,900 - $13,200 (30-day month)
11.	Institutionalization	$230 - $280 per day $83,950 - $102,200 per year
12.	Travel Costs	Would vary, but if travel necessary, additional thousands of dollars would be added to cost of treatment/care.

1/86

FACT SHEET: FETAL ALCOHOL SYNDROME (FAS)

compiled by Marcia Michel

FACTS

Twelve years of research have conclusively established that alcohol use during pregnancy poses a threat to the health of the child.

Fetal Alcohol Syndrome is a pattern of mental, physical and behavioral defects that may develop in the unborn child when its mother drinks alcohol during pregnancy. FAS is characterized by a cluster of congenital birth defects that include the following:

- Prenatal and postnatal growth deficiency, meaning low birth weight and failure to catch up
- A pattern of facial malformations, including small head size, misshapen eyes and midportion of the face
- Central nervous system dysfunction which can include mental retardation; brain damage resulting in difficulty with balance, coordination, learning or memory; alcohol withdrawal symptoms at birth; a poor sucking response and sleep disturbances during early infancy, restlessness and irritability; developmental delays; hyperactivity, short attention span and/or behavioral problems
- Varying degrees of malformations, particularly of the heart, joints, kidneys and genitalia.

Fetal Alcohol Effects (FAE)—less severe alcohol-related birth defects—have shown up in babies whose mothers drank smaller amounts.

According to current research, there is no safe drinking level for pregnant women.

In many cases, high levels of consumption will produce the full expression of FAS, but in some cases, moderate consumption is enough to produce FAS.

Researchers estimate that nationally FAS occurs in about 1 to 3 per 1,000 live births.

In Alaska, preliminary results indicate that FAS occurs in at least 3 per 1,000 live births among the Native population.

FAS has been found in virtually every ethnic and cultural group and in every social class.

For every child with FAS, as many as 10 other children may be born with FAE.

The severity of FAS seems to rise with each succeeding affected child born to a woman drinking alcohol.

FAS is the third leading cause of birth defects with accompanying mental retardation, and is the only preventable one among the top three.

Research shows there is no safe time to drink during pregnancy. The first trimester appears to be the interval when developing organs are vulnerable to damage.

Evidence supports an association between alcohol consumption and an increased incidence of spontaneous abortions found during the second trimester.

Alcohol exposure during the third trimester may interfere with the rapid growth that occurs during this time, including the growth of the brain.

The major effects of alcohol on developing tissues are slowing of growth and interference with cell migration.

Alcohol itself is the toxic agent, but other factors (nutrition, smoking, use of other drugs and other "unknowns") may enhance the effect of alcohol and influence the actual risk for FAS.

Cost of institutionalization for an FAS child in Alaska averages $90,000 per year. Travel and surgery on birth defects would be additional costs depending on amount and severity.

While all of the defects caused by drinking have not yet been identified, we do know:

- alcohol interferes with normal pregnancy
- effects on the fetus are permanent
- whether they occur or not is a matter of the basic metabolism of both the pregnant woman and the fetus

There is no treatment for FAS.

It is totally preventable.

In the absence of research establishing a safe drinking level, the U.S. Surgeon General advises women who are pregnant (or nursing or considering pregnancy) to refrain from drinking alcohol during pregnancy.

This information was compiled from several sources. For a complete listing of these sources, please contact Marcia at the Alaska Council.

ALASKA COUNCIL ON PREVENTION
OF ALCOHOL AND DRUG ABUSE, INC

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FETAL ALCOHOL SYNDROME
(FAS)
FACT SHEET

* Fetal Alcohol Sydrome (FAS) is a birth defect caused by the mother drinking during her pregnancy.

* FAS is probably the second most common birth defect.

* FAS may be the number one cause of mental retardation in the nation.

* Doctors Kenneth Jones and David W. Smith first identified and described the Fetal Alcohol Syndrome in Seattle, Washington in 1973.

* The complete syndrome is termed Fetal Alconol Syndrome (FAS) with milder forms of prenatal alcohol damage termed Fetal Alcohol Effects.

* Criteria for FAS
  1. Prenatal or postnatal growth retardation in height, weight, and/or head circumference.
  2. Altered morphogenesis (abnormalities) especially of the face.
  3. Central nervous system involvement, often with mental retardation.

  AND

  4. There must be a positive history of the mother drinking during the pregnancy.

* Facial abnormalities that are characteristics of FAS include:

  - small head circumference
  - small widely spaced eye openings
  - indistinct or no groove between the nose and upper lip
  - short nose
  - thin upper lip
  - flat midface

* FAS children are smaller than normal children in height, weight, and head circumference, usually below the third percentile, and they NEVER "catch up." They remain shorter. They remain thinner even with adequate nutrition. The head is smaller because when the alcohol affected the brain's development, it stopped growing. And when the brain stopped growing, so did the skull. The head remains smaller.

* The most devastating aspect of alcohol damage to the central nervous system is mental retardation. Alcohol "scrambles" the normal development of the brain so the children with FAS can be mildly to severely mentally retarded. The average I.Q. of 100 being normal. The range of I.Q. scores of FAS children is very broad with recorded scores of 15 to 105.

* Other problems seen with central nervous system damage due to alcohol include:

  - irritability in infancy

babies born to moderate (2 drinks per day) drinking mothers have FAS.

* Once a woman has an FAS child, and if she continues to drink, her future children will have FAS with increasing severity.

* Nursing mothers who drink are also passing alcohol to their infants. Alcohol level in the milk is about the same as her blood alcohol level. Heavy drinking while breast feeding may have deleterious effects including growth retardation (particularly of the brain) and decreased viability.

* Total Cost to Society of Fetal Alcohol Effects

  - lost productivity and potential
  - special care facilities
  - health care costs
  - special education needs
  - physical, intellectual and behavorial impairments
  - emotional burden on family and child

* Preventing FAS is EVERYONES' responsibility.

* Create an awareness about alcohol use and pregnancy with everyone you talk with.

* Support pregnant women in not drinking.

* Encourage the father to be supportive and make him aware of his responsibility in preventing FAS.

* Tell women who are planning to become pregnant to stop drinking alcohol at least one month before they expect to get pregnant. Maybe the rule should be, "No birth control, no alcohol."

* Offer alcohol-free drinks like alcohol-free beer and alcohol-free sparkling wine. Don't forget there are other fruit and vegetable juices that can be used in making tasty drinks.

* We all pay in one way or another for every FAS child born.

MEDICAL EVALUATION AND THERAPY OF FAS AND FAE CHILDREN

Among FAS and FAE children, there is considerable variation in the degree and types of anomalies present. Many of the anomalies are associated with functional deficits which may require immediate and long term medical attention. When FAS or FAE children are diagnosed they should be evaluated for these deficits and appropriate medical and rehabilitation services provided. Some of the anomalies, common in FAS and FAE children which will require further medical and or developmental evaluation and treatment are outlined below. This list is not intended to be a complete list of anomalies present in FAS or FAE children but should provide the health care provider with a direction in evaluating the medical and social needs of these children.

Area of Anomalies:	Evaluate for:	May Require:
- Growth	- Failure to thrive - Weak sucking ability - Other feeding dysfunction	- gastronomic or nasogastric feeding in infancy
- Head and Face		
Eyes	- Ptosis - Strabismus - Epicanthic folds - Micropthalmic - Nystagmus - Myopia - Estropia - Abnormal retinal vasculature	- thorough opthalmologic evaluation, glasses
Nose	- persistent rhinorrhea associated with a small nose and small nasal canals	
Ears	- recurrent otitis media - auditory deficiencies	- hearing aids, thorough hearing evaluation
Mouth	- cleft palate - cleft lip - poorly formed teeth - small trachea (may cause difficult intubation)	- surgery, orthodontic treatment, speech therapy
- Body Organs		
Heart	- cardiac defects (detected in 70% of diagnosed FAS cases): - septal defects - teratology of fallot - pulmonary valve stenosis - patent ductus arteriosus	- surgery
Kidney and Urogenital Tract	- hydronephrosis (dilation of the kidney, usually due to obstruction of urine flow) - hypoplasia (small kidney) - renal agenesis (absence of one or both kidneys) - obstruction of the Uthero-pelvic conjunction	- surgery, management of urinary tract infections

Medical Evaluation and Therapy of FAS and FAE Children (continued)

Area of Anomalies:	Evaluate for:	May Require:
Liver	- prolonged hyperbilirubinemia - abnormal liver functioning	
Genitals	- undescended testicles - hypospadias (abnormal urethral openings) - delay of menarche in girls	
- Skeletal		
Limb and Joints	- limited range of motion of hip, knees, elbows, and other joints - Clubfoot - radioulnar synostosis (fusion of elbow and forearm bones) - Klippel-feil anomaly - scoliosis - reduced skeletal age - shortened fingers - congenital hip dislocation - flexion contracture of the elbow - limited flexion of metacarpal phalangeal joints	- thorough orthopedic evaluation, physical therapy, surgery, occupational ther
- CNS		
Brain	- mental retardation - learning disorders - microcephaly - seizure activity - cerebral palsy	- IQ testing; educational diagnostic workup; management of behavior disorders, hyperactivity, seizures, etc.; special education; foster placement; complete developmental assessment.
- Other Behavioral Deficits	- delays in gross motor development - poor motor coordination - hyperactivity - poor eye-hand coordination - short attention span - variable social quotient - learning disabilities - school failures and conduct disorders - sleep disturbances - psychopathology	
- Other CNS Disorders	- neural tube defects	
- Other Health Problems	- recurrent infections - immune deficiencies	- special monitoring for high risk recurrent health probl
- Home Environment	- alcohol abuse - child neglect or abuse - proper nutrition - stimulating environment	- foster placement, pre-school attendance, public aid, family counseling/therapy

FAS High Risk Criteria

A woman is considered at risk for having a FAS infant if she reports one of the following:

1. Consuming two or more alcoholic drinks per day or a total of 45 drinks per month, or
2. Binge drinking (consuming five or more alcoholic drinks on any one occasion ranging from twice a week to two or three times a month), or
3. Previously delivered a FAS or FAE infant, or
4. If the patient identifies herself as being at risk because of drinking environment and lack of supportive environment in which to stop drinking during the pregnancy.

ALASKA NATIVE HEALTH BOARD/ALASKA AREA NATIVE HEALTH SERVICE
FETAL ALCOHOL SYNDROME PREVENTION PROGRAM

GLOSSARY OF TERMS

ABBERANT	-Wandering or deviating from the usual or normal course.
ACETALDEHYDE	-A compound formed by the action of enzyme systems on ethanol when it is metabolized by the body. It is further metabolized to acetic acid.
ANOMALIES (ANOMALY)	-Marked deviation from the standard, especially as a result of congenital or hereditary defects.
ANTABUSE	-The trademark for a preparation of disulfiram used to treat alcoholics. It is thought to interfere with metabolism of acetaldehyde, and its use results in temporary nausea, vomiting, palpitation, and other adverse effects.
APNEA	-Cessation of breathing.
CAMPTODACTYLY	-One or more fingers constantly flexed at one or more joints.
CLINODACTYLY	-Abnormal bending of fingers or toes.
CORPUS CALLOSUM	-An arched mass of white matter found in the longitudinal tissue that separates the two hemispheres of the brain. Transverse fibers connect the two hemispheres.
CYANOSIS	-A bluish discoloration of skin and mucus membranes due to excessive concentration of reduced hemoglobin in the blood.
CONGENITAL	-Existing at, or dating from birth.
DEFICITS	-A lack or deficiency.
DYSMORPHOLOGY	-The study of birth defects or malformation in a species.
ECCHYMOSES	-Blood under the skin--giving the appearance of bruises.
EMBRYO	-The fertilized ovum that eventually becomes the offspring during the period of most rapid development. In humans, this period is from 2 weeks after fertilization until the end of the 7th or 8th week, then it becomes a fetus.

MOTILITY	-The ability to move spontaneously.
NECROPSY	-Examination of a dead body to determine cause of death. Syn. - Autopsy.
NEONATE	-A newborn under 28 days of age.
PALMER CREASE	-Any of the normal grooves across the palm which accommodate flexion of the hand. In certain congenital anomalies, there is only a single transverse crease.
PALPEBRAL FISSURE	-The longitudinal opening between the eyelids.
PARITY	-The number of live births that a woman has delivered.
PERINATAL	The period shortly before and after birth generally considered to begin with completion of 28 weeks of gestation and ending 1 to 4 weeks after birth.
PHILTRUM	-The vertical groove in the middle of the upper lip.
PLACENTA	-An organ surrounding the fetus during pregnancy which joins the mother and offspring and supports growth and development during gestation.
POSTNATAL	-Occuring after birth.
PRENATAL	-Existing or occuring before birth.
PTOSIS	-Drooping of the upper eyelid.
STRABISMUS	-Deviation of the eye which the patient cannot overcome without treatment. The inability of both eyes to focus on one subject.
SYNDACTYLY	-Fingers or toes joined together.
SYNDROME	-A group of symptoms that characterize a disease or pathological entity.
TACHYCARDIA	-Accelerated pulse.
TERATOGEN	-An agent or factor that causes physical defects in the developing embryo.

ies can be born deformed or retarded —
the United States has a higher rate of
Alaska Natives.

the unborn

Anchorage Daily News/Michael Penn

By ELIZABETH PULLIAM
Daily News reporter

A tiny baby struggles in a hospital incubator and lets loose a muffled cry. His wrinkled face turns red from the effort, while pencil-thin ribs stand in sharp relief on his palm-sized chest. The baby has been isolated in the plastic box because he has almost no fat on his arms and 4-pound body and because one of the walls in his heart hasn't completely formed.

The hole in his heart will eventually heal, either on its own or with a surgeon's help. Eventually, too, he will put on weight, although he always will be a small, spindly child.

But nothing will change the damage to his brain or the wreckage on his face. This child, who could have been an Einstein or a leader of his people, or just a normal, healthy boy, will not be like other children. His face will be flat, his lips thin, his eyes curiously folded. He will be susceptible to sickness and seizures. The stunted brain inside his tiny head may never learn to read a book or count the fingers on his hands.

The baby's deformities are not the result of a rogue gene, an unnatural trauma or some act of God.

He is the way he is because his mother drank.

Alaska Natives have the highest known rate of fetal

See Page A-8, FETAL

A PEOPLE

IN PERIL

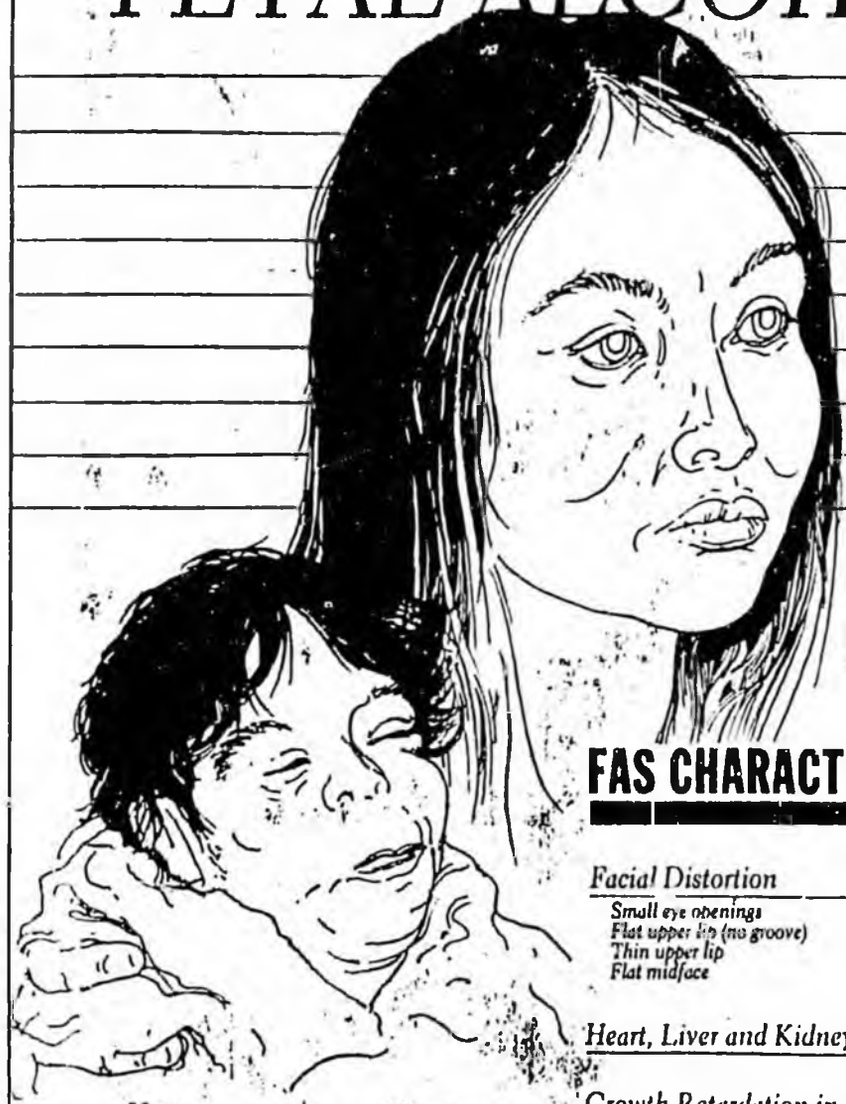
TODAY

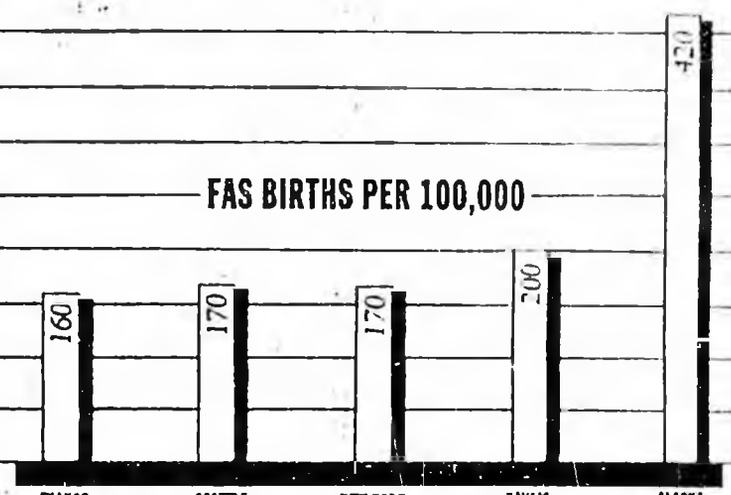
The destructive power of alcohol reaches to the most innocent of all: the generation of Alaska Natives just being born to mothers who drink. In the fourth day of the Daily News' 10-day series on self-destruction in the Bush, reporter Liz Pulliam writes about fetal alcohol syndrome, an entirely preventable disease that affects Natives more than any other group in the United States. These children who suffer from their mothers' drinking have reduced mental capacity, smaller bodies and a greater susceptibility to disease than healthy children.

er from fetal alcohol syndrome.

FETAL ALCOHOL SYNDROME

(FAS)





FAS CHARACTERISTICS

Facial Distortion

- Small eye openings
- Flat upper lip (no groove)
- Thin upper lip
- Flat midface

Heart, Liver and Kidney Problems

Growth Retardation in Height and Weight

Vision Problems

Small Head Circumference

Smaller, Deformed Brain

FAS is the most common

An example of reduced brain size

The mother's blood alcohol level is transferred directly to the fetus through the placenta. The fetus' blood alcohol level is the same as the mother's.

The alcohol level in the mother's breast milk is the same as her blood alcohol level.

Continued from Page A-1

alcohol syndrome in the country. Alcohol stunts one in every 25 Native babies, and the full-blown syndrome — arrested growth, organ defects, facial deformities and mental retardation — mars at least four of every 1,000 infants born to Native women, according to the Alaska Native Health Board.

That's more than twice the rate discovered among the Navajos, the only other Native Americans who have been studied, and two and a half times the rates in Seattle and New York.

The Alaska figure only counts children identified by health aides at village clinics or pediatricians at the Alaska Native Medical Center.

"Not everyone comes into the clinics. I think there are a lot of addicted women we just don't see," says Jerry Nasenbeny, a pediatrician at the medical center.

No one knows the FAS rate for other Alaskans. The state health department has never surveyed the general population, and private doctors aren't required to report children they think might be affected by alcohol. But the Native health board and many pediatricians believe the non-Native rate is also high.

"We know of one (non-Native) woman in Homer who has had seven FAS kids," says Vicki Hild, coordinator of the board's FAS prevention program. "The youngest is 5 months old. And the mother is still drinking."

These children carry an enormous financial cost. Their hospital bills, special education and welfare payments — virtually none will ever be able to live independently — will run at least $1 million in each child's lifetime.

But what bothers

…n Nasenbeny most …an potential lost. …an entirely …e syndrome," he …se kids could have …es scholars. We'll …v."

…HILD AS VICTIM

…vasnikoff Jr., now 9, …st to show the …is mother's

…older brothers and …been normal, …ldren. Three were …their mother …nking, and the …a pretty …shows no ill …her mother's …drinking during …But Mack wasn't …is mother drank heavily and didn't stop or even slow down when she found out she was pregnant with him.

Mack Jr.'s round, wide-set eyes and thin lips were apparent from birth. When he reached school age, he fell behind the other children and had to be left back a grade.

"The public health nurses gave me pamphlets (about alcoholism and FAS). I threw them away," remembers his mother, Justina, a 38-year-old resident of English Bay. When friends commented on the child's small size, she would say, "He's short like me. He's skinny like his dad."

By the time Justina's sixth child, Nicholas, was born in 1982, the Kvasnikoff family had almost fallen apart. Justina and her husband, Mack, fought constantly over booze and hoarded bottles from each other.

Mack Jr. remembers going to school with uncombed hair and dirty jeans. The oldest daughter, Kathy, now 21, remembers her parents passed out in the cluttered living room while the children struggled to make some kind of dinner — usually scrambled eggs, because that was all they could manage.

Justina remembers her state of mind during those chaotic, ugly days, and it was brutally single-minded: all that mattered was alcohol.

"When Nicholas was 6 months old he got sick . . . Timmy (the oldest son) told me he might die," she says. "All I thought was, 'So what? Then I will be free. Free to drink some more.'"

Today, Justina sits at her Formica-topped kitchen table, her eyes following little Nicholas as he bounces away to watch Sesame Street on TV. Nicholas also turned out to be a FAS child. At 5 he has the body and mind of a 3-year-old. Nicholas is also deaf, the result of an diabetes-related illness at 6 months. Doctors told Justina his deafness wasn't directly caused by FAS, but she says she still feels responsible.

But though small and prone to sickness, Nicholas is as bright-eyed and rambunctious as most children, and he wrestles playfully with his older brother Mack before settling down in front of the screen.

The wall over their heads holds a Russian Orthodox shrine, with votive candles and pictures of Jesus that look over the small, spotless living room. A pot of coffee steams on the counter, completing a scene of order and neatness, an island of domestic tranquility in this wind-whipped village south of Homer.

But Justina still vividly remembers what the home looked like five years ago. Clothes and debris were scattered everywhere. Dirty dishes piled high in the sink. The smell of unwashed bodies and unemptied ashtrays hung in the air.

She also remembers what she looked like then. Now a soft-spoken, smiling woman with bright eyes and a pixie haircut, then she was an unkempt drunk. Her face bloated from alcohol, her body battered from her husband's drunken rages, she would stand in the corner and scream obscenities over the citizens band radio whenever she was on a binge. She would drink from morning until

Anchorage Daily News/Michael Penn

…lkoff drank heavily while pregnant with Mack Jr. and Nicholas.

See Page A-9, FETAL

FETAL ALCOHOL

Anchorage Daily News/Michael Penn

Mack Kvasnikoff, now an alcohol abuse counselor, sits with his 5-year-old son Nicholas in the family kitchen at English Bay.

Continued from Page A-8

insensibility; she drank so much on the night of Nicholas' birth, in fact, that she passed out in the middle of her contractions.

Justina says she started drinking at 19 to cover her natural shyness. Already the mother of three, she wanted to escape from some of her responsibilities and join in the fun her husband and his friends seemed to be having.

She drank until she blacked out. The next weekend, she did it again. The fun quickly turned into week-long binges and then into months of daily, heavy drinking.

Finally, the Division of Family and Youth Services stepped in. The children were taken away and given to relatives. The Kvasnikoffs were ordered into treatment at the Salvation Army's Clitheroe Center in Anchorage.

That was the turning point. Both Mack and Justina had

See Page A-10, FETAL

Mack Kvasnikoff, now an alcohol abuse counselor, sits with his 5-year-old son Nicholas in the family kitchen at English Bay.

See Page A-10, FETAL

Voices

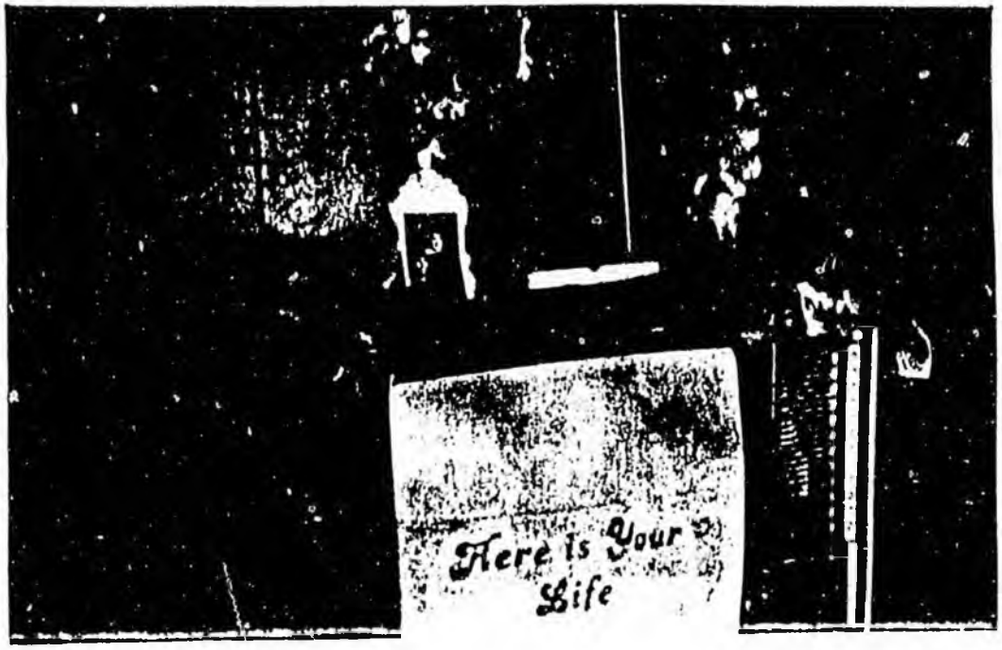
What role do schools play in helping or not helping young Natives cope with cultural changes, alcoholism, drug abuse and suicide? Are schools contributing to the problems of young Natives by emphasizing Western ideas and ideals?

"We intend to do more as a school. We're expanding the youngsters' experience. We're sending 10 youngsters to the AFN annual convention. We're committed to the sports program. But all of that isn't enough. We can have the greatest programs in the world in school, but still youngsters go home at night and the problem is there — in many of our homes."

— ED GRAHAM, principal, Hoonah Bay High School

Voices

What role do schools play in helping or not helping young Natives cope with cultural changes, alcoholism, drug abuse and suicide?



Continued from Page A-9

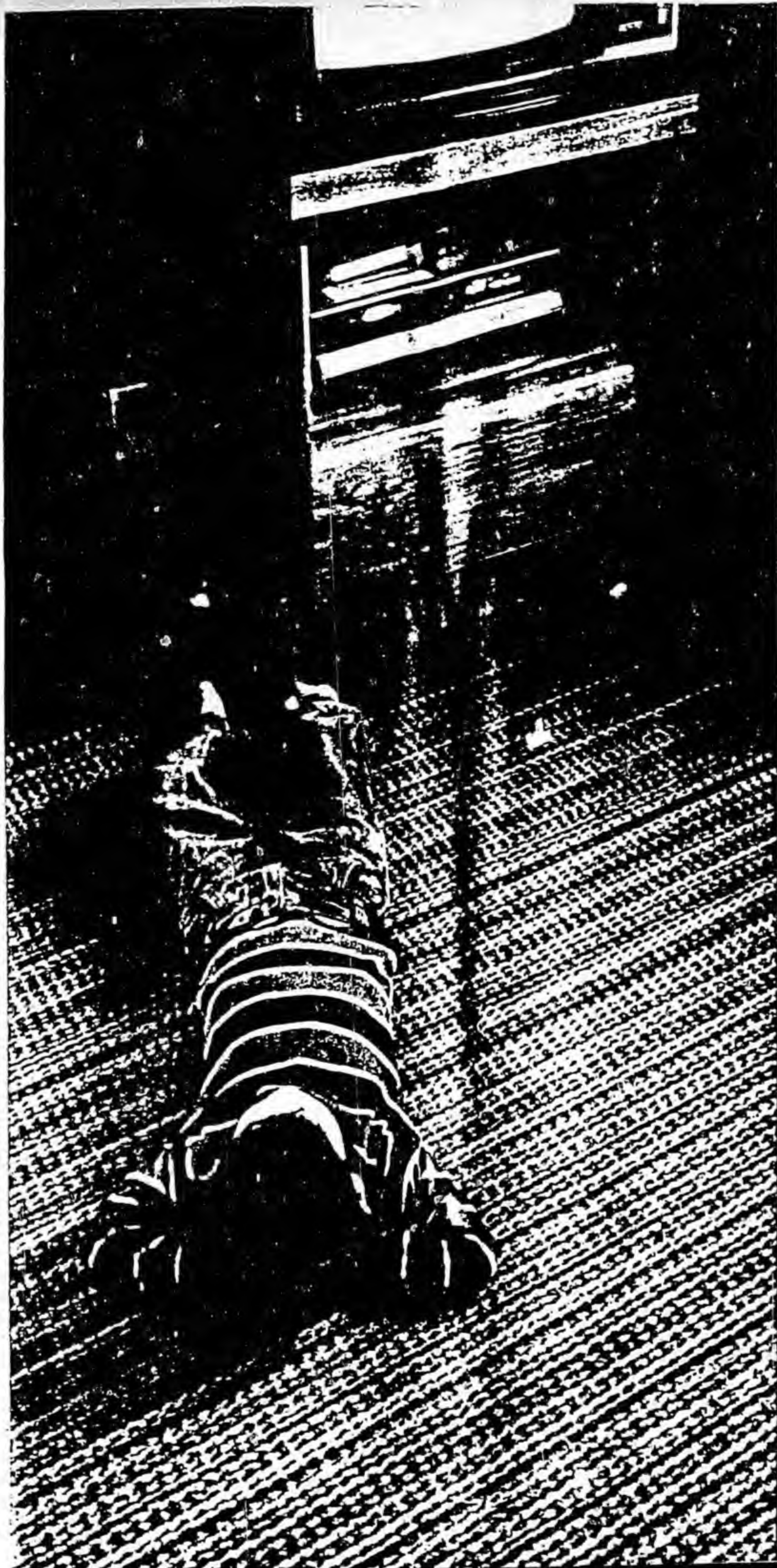
been in court ordered treatment before, but neither could admit to alcoholism. This time the message sank in and they began to face what they had done to their lives and their family.

"At first it was hard to accept that alcohol had damaged the children. Denial was very strong," says Mack Sr. "But it was a mistake that we both made. I'm not letting her suffer alone."

The Kvasnikoffs have been sober for four years. They say part of their healing comes from talking about what happened to them. Mack is now English Bay's drug and alcohol counselor, and Justina talks with her daughters and sons, and their friends, about the dangers of drinking.

They also talk about learning to forgive themselves, although they say it isn't easy. The evidence of 15 years of binges, blackouts and hangovers always will remain on the faces, bodies and minds of their two youngest sons.

"Kids at school told Mack Jr. that he was small and slow because his mother drank while he was in her stomach. He asked me, 'Is that true, Mommy?'" Justina's brown eyes fill with tears. Her voice drops to a whisper. "I didn't know what to say. I say, yes, it's true."



NO DRINK IS SAFE

No one knows how much alcohol it takes to damage a baby. Researchers [illegible] seen the full-blown syndrome in women who drink less than one fluid ounce of alcohol — the equivalent of two shots of whiskey or two beers — a day. Some women can drink a six-pack a day and produce healthy children.

But as few as two binges, with five drinks or more at a time, can cause birth defects like stunted growth or mild retardation. Because research on the syndrome is just beginning — it was discovered by a Seattle doctor in 1973 — many doctors don't consider even a single drink during a pregnancy to be safe.

Most Native women now know alcohol can hurt their babies and stop drinking as soon as they find out they are pregnant, says Janet Allan, a nurse at the medical center who screens pregnant women for alcohol problems.

"That's what impresses me the most. It's what I call daily heroics," she says. "These women often have the courage to get out of bad situations. (Many) are faced with domestic violence, emotional violence, sexual violence. It's hard to quit when everybody around you is drinking. But some do."

Alaska has few places that pregnant women can go to escape the pressures of abusive, alcoholic families. Care Cottage, a hospice for women with high-risk pregnancies, keeps a few beds for alcoholic mothers, and shelters like Clare House and McKinnell offer some support.

But many of the pregnant women who stay at the shelters last only a few days or weeks, shelter workers say. Then they return to their friends and their families and their drinking. Some women never seek help at all.

"An addicted person who's using heavily sees alcohol as her best friend," Allan says. "Often the women feel guilty, but they continue to use anyway. They are into the denial stage of the disease."

Their denial is fueled when they see other women drink and give birth to seemingly normal children — a not uncommon experience, since fetal alcohol syndrome is not inevitable. Even the heaviest drinker has less than a 50 percent chance of producing a defective child during the first pregnancy.

But once a woman has one child stunted by alcohol, the next babies will be more and more damaged, unless the mother stops drinking, according to researchers. That's why the Native health board urges villages and regional corporations to develop prevention programs, to educate children as early as junior high about the dangers of drinking and to step in with counseling and guidance when women are in danger of producing alcohol-damaged children.

What's at stake, many health care professionals fear, is the future of the Native population as a whole.

"What's going to happen if we keep reproducing children that are so badly affected? How effective are we going to be?" asks Elenore McMullen, a village health aide who runs the fetal alcohol prevention program in Port Graham. "People have to be involved. Or what's the Native population going to be like in the years to come?"

CRISIS NUMBERS

Every Alaskan with access to a telephone has someone to talk to if they start feeling self-destructive. Juneau, Fairbanks and Anchorage have local crisis lines. And there is a toll-free 800 number that everyone can use.

- Juneau: 586-4357. Answers from 7 p.m. to 11 a.m. At other times use the 800 number.
- Anchorage: 276-1600. Answers 24 hours a day.
- Fairbanks: 452-4357. Answers 24 hours a day.
- Everywhere in Alaska: 800-478-1600. In some locations, you may have to dial 1-800-478-1600. Answers 24 hours a day.

A PEOPLE IN PERIL

Sunday	Alaskans' suicide epidemic
Monday	Death & disease throughout state
	Troubled system that gathers vital statistics
Tuesday	Rage and alcohol turn 15-year-old into killer
	A death brings temporary harmony to [illegible]
TODAY	Fetal Alcohol Syndrome victimizes the unborn
Thursday	A legal river of booze to the Bush
	[illegible] effort to restrict the flow of booze
	[illegible] the bootlegger's friend
Friday	How bootleggers ply their trade
	A tragedy in St. Mary's
Saturday	[illegible] fights the importation of liquor
	One wet, one dry, one damp community
Sunday	Anchorage is a different kind of village
	Portrait of the Natives who live in Anchorage

FETAL ALCOHOL SYNDROME

NEWS ARTICLES

1980 - 1986

October 13, 1986

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OCT 16 1986

Vicki A. Hild
Alaska Area Native
Health Service
A-CHSB
P.O. Box 7-741
Anchorage, Alaska 99510

Dear FAS Networking Members:

Just a brief update. On September 29th I assumed the position of statewide FAS Coordinator with the Alaska Native Health Board and the Alaska Area Native Health Service. I feel it will be an exciting and challenging position that will enhance our FAS prevention efforts. I will be in contact with most members on specifics. My mailing address will remain the same. The new telephone number is 257-1709.

The North Pacific Rim's FAS Program, which started as a pilot project, will continue with emphasis on prenatal clinics at the Alaska Native Medical Center and on community education in their villages. Also, the Copper River Native Association has submitted a proposal for a FAS prevention program.

Results from the FAS diagnostic clinics held this past year throughout Alaska revealed a FAS rate for Alaskan Natives of 4.1/1000 live births. This is a conservative rate as some FAS children were unable to attend these clinics.

How does this rate compare? The rate of FAS in France and Sweden is 1.4/1000 live births, in the contiguous 48 states the rate is 1.7/1000 live births, and in Navajo the rate is 2.0/1000 live births.

For those who may not have heard about the case in California on Fetal Abuse, I have enclosed a copy of a newspaper article. Another interesting update is regarding the case in Canada where a woman who had given birth to a FAS infant was charged with child abuse -- she was found guilty.

Until the next update.

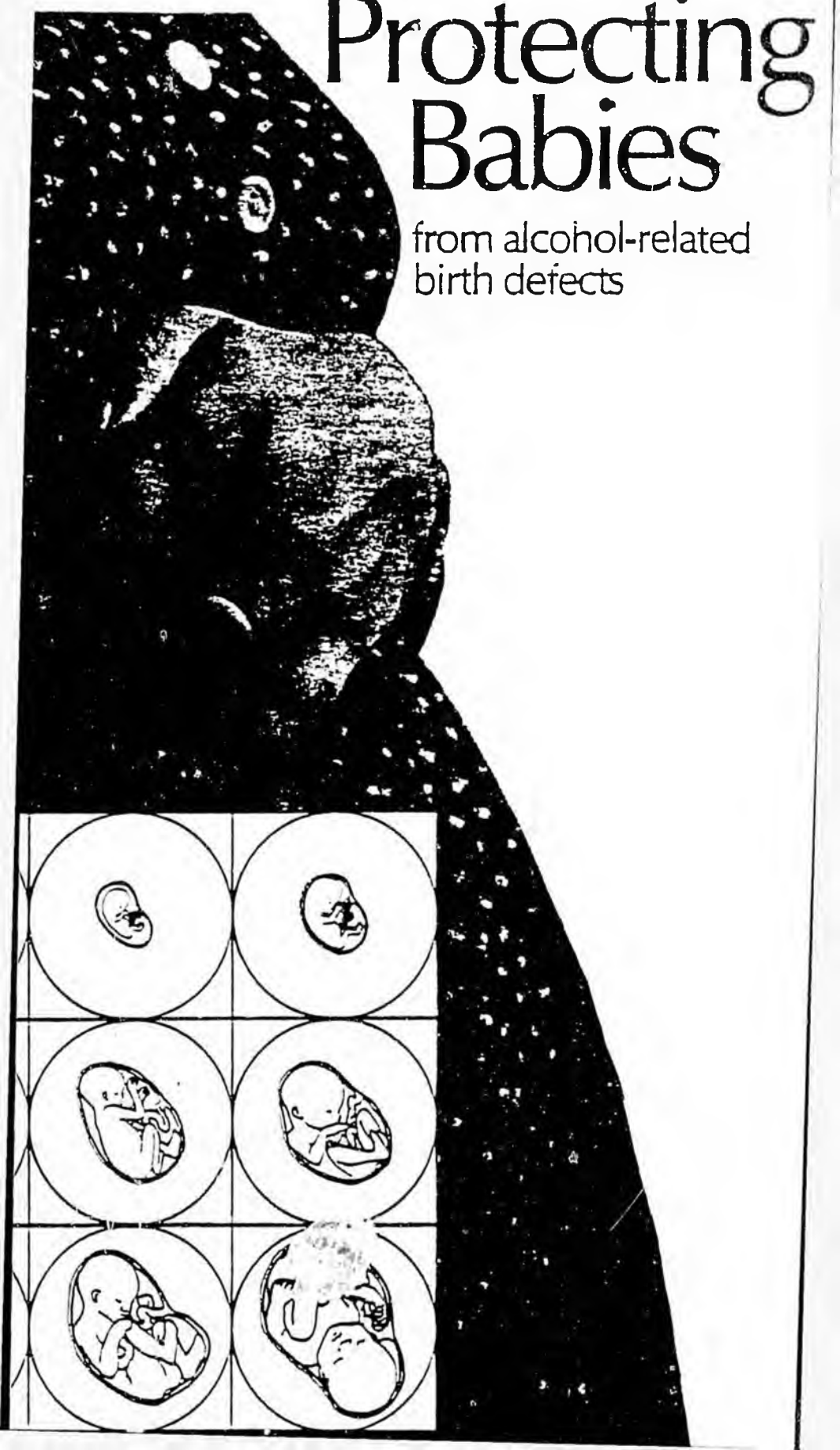
Sincerely,

Vicki A. Hild, M.S.P.H.
FAS Coordinator

lifornia at San Diego

Protecting Babies

from alcohol-related birth defects



Expectant mothers who drink during their pregnancy may cause irreparable harm to their frail, delicate unborn babies. A major effort to reduce alcohol-related birth defects is under way in California.

Individuals and organizations concerned with the problem are active on a variety of fronts. Among their strategies

- Urging city and county governments to require that birth defect warning posters be displayed wherever alcoholic beverages are sold.
- Supporting state and federal legislation mandating that birth defect warnings be included on the labels of alcoholic beverages.
- Training medical practitioners to recognize symptoms of alcohol and drug abuse in women of child-bearing age so they can be referred to appropriate treatment.
- Making FAS an element in pre-natal counseling, with emphasis on educating fathers as well as mothers about the risks of alcohol and drug use during pregnancy.
- Creating new school curriculum materials for early education about the risks of using drugs or alcohol during pregnancy. As yet, barely five percent of California school districts include prevention of birth defects in their health classes.
- Improving programs for diagnosis of alcohol-related birth defects so that children with this disability may receive treatment that will help them develop to their full potential.
- Expanding research to determine exactly how a developing fetus is affected by the mother's alcohol and drug use, and to develop better modes of care for victims of alcohol and drug related birth defects.

Preventing birth defects associated with alcohol use was the subject of a national conference held in San Diego in 1986, sponsored by the Program on Alcohol Issues of the UCSD Extension. Research and treatment specialists from 15 states and Canada attended the conference, adopting a series of recommendations for new measures aimed at increasing public awareness of the danger of drinking during pregnancy.

Photo by Kurt Mulholland, NIAAA; drawing courtesy March of Dimes Birth Defects Foundation.

Dr. Gladden Elliott, president of the California Medical Association, told the conference that new knowledge is dispelling the notion that Fetal Alcohol Syndrome is relatively rare.

"We now know that the syndrome affects from one to 11 of every 1,000 births," he said. "For those women who have a drinking problem, it may strike as many as 29 infants per 1,000 births. This means that every year physicians are treating between 3,600 and 6,000 babies with fetal alcohol syndrome. And an additional 36,000 newborns each year show some signs of less severe alcohol-related birth defects."

More research is needed to determine what proportion of the 10,000 to 12,000 infants born each year with birth defects or developmental disorders are the victims of Fetal Alcohol Syndrome (FAS) or Fetal Alcohol Effects (FAE).

Fetal Alcohol Syndrome is the most severe of these conditions and is associated with alcohol abuse or dependence by the mother, especially in the early weeks of pregnancy. FAS babies have decreased weight and head size, various degrees of mental retardation, and physical abnormalities most evident in facial features. The less severe Fetal Alcohol Effects are associated with drinking at any stage of pregnancy and include low birth weight, spontaneous abortion and some partial aspects of the Fetal Alcohol Syndrome.

The costs associated with Fetal Alcohol Syndrome are staggering. The direct costs of caring for affected children in the United States are estimated to be at least $2 billion a year. Institutional care for a severely retarded FAS child may run to $65,000 a year, or $2.5 million over its potential lifetime. In terms of human suffering, of course, the cost is incalculable.

A new study reported late last year in the British medical journal Lancet identifies Fetal Alcohol Syndrome as the leading cause of mental retardation in infants – ranking ahead of Down syndrome and spinal bifida. Alcohol use is the one cause of birth defects that is completely preventable.

Research has yet to establish exactly what mechanism is involved in causing harm to a developing fetus when the mother drinks. There is no known "safe" amount of alcohol that an expectant mother can drink, nor a period in her pregnancy that might be considered safe for drinking. Therefore pregnant women are urged to abstain altogether from alcohol when they are trying to conceive and throughout their pregnancy.

Programs to combat alcohol-related birth defects are being waged by public health agencies and medical organizations along with such private organizations as the March of Dimes Birth Defects Foundation and Healthy Mothers, Healthy Babies.

A special effort is being made to reach teen-agers with information about FAS and FAE. Dr. Mary Lu Hickman, a medical consultant to the state Department of Developmental Services, points out that one out of 10 girls will give birth before the age of 18.

"Teen-age mothers often don't realize they are pregnant until maybe the second or third month," says Hickman. "By that time, if they have had drinking episodes, the damage of FAS probably has already occurred. Major brain and organ systems are laid down by the eighth or ninth week."

Dr. Hickman chairs the California Prevention Task Force on developmental disabilities which is developing a plan called "Prevention 1990." The plan, she told the UCSD conference, will have a strong component dealing with both the prevention and treatment of alcohol related birth defects.

"The most important element of the plan is to get birth defects into the educational curricula," she said. "We want all students to have awareness and knowledge of the lifestyle necessary to prevent birth defects, including FAS and FAE."

She said the key to effective education about the risks of drinking and smoking during pregnancy must begin at an early age. "We feel very strongly that the knowledge needed to make a decision whether to drink or smoke should be given at least by grades three and four if it is going to be effective."

Future mothers and fathers are not the only target of education programs aimed at reducing alcohol-related birth defects. The California Medical Association recently inaugurated a

Chemical Dependency Education Program for physicians which hopes to improve their ability to detect drug and alcohol abuse in their patients and refer them to appropriate treatment.

Recognition of chemical dependency symptoms is especially important for obstetricians, who are in a position to help expectant mothers obtain counseling and treatment for alcoholism and other drug abuse which could jeopardize their unborn babies.

The CMA is also an ally of other organizations which are lobbying in Sacramento and Washington on behalf of legislation that would help inform the public about the link between alcohol and birth defects. Lawmakers at both the state and federal level are being urged to pass bills that would require warning labels on alcoholic beverage containers, and warning messages in advertising for the beverages.

State Sen. Gary Hart of Santa Barbara is sponsoring a 1987 version of a labeling bill that was effectively blocked in 1986 by heavy lobbying by the beverage industry. A coalition of organizations concerned about public health and child welfare is working on behalf of the legislation under the leadership of Consumers Union.

In Washington, the Center for Science in the Public Interest has been campaigning on behalf of federal legislation that would require a health warning label on alcoholic beverages.

The most successful battles on behalf of health warnings have been fought in local communities. More and more city and county governments are requiring that posters warning of the risk of birth defects from drinking alcohol be posted in all establishments where alcoholic beverages are sold.

Both the Los Angeles City Council and the Los Angeles County Board of Supervisors have adopted ordinances requiring such warning posters. (See accompanying article about how concerned individuals and groups in Los Angeles worked on behalf of the new regulations.)

In San Diego County, the Board of Supervisors voted favorably on a warning poster ordinance in October, 1986, and planned to lay down a procedure for implementing it in unincorporated areas of the county early in 1987.

"There is very little doubt at all that drinking alcohol in any form during pregnancy can cause birth defects," said Supervisor Susan Golding, who sponsored the San Diego County ordinance. Another supervisor, Brian Bilbray, said he was not impressed by the argument of opponents that it was up to doctors, not sellers of beverages, to warn women about alcohol and birth defects. Representatives of the restaurant and grocery industries opposed the ordinance.

"Maybe in your neighborhood you have pregnant ladies going to their physicians," Bilbray told the opponents. "A lot of my constituents never see a physician until they're ready to deliver."

The San Diego ordinance was supported by the March of Dimes Birth Defects Foundation, the National Council on Alcoholism and other public and private agencies concerned with maternal care, child welfare and prevention and treatment of alcohol and drug problems.

As proposed by Supervisor Golding, the San Diego posters would carry this message: "Warning. Pregnancy and alcohol do not mix. Drinking beer, wine or liquor while you are a pregnant or nursing mother—even in moderate quantities—can be harmful to your baby."

Georgia and South Dakota are now requiring warning signs statewide. Other cities which require the warnings include New York; Philadelphia; Washington, D.C.; Jacksonville and Leesburg, Florida; and Columbus and Lakewood, Ohio.

The Oklahoma Health Department has been circulating posters to liquor-serving establishment and asking that they be displayed voluntarily. A proposal still under consideration in Wisconsin would require that a pamphlet about Fetal Alcohol Syndrome be handed to all persons applying for marriage licenses in that state.

In most cases where posters are required, the warning deals only with the risk of birth defects. One community goes further, however. In Leesburg, Florida, the posters carry this message:

"Warning: Alcohol in Beer, Wine, and Liquor can cause intoxication, addiction, birth defects. Reduce your risks: do not drink before driving or operating machinery; do not mix alcohol with other drugs (it can be fatal); do not drink during pregnancy."

In Los Angeles, the California Restaurant Association filed a lawsuit challenging the constitutionality of the city's warning poster ordinance. However, a Superior Court judge rejected the argument that the ordinance infringes on the state's powers to regulate the sale of alcoholic beverages.

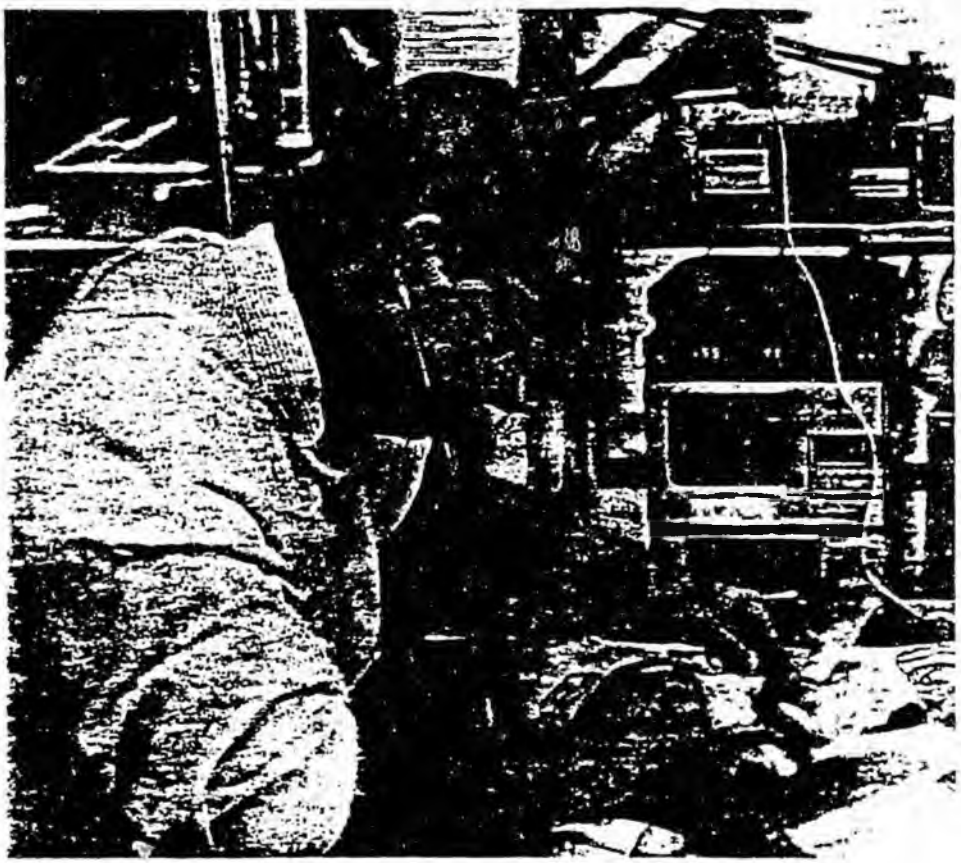


Photo by March of Dimes Birth Defects Foundation

Birth defects associated with alcohol use during pregnancy may affect as many as 6,000 babies born in the United States every year. A new study ranks alcohol abuse by the mother as the leading cause of mental retardation in America.

Warning Posters

–Persistence Pays Off in Los Angeles

Adoption of warning poster ordinances by the Los Angeles City Council and the Los Angeles County Board of Supervisors is a textbook example of how community concern about an alcohol problem can be translated into action by local governing bodies.

The successful campaign was guided by a Task Force organized by the Alcohol and Drug Dependency Council of Los Angeles County, which is the local affiliate of the National Council on Alcoholism.

The choice of leaders for the campaign showed an awareness of political realities. Co-chairing the Task Force were Mary Louise Frawley, who has the credentials of a conservative Republican, and Elizabeth Snyder, a prominent Democrat.

"Between the two of us, we had things pretty well covered," says Frawley. "There's a Democratic majority on the City Council, and a Republican majority on the Board of Supervisors."

The two chairpersons assembled a Task Force representing a dozen health and welfare organizations with a special interest in protecting mothers and children from the risk of alcohol-related birth defects. Members of the Task Force in turn reached out to other organizations that might be persuaded to join in the campaign. Eventually more than 35 public and private agencies were lending their names and influence to the effort. Frawley says the Task Force found valuable tips in a booklet on how to get local alcohol warning legislation passed, available from the Center for Science in the Public Interest, 1501 16th St. NW, Washington, D.C. 20036.

The Task Force lined up medical experts on the Fetal Alcohol Syndrome and Fetal Alcohol Effects to testify before the City Council's Health Committee about the importance of informing the public about the risks of drinking during pregnancy. By strategic timing, the Health Committee hearing was held during an observance of "Alcohol Awareness Week" in Los Angeles.

A favorable report by the Health Committee was followed by adoption of the warning poster ordinance by the full 15-member City Council. "We were surprised at the lack of opposition," says Frawley. "I think the beverage industry people were caught off guard."

This was not the case when the Task Force took the issue to the Board of Supervisors, seeking a similar ordinance to apply to the unincorporated areas of Los Angeles County. This time, representatives of the beverage and service industries were on hand to argue against the ordinance. The FAS Task Force made sure that its side was well represented, too.

"We had a fine turnout of our people for the county hearing," Frawley says. "We wanted to make sure the supervisors knew how many of us were in the audience, so we all wore 'Fight Birth Defects' ribbons."

The main argument made against the proposed ordinance was that it was unconstitutional – that only the state government was empowered to make regulations affecting the sale of alcoholic beverages. Legal scholars at the Prevention Research Center in Berkeley helped provide ammunition for an effective counter-argument in the presentation to the supervisors.

The supervisors adopted the ordinance. Warning posters now are required in 7,500 establishments selling alcoholic beverages in the city of Los Angeles, and in another 1,500 similar businesses in unincorporated areas of the county. Volunteers from the Task Force have been assisting city and county authorities in distributing posters to the affected businesses. Members of the Task force also hope to persuade other municipalities in the Los Angeles area to adopt similar ordinances.

In drafting a proposed text for the warning signs, the Los Angeles Task Force profited by the experience of others. In New York, similar warning posters refer only to the risk of birth defects from drinking "alcoholic beverages" during pregnancy. Surveys have indicated that some people believe the message refers to distilled spirits, but not to beer and wine. The Los Angeles posters state specifically that the risk lies in drinking "beer, wine and other alcoholic beverages."

What's the secret of a successful community effort to pass a warning sign ordinance? "Persistence," says Mary Louise Frawley.

"Liz and I spent a lot of time on the telephone, keeping after people to remind them of what we were doing and getting them to follow through on their promises to write letters or call a councilman or supervisor."

She had another tip for organizers of such campaigns. "We kept it as informal as possible. We tried not to have too many meetings. People shy away from commitments that mean sitting through a lot of dull meetings. Whenever you can, use the phone."

Fetal Alcohol Syndrome

Kenneth L. Jones, MD*

The fetal alcohol syndrome is a specific pattern of altered growth, structure, and function seen in the offspring of alcoholic women who drink heavily throughout pregnancy. Since the initial delineation of this condition in 1973,[1,2] it has become clear that prenatal alcohol exposure can be associated with a wide spectrum of abnormalities including otherwise normal children with learning disorders, more severely affected children who manifest prenatal onset growth deficiency, mental retardation, and typical facies, and spontaneous abortion, the most severe effect that alcohol can impose on the developing fetus.

HISTORICAL PERSPECTIVES

Despite the fact that we in the 20th century have not until recently been aware that alcohol could be detrimental to the unborn baby, ample historical evidence is available indicating that an association between maternal alcoholism and serious problems in the offspring is not a new observation. In the Old Testament, an angel admonished Samson's mother: "Behold, thou shalt conceive, and bear a son: and now drink no wine or strong drink . . ." (Judges 13.7) Evidence is available from classical Greek and Roman mythology suggesting that maternal alcoholism at the time of conception can lead to serious problems in fetal development. This led to an ancient Carthaginian ritual forbidding the drinking of wine by the bridal couple on their wedding night in order that defective children might not be conceived. More recently, an 1834 report to the British House of Commons indicated that infants born to alcoholic mothers sometimes had a "starved, shriveled, and imperfect look." In 1900, Sullivan investigated female alcoholics at the Liverpool Prison. He was able to document an increased frequency of early fetal death and early infant mortality in their offspring.

* Associate Professor, Department of Pediatrics, University of California, San Diego, La Jolla, CA.

INCIDENCES

Because we are not yet fully aware of the total spectrum of abnormalities associated with prenatal alcohol exposure, the incidence of this disorder in the general population is unclear.

In a study published by Olegard et al[3] from Goteborg, Sweden, the incidence of the full-blown fetal alcohol syndrome was estimated to be 1 in 600 live births. However, they estimated the rate of 1 in 300 when infants with partial or more mild manifestations of the syndrome were included.

In the United States, it has been suggested that the fetal alcohol syndrome is the third most common recognizable cause of mental retardation with an estimated incidence of 1 to 2 per 1,000 live births.[4] However, in areas where the incidence of alcoholism is high in reproductive-age women, the incidence of this disorder is clearly much higher.

PATTERN OF MALFORMATION

The principal features of the fetal alcohol syndrome are given in the Table, are illustrated in Fig 1 through 3, and are further outlined below. It is important to emphasize that alcohol, like other teratogens, produces a spectrum of defects and that affected children may show great variability. One finds every gradation from the full-blown fetal alcohol syndrome to much milder effects of alcohol referred to as fetal alcohol effects.

Birth length, weight, and head circumference are decreased approximately 2 SD to 3 SD below the mean for gestational age. With advancing age, linear growth remains delayed, weight becomes more retarded than length, and head circumference is most severely affected.

Clearly of greatest importance is the effect that prenatal exposure to alcohol can have on brain development. Although the average IQ is 63, recognition of large numbers of patients indicates a wide spectrum of developmental outcomes ranging from children with profound mental retardation and cerebral palsy to those with normal intelligence who manifest learning disorders and other behavioral aberrations.

Of particular importance in the immediate newborn period is the occurrence of neonatal withdrawal symptoms. Although not as common or as severe as can occur in babies born to mothers addicted to heroin or methadone, neonatal ethanol withdrawal is manifested primarily by jitteriness, irritability, and hyperactivity and usually has its onset within 12 hours of birth.

Characteristic neuropathologic features, including multiple heterotopias resulting from alterations in neuronal migration, have been demonstrated in the brains of some affected children.[5] Although noted in extremely small numbers, meningomyelocele and hydrocephalus have also been seen.

The typical facial features which to a great extent permit clinical recognition of the fetal alcohol syndrome are at least partially a function of the effect of alcohol on early brain development. For example, the short palpebral fissures are most likely the result of deficient eye formation. The optic vesicles develop as evagina-

EDUCATIONAL OBJECTIVES

1. Appropriate familiarity with the characteristics of the neonate whose mother has consumed alcohol throughout pregnancy (Recent Advances, 86/87).

4. The pediatrician should be able to develop an appropriate evaluation of a small-for-gestational age newborn infant, with ability to differentiate among maternal toxemia, placental insufficiency chromosome abnormality, intrauterine infection due to cytomegalovirus, maternal malnutrition, fetal alcohol syndrome, maternal heroin addiction, maternal smoking, or dysplastic causes, and develop an appropriate plan for management (Topics, 86/87).

TABLE. Fetal Alcohol Syndrome Pattern of Malformation

Growth: Prenatal and postnatal growth deficiency.

Performance: Developmental delay. Fine motor dysfunction manifested by weak grasp and poor eye-hand coordination. Irritability, hyperactivity, and poor attention span. Speech problems.

Craniofacial: Microcephaly. Short palpebral fissures. Ptosis. Maxillary hypoplasia. Long, smooth philtrum. Thin vermilion of upper lip.

Skeletal: Joint alterations including camptodactyly, flexion contractures at elbows, congenital hip dislocations, foot positional defects. Radioulnar synostosis. Tapering terminal phalanges with hypoplastic finger and toe nails. Cervical spine abnormalities. Altered palmar crease pattern.

Cardiac: Ventricular septal defect. Atrial septal defect.

Other: Cleft lip and/or cleft palate. Myopia. Strabismus. Epicanthal folds. Dental malocclusion. Hearing loss. Protruberant ears. Abnormal thoracic cage. Renal anomalies. Strawberry hemangiomata. Hypoplastic labia majora.

Fig 1. Top, left. Newborn American Indian baby with fetal alcohol syndrome. Note long smooth philtrum and thin vermilion border of upper lip.

Fig 2. Top, right. 3½-year-old white girl with fetal alcohol syndrome. Note bilateral ptosis and epicanthal folds, unilateral strabismus, short palpebral fissures, long smooth philtrum and thin vermilion border of upper lip.

Fig 3. Bottom, left. 4-month-old white boy with fetal alcohol syndrome. Note short palpebral fissures, long smooth philtrum, and thin vermilion border of upper lip. Right. Same child at 6 years of age. Note ptosis in addition to same features present at 4 months of age.

tions from the neural epithelium. Because the optic vesicles are responsible for induction of normal palpebral fissures, it is suggested that alcohol-related alterations in early brain development, and thus eye development, lead secondarily to an alteration in palpebral fissure size. Moreover, it has been suggested that the long smooth philtrum and thin vermilion of the upper lip is secondary to an alteration in forebrain development resulting in closely set olfactory placodes and underdeveloped medial nasal processes. Using a mouse model, Sulik et al[6] demonstrated deficient medial nasal process derivatives secondary to early prenatal ethanol infusion. In that the medial nasal processes form the columella, the philtrum, the portion of the dentoalveolar ridge containing the upper incisors and the anterior portion of the hard palate, she suggested that deficiency of the medial nasal processes leads to fusion of the maxillary processes at the midline to form the typical long philtrum seen in the fetal alcohol syndrome.

Finally, many of the skeletal defects seen in this disorder are also secondary to the effect of alcohol on brain development. Normal joints de-

pend on fetal activity for their development. In situations in which fetal activity and thus intrauterine joint mobility is decreased, contracture of a variety of joints may occur (Table). Similarly, palmar crease patterns, also dependent on movement of the hands for their normal development, are altered secondary to the effect of alcohol on early development of the brain.

In a study published by Smith et al,[7] radiographic evidence of cervical spine fusion and tapering of the terminal phalanges occurred in 43% and 72% of cases, respectively. The fusion of the cervical spines could be demonstrated only after 1 year of age. The frequency of renal defects is unclear. Results of systematically performed intravenous pyelograms in 19 affected children indicated that two had ureteropelvic obstruction, one had a neurogenic bladder secondary to meningomyelocele, and one had malrotation of one kidney which suggests that renal ultrasound is warranted in the evaluation of children with the fetal alcohol syndrome.

RISKS TO THE FETUS OF ALCOHOL EXPOSURE

Chronic Maternal Alcoholism

The incidence of adverse pregnancy outcome in the offspring of alcoholic women who continue to drink heavily throughout pregnancy ranges from 30% to 50%. This is based on a number of both prospective and retrospective studies. Perhaps of greatest significance is a prospective study from Goteborg, Sweden, published by Olegard et al.[3] Twenty-eight alcoholic pregnant women were ascertained and counseled early in their pregnancy regarding the deliterious effects of alcohol on the unborn. Five elected to have a therapeutic abortion. Two additional infants died during labor, one at 29 weeks of gestation of unknown cause and the other at 40 weeks from acute abruption of the placenta. Of the remaining 21 women, seven gave birth to normal babies, seven gave birth to babies with the fetal alcohol syndrome, and seven gave birth to babies with what was interpreted as the prenatal effects of alcohol but not the full-blown fetal alcohol syndrome.

The extent to which therapy for heavy drinking during pregnancy might improve pregnancy outcome has not been determined conclusively. The author has seen the full-blown fetal alcohol syndrome in some children whose alcoholic mothers drank heavily throughout the first trimester, yet totally abstained throughout the remainder of pregnancy. However, Rosett et al[8] have shown that different degrees of alcohol reduction during pregnancy, ranging from moderate to complete abstinence, seem to improve pregnancy outcome.

Finally, in a study by Little et al[9] of women who reported total abstinence during pregnancy but who had a history of alcoholism prior to conception, the mean birth weight of study infants was 258 g less than that of study infants. This raises concern that a history of maternal alcoholism may be associated with intrauterine growth retardation independent of alcohol use during pregnancy. Intellectual performance was not evaluated in those children.

Moderate Alcohol Consumption

In a study by Hanson et al,[10] 11% of babies born to moderately drinking mothers had evidence of the prenatal effect of alcohol. For the purpose of that study, moderate drinking was defined as 30 to 60 mL (1 to 2 fl oz) of absolute alcohol per day in the month preceding pregnancy. It was believed by the authors of that paper that the month preceding pregnancy actually referred to the first few weeks after conception. The 30 to 60 mL (1 to 2 fl oz) of absolute alcohol translates into approximately 60 to 120 mL (2 to 4 fl oz) of whiskey, two to four glasses of wine, or two to four cans of beer.

Lesser Amounts of Alcohol

The extent to which lesser amounts of alcohol at various times during pregnancy lead to problems in fetal development is not known. However, the full-blown fetal alcohol syndrome has not been seen in babies born to women who drink less than 30 mL (1 fl oz) of absolute alcohol per day. Pregnancy outcome associated with lesser amounts of alcohol becomes particularly difficult to study because it is quite possible that some of the more mild effects of prenatal alcohol exposure might not become obvious until the child enters the first grade in school. However, when referring to heavy and moderate alcohol consumption, it is clear that not all infants prenatally exposed to the same amount of alcohol will be affected to the same extent. It would, therefore, seem naive to consider that there exists a "safe" amount of alcohol for all pregnant women. What may be a "safe" amount for most women might well be devastating for another woman's unborn baby. Therefore, it is the author's belief that total abstinence from alcohol is the best policy throughout pregnancy.

NATURAL HISTORY

A follow-up evaluation of the original 11 children with the fetal alcohol syndrome, 10 years following initial diagnosis, demonstrates the long-term effects prenatal exposure to alcohol can have on the developing fetus.[11] One of the children was lost to follow-up and two are now dead, one died in the newborn period following multiple apneic episodes and the other drowned in the bath tub at 3½ years of age. Of the remaining eight, all continue to be growth deficient, dysmorphic, and mentally delayed. Medical findings that have become particularly significant with time include dental malalignment and malocclusions, eustachian tube dysfunction, and myopia. In fact, in five of the children a class III malocclusion developed, and dental malalignments were seen in all patients. Chronic otitis media, probably secondary to eustachian tube dysfunction associated with maxillary hypoplasia, required medical and surgical procedures in four children, three of whom have suffered permanent conductive hearing loss. Esotropia and/or myopia were noted in four children, and two had optic nerve hypoplasia. Cardiac anomalies, initially believed to be present in all eight of the surviving children, all resolved spontaneously or were considered to be insignificant. It

is important to recognize, however, that Smith et al have reported a different experience regarding prognosis for cardiac defects in children with the fetal alcohol syndrome. Of the 76 patients diagnosed by them as having the fetal alcohol syndrome, 31 had a cardiac defect, and 12 additional children had functional murmurs. Although only three of the 15 children with isolated ventricular septal defects required surgery, ten of the 16 children with complex cardiac defects required or had undergone surgery at the time of publication. With respect to skeletal defects, congenital hip dislocation, present in three of the eight surviving children, was managed successfully with casting and/or abduction splints in two children and the third child required hip surgery. With the exception of one patient with scoliosis requiring a spinal laminectomy, none of the other skeletal or joint anomalies in these eight children have required surgery or have interfered with performance.

With respect to intellectual performance, four of the eight surviving children were mildly retarded with IQ scores in the borderline to dull-normal range and were attending school in a combination of regular and remedial classes. The remaining four children were seriously handicapped, required constant surveillance, and continued to require sheltered environments.

FACTORS PREDICTIVE OF ULTIMATE PROGNOSIS

Two factors may be helpful in predicting the ultimate prognosis for children with the fetal alcohol syndrome. (1) Of greatest importance is the extent and severity of the pattern of malformation, including the growth deficiency. Those children noted in the newborn period to be most severely affected were noted in follow-up to have the most severe degree of microcephaly, the shortest stature, and the most impaired intellectual function. (2) The severity of the maternal alcoholism. Three of the four mothers of the most seriously handicapped children followed for 10 years by Streissguth et al[1] died of alcohol-related causes within 6 years of the birth of their affected child. Unfortunately, the quality of the home environment did not seem to have any impact on ultimate prognosis. Two of the four most severely affected children lived in the most stable foster homes.

COUNSELING THE PARENTS OF AFFECTED CHILDREN

The vast majority of women who gave birth to a baby with a birth defect believe that they were somehow responsible for their child's problem. In the case of a child who's defects are caused by the mother's alcohol consumption, that potential guilt is frequently exaggerated. Although there is certainly no "right" way to help women deal with the anxiety related to this issue, it is the author's strong conviction that a straightforward, nonjudgmental, and open presentation of the facts, followed by a willingness to help both the mother deal with her alcohol problem and the child cope with his or her disabilities, is always the best approach.

In some situations, realization that her child has the fetal alcohol syndrome is a horrible shock and represents the first time that a woman actually has to admit to herself that she is, in fact, an alcoholic. More frequently, however, she has already suspected that her child's problem relates to alcohol consumption.

Because many children with the fetal alcohol syndrome are born to nonalcoholic women who drink moderately, and conversely, because many alcoholic women give birth to completely normal children, the decision to file abuse charges and remove a child from the home should never be based upon whether the child has the fetal alcohol syndrome but, rather, whether the parents are capable of providing a stable environment for the child.

SUMMARY

The fetal alcohol syndrome is the third most common recognizable cause of mental retardation in the United States. Many of the features of the fetal alcohol syndrome are secondary to the effect of alcohol on brain development. These include microcephaly, short palpebral fissures, the long smooth philtrum and thin vermilion of the upper lip, joint anomalies, altered palmar crease pattern, and mental retardation. Approximately 40% of babies born to alcoholic women and 11% of babies born to nonalcoholic moderately drinking women have evidence of the prenatal effect of alcohol. Alcohol, like other teratogens, causes a spectrum of defects. Thus, affected children may show great variability from the full-blown fetal alcohol syndrome to much milder effects of alcohol, some of which may not be obvious until school age. A "safe" amount of alcohol probably does not exist for the pregnant woman. Depending on unknown factors, what may be a safe amount for some women may be devastating to the unborn baby of another. Two factors, the severity of the maternal alcoholism and the extent and severity of the pattern of malformation, seem to be most predictive of the ultimate prognosis for children with the fetal alcohol syndrome. Any decision to file child abuse charges against a mother whose baby was prenatally exposed to alcohol should be based on the parents ability to provide a stable home environment and not on whether the baby has features of the fetal alcohol syndrome. The fetal alcohol syndrome, the third most common recognizable cause of mental retardation, is completely preventable. All attempts must be made to educate people regarding the deleterious effect of alcohol.

CONCLUSION

It is now clear that alcohol is a human teratogen. As well as the effect it can have on the immediate family, the birth of a child with the fetal alcohol syndrome can have a profound economic and educational impact on our society. From a practical standpoint, the tragedy of this disorder is offset to a great extent by the realization that prenatal alcohol exposure is a completely preventable cause of birth defects. Thus, a program that successfully educates women in the childbearing years regarding the deleterious effects of alcohol on the unborn could well represent the simplest and most effective method at our disposal to sig-

mitigate, decrease the incidence of birth defects.

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EDUCATIONAL OBJECTIVE

16. Appropriate familiarity with the advantages and risks of long term acyclovir administration in prophylaxis of recurrent genital herpes (Recent Advances, 85/87).

Advantages and Risks of Prophylaxis for Herpes

Suppression of Frequently Recurring Genital Herpes. Straus SE, et al: *N Engl J Med* 1984;310:1545

Resistance to Antiviral Drugs of Herpes Simplex Virus (HSV) Treated With Acyclovir. Crumpacker CS, et al: *N Engl J Med* 1982;306:343

Risk of Recurrences After First Episode of Genital Herpes. Reeves WC, et al: *N Engl J Med* 1981;305:315

Of primary herpes simplex virus type 2 infections, 60% recur, and the recurrences are clinically significant in most patients. Recurrent herpes simplex virus infections can be reduced in frequency by the use of a regimen of daily acyclovir. In a study by Straus et al, the recurrence rate during a 4-month period was 4/16 in patients receiving acyclovir and 16/16 in patients receiving placebo. Unfortunately, the infections recurred in all patients after acyclovir therapy was discontinued. Acyclovir was well tolerated but drug-resistant virus was isolated during therapy.

Crumpacker et al isolated a resistant herpes simplex virus mutant after multiple courses of acyclovir therapy in an immunoincompetent child. The clinical significance of this finding was not determinable.

Comment: Acyclovir treatment for herpes simplex virus-2 recurrences in patients with a high frequency of recurrence (ten to 15 recurrences per year) is unquestionably effective during therapy but does not alter the natural history of disease. In addition, the authors "remain concerned about possible long-term consequences of continuous treatment with a drug that may affect, however minimally, normal host-cell metabolism ... [and] the potential for inadvertent use early in pregnancy." They conclude that acyclovir therapy "is best reserved for reliable patients who have well-established patterns of frequent or complicated herpetic recurrences, and the treatment should be of limited duration ... therapy should be interrupted occasionally to determine whether the patient continues to have frequent recurrences." (*R H R*)

EDUCATIONAL OBJECTIVE

91. Appropriate familiarity with the picture of hyponatremia and failure to thrive in the infant with ileostomy or other gastrointestinal diversions (Recent Advances, 86/87).

Hyponatremia

Sodium Needs of Infants and Children With Ileostomy. Schwarz KB, Ternberg JL, Bell MJ, et al: *J Pediatr* 1983;102:509

This group studied seven infants with abdominal ileostomies and three with a Soave ileoendorectal pull-through. They showed that, although the initial very high sodium losses spontaneously lessened in ten days, the obligatory losses, however, continued to be high enough so that, when the minimum sodium intake for a healthy infant was given, there was maximum aldosterone secretion, reducing urine losses. Despite the compensation at such intake levels hyponatremia resulted from the high stool output of sodium. The patients did well when a sodium chloride supplement double the usual intake for a normal infant was given.

Comment: In any situation in which there is an obligate increase in sodium (and chloride) losses, eg, cystic fibrosis, vigorous sweating, or intestinal diversion, allowance must be specifically made for an increase in dietary sodium chloride. When there is intestinal diversion, deficiency of vitamin B_{12} should also be prevented by supplementation. (*L Finberg, SUNY Downstate*)

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The Spectrum of Fetal Abuse in Pregnant Women

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Physical assault by a woman or her partner upon their unborn child has received minimal attention in the psychiatric or obstetric literature. The spectrum concept facilitates the application of knowledge about one type of fetal abuse (*e.g.*, physical assault in response to fetal movements) to other types (*e.g.*, neglect or failure to protect the fetus from chemical assault by alcohol, nicotine, or drugs). Three illustrative case histories are presented, including two cases of assault by the mother via the anterior abdominal wall. Fetal abuse may be one antecedent of child abuse, and this paper attempts to transpose the known correlates of child abuse into an antenatal time framework. The resultant preliminary etiological model also draws upon research findings from neonaticide, the psychology of pregnancy, and the psychology of aggression. In addition, recent research on the maternal-paternal-fetal triad is reviewed in an attempt to delineate under what circumstances ambivalence in the parental-fetal relationship may find expression as fetal abuse. The characteristics of individuals most at risk of perpetrating fetal abuse are outlined.

The term "fetal abuse" is used here to encompass a range of behaviors in pregnant women (or their partners) which are characterized by the nonaccidental performance of some act which the individual knows is potentially detrimental to fetal well-being. Such a spectrum of behaviors could be considered to extend from direct physical assault on the fetus (either through the anterior abdominal wall or per vaginam) to a failure to protect the fetus from "chemical" assault with alcohol, nicotine, or drugs. In the field of child abuse, a similar spectrum is recognized, ranging from physical assault to neglect or failure to protect.

Behaviors, including therapeutic or self-induced abortion, the prime, conscious objective of which is termination of the pregnancy, are excluded from the present framework. It is the author's impression that such behaviors tend to occur in early pregnancy (sometimes even before the pregnancy has been confirmed) and are directed at the *state per se*. The present paper focuses on behaviors more often occurring in late pregnancy, which are aimed at the *fetus itself* without a conscious intention to achieve abortion. Elsewhere, the author has demonstrated that parents' attitudes toward "being pregnant" often bear little relationship to those toward the fetus itself (Condon, 1985). In practice, the dichotomy "wanted" *vs.* "unwanted" pregnancy is often less than clear-cut, and varying degrees of ambivalence, operating at different levels of awareness, prevail. Even a "wanted" fetus may become the victim of abuse.

The incidence of fetal abuse is currently unknown. As in the case of wife and child abuse, such behaviors are almost certainly underreported (Adams-Hillard, 1985; Rae-Grant, 1983). A small literature, recently reviewed by Adams-Hillard (1985), focuses on physical abuse of pregnant *women by their partners*. Gelles (1975) has speculated that sometimes the fetus may be the real target in such cases. MacKenzie *et al.* (1980) describe a case of fetal abuse by alcohol. To the author's knowledge, no case of physical assault on the fetus through the anterior abdominal wall by the mother has been reported previously, and the possibility is virtually never considered even by experienced professionals. In the author's experience, *if specific inquiry is made*, the impulse is not uncommon in pregnant women, and four cases of physical assault have been personally encountered, two of which are presented below. Estimates of the incidence of fetal abuse by alcohol or nicotine have been reported elsewhere (Kwok *et al.*, 1983; Little and Streissguth, 1981; Sokol, 1981; Streissguth *et al.*, 1983) and similar caveats would probably apply as regards underreporting.

The emotional and financial cost to society of fetal abuse is thought to be immense. The fetal alcohol syndrome has now become the third most common known cause of mental retardation in the United States, affecting one in 750 live births (Little and

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Streissguth, 1981). It has been estimated that the risks to the fetus from maternal alcohol and nicotine abuse alone outweigh those of diabetes, toxaemia, Rh incompatibility, and other medical conditions for which extensive screening is routinely performed during pregnancy (Sokol, 1981). No information exists concerning the possible contribution of in utero physical assault to such complications as abortion, prematurity, stillbirth, deformity, or mental retardation.

The major advantages of defining such a concept are similar to those that have resulted from Kempe *et al.*'s (1962) coining the term "battered child syndrome." Such gains would include:

1. Increased awareness and heightened vigilance in professionals. Denial of the brutal treatment afforded children throughout history has been notoriously prominent by both professionals and society as a whole, as is apparent in any review of the history of child abuse (Smith and Pagan, 1978). As regards fetal abuse, the adverse effects of alcohol on the fetus have been documented since the time of Aristotle and, despite clear descriptions of the fetal alcohol syndrome published in 1968 (Lemoine *et al.*, 1968), the findings were ignored or dismissed until the paper by Jones *et al.* appeared in 1973. In both areas powerful taboos seem to operate that mitigate against both recognition and scientific investigation of the phenomena.

2. Defining the spectrum of fetal abuse raises the possibility that an understanding of the psychological processes associated with the more flagrant physical assaults may contribute to an increased awareness of those associated with the less obvious failures to protect the fetus from harm. Similarly, psychological mechanisms that operate to safeguard the fetus from these various kinds of assault may have significant aspects in common.

3. A better comprehension of fetal abuse may both enrich and be enriched by our understanding of child abuse in general. Of particular interest is the question of whether fetal abuse is an antecedent of child abuse.

4. As will be discussed further below, the delineation of the concept of fetal abuse permits the identification of a number of areas of interest to many health professionals where previous research findings may illuminate aspects of the fetal abuse phenomenon.

The quality of the intrauterine environment that an expectant couple endeavors to provide for their unborn child will, in part, be determined by the complex interplay between those factors favoring expression of hostility toward the fetus and those factors favoring its care and protection. The spectrum of fetal abuse arises when assaultive or nonprotective impulses attain behavioral expression at the expense of caring and protective ones. The present paper, after presenting three case vignettes illustrating the spectrum of fetal abuse, attempts a preliminary etiological formulation using research findings from a number of related disciplines.

Case 1: Physical Fetal Abuse

D. R. was a 15-year-old girl living in a church-run home for teenage unmarried mothers. She was seen by the author at 25 weeks' gestation at the request of her obstetrician, to whom she had presented with an episode of atypical p.v. bleeding within a few hours of being informed that it was "too late" for an elective termination of her pregnancy. The obstetrician suspected that the patient may have "done something" in an attempt to cause abortion. On specific questioning by the author, the patient admitted that, since quickening, she had regularly punched the fetus through the abdominal wall in response to its movements.

The patient was the youngest of three girls, and her childhood was characterized by rotating placements in various foster families, state homes, and her own dysfunctional family. Her father had physically and sexually abused her from an early age. Her mother had told her in graphic detail of her attempts to induce the abortion of the patient by "jumping off chairs, lying in very hot baths, and getting drunk."

The patient had declined termination in early pregnancy at the insistence of her 18-year-old Greek boyfriend (the baby's father), who had subsequently become progressively more disenchanted with both the relationship and prospective fatherhood. Both had naively decided on termination at 25 weeks, which the obstetric unit had predictably declined to perform. Physical assault on the fetus had intensified as a result. The patient denied that the objective of her assaults was to cause abortion. The initial assaults appeared to be impulsive expressions of rage. Subsequently, once her fetal abuse had become known, she used it as a threat to pressure the obstetrician to perform a termination.

The patient discussed her fetus as follows:

"It's destroying my whole life . . . all it does all day is just lie there getting bigger and bigger and kicking me whenever it feels like it . . . I hate it and I want it out . . . I look terrible—so fat . . . I can't go anywhere socially . . . I can't even play netball . . . it knows what it's doing to me . . . it does it all on purpose. No one is interested in me—all the doctors care about is it."

Comment. Although the patient satisfied DSM-III criteria for conduct disorder, there was no evidence of mental retardation or other psychiatric illness. The level of intent, illogically attributed to the fetus, is not delusional and is identical with that present in the majority of parents who abuse their children in the

first year of life (Gelles, 1973). The patient's grossly emotionally deprived childhood rendered her psychologically unable to relinquish the role of nurturant-hungry child herself, a prerequisite for the mother role. The demands of pregnancy and of the fetus overwhelmed her and she projected her anger onto the fetus, perceiving it as attacking. She had never identified with her own mother until her own unplanned pregnancy gave her the opportunity to do so. Thus, she replicated her own mother's fetal abuse.

Experienced nursing and medical staff, after initially expressing disbelief at the patient's account of her assaults on the fetus, were profoundly distressed by the patient's behavior and several admitted that it caused them to feel "physically sick." There were insistent demands that the patient should be declared insane and treated as such. Such reactions are, of course, similar to those recorded historically when physical child abuse first came into prominence.

Case 2: Physical Fetal Abuse

The patient, Mrs. K., aged 19, was 34 weeks into her second pregnancy when she was referred to the author after her own request for psychiatric help. At the first interview (after specific inquiry about fetal abuse by the author) she related the following account of an incident that occurred 25 weeks into her first pregnancy when she was 17:

"I was worried about Joe [her de facto husband]. He was drinking and seeing other women—it was late at night—he wasn't home—I was just sitting watching television, not feeling angry at all. I felt the baby move and I suddenly thumped it as hard as I could, only once. I don't know why I did it ... I felt terribly guilty and didn't say anything to anyone ... I thought I must have killed it because I hit something really hard, like a bone, and the next day I had a huge bruise on my stomach."

In reply to a question about how she remembered feeling about the fetus on her first pregnancy, she replied: "That's just it ... I didn't feel anything at all ... most of the time I forgot it was there ... it was a real 'it.' I thought of it as his baby, not mine."

The patient was herself a child who suffered physical abuse from a brutal alcoholic father and had failed to be protected by a passive, uncaring mother. She smoked and drank moderately heavily throughout both pregnancies ("because I don't believe what they say about it harming the baby").

Comment. The patient's physical fetal abuse, representing, in part, a displacement of anger felt toward her de facto husband onto "his" fetus, had continued as physical child abuse in the neonatal period. The baby had been removed from her care by the authorities at the age of about 6 months. Mrs. K. also related that during her first pregnancy her de facto husband had "tried to punch me where the baby was."

Case 3: Fetal Abuse by Alcohol

The patient was a 25-year-old professional woman who, previously a light drinker, had commenced drinking heavily toward the end of the second trimester of her first pregnancy. Major marital dysfunction dated from confirmation of the pregnancy, and both partners had been ambivalent about termination. She had concealed her alcohol problem from her obstetrician and was interviewed by the author at 30 weeks as a result of her husband's insistence that she should seek help. She stated:

"I've had to give up too much for this pregnancy—I feel like the baby is using me up—it's taking everything including my energy and giving nothing back ... I look awful ... I have rights, too, but everyone only thinks of the baby's rights, especially Peter (her husband) ... of course, I know alcohol is bad for the baby but I've got a right to some pleasure ... I'm angry with Peter and with the pregnancy."
Interviewer: "When you feel angry like that, do you ever feel like taking it out on the baby—like hitting it?"
Patient: "Yes, often, especially when it moves. The anger really frightens me—I would never hit it—I know I wouldn't actually do anything."
Interviewer: "I wonder if your drinking might be your way of punishing the baby for what you feel it's done for you."
Patient: "I've thought of that, many times. I think it might ... I feel so guilty about it."

Comment. This patient did not satisfy diagnostic criteria for any psychiatric diagnosis other than alcohol abuse. The latter was, as always, overdetermined. However, there was a strong impression that one function it served was to assault the fetus, which was experienced by her as alien and devouring.

Discussion

Fetal Abuse and Child Abuse

There is a consistent finding in the literature that abused children tend to have low birth weight, and Smith and Hanson (1974), in one of the few carefully controlled studies of abused children, found a fourfold increase in low birth weight that was independent of social class. The usual explanation of such findings involves invoking the hypothesis of Klaus *et al.* (1972) that early maternal-infant separation (necessitated by the low birth weight) leads to subsequent dysfunctional bonding, predisposing to child abuse. However, Smith and Hanson (1974) remark that few of their babies underwent separation. Moreover, in recent years the evidence upon which Klaus *et al.*'s (1972) findings were based has been much criticized (Herbert

et al., 1982; Lamb, 1982), with the result that whether or not early separation affects later bonding should be considered as unconfirmed. An alternative explanation of the association between low birth weight and subsequent child abuse is that fetal abuse is an antecedent of child abuse. It is clear that nicotine and alcohol use during pregnancy cause low birth weight. Moreover, abdominal trauma, although unlikely to seriously damage the fetus (cushioned by the amniotic sac), may precipitate labor with resultant prematurity and low birth weight.

Several etiological themes recur in the child abuse literature that may potentially illuminate fetal abuse. First, parents who abuse their children often have unrealistic and idealized expectations of parenthood. They look to the child to gratify a variety of *their* needs and experience the demands of the child as a deliberate and personal attack against which they retaliate. Pregnancy tends to be idealized in our society, and encountering the reality of losses and threats inherent in pregnancy constitutes a crisis for most normal women (LeMasters, 1957) and overwhelms a significant minority (Oakley, 1980). The losses and threats, if handled maladaptively, lead to depression and anxiety, respectively. The fetus, whose intrapsychic representation is a curious admixture of fantasy and reality, is a recipient par excellence for projection and displacement. Thus, not only may it be perceived as the cause of all losses, dissatisfactions, and threats of pregnancy, but also may be perceived as having deliberate intent. The resultant "attacking," "demanding" fetus may then "need to be punished" in a manner analogous to the abused child, as described in case 1 above.

Second, many child-abusing parents have themselves received grossly inadequate parenting, leaving a legacy of unmet dependency needs. Such parents have difficulty relinquishing the unconscious wish to remain children themselves (Smoller and Lewis, 1977). As in cases 1 and 3 cited above, the fetal abuse may be triggered by a woman's perception of her spouse, family, or doctor, as directing their attention to the fetus rather than to her. The resultant jealousy and anger at the perceived rejection may be translated into an attack on the fetal "rival" or into a more passive failure to protect it from harm. The latter could be considered the antenatal equivalent of some forms of failure to thrive in which neglect of the child or fetus results in poor weight gain and stunted development in both instances.

Fetal Abuse and Neonaticide

The phenomenon of neonaticide, defined as murder of the newborn during the first 24 hours of life, most clearly approximates physical fetal abuse, at least from a timing perspective. In the absence of any systematic study of the latter, the correlates of neonaticide may potentially contribute to our understanding of the spectrum of fetal abuse.

Reviewing the literature in 1970, Resnick concluded that: "Hundreds and possibly thousands of neonaticides still occur in this country (United States) each year" (p. 1419). Three of Resnick's findings on contemporary neonaticide warrant cautious generalization to antenatal abuse and recur as themes in the cases cited above:

1. Unlike women who subsequently murder their older children, mothers who commit neonaticide are rarely psychotic. The great bulk of neonaticide is committed simply because the child is not wanted. Psychosis is not common in pregnancy and probably is not a major factor in fetal abuse.

2. "Passivity" is the single most important personality characteristic differentiating women who commit neonaticide from those who obtain abortions. In fetal abuse, it is likely that passive acceptance (or denial) of an unwanted pregnancy is common and consequently elective termination has not been sought.

3. Mothers who commit neonaticide deny or suppress the reality of their pregnancy (or rationalize that they will have a stillbirth) and hence make no advance preparations. They murder the infant when confrontation with its reality (at birth) breaks through the defenses. Antenatally, the event that most dramatically confirms fetal existence, and threatens denial, is quickening. In both of the above case reports of physical abuse, assaults were clearly linked to the experience of fetal movement. Around the time of quickening the fetus also begins to acquire the attribute of "separateness," facilitating projection and displacement of hostile impulses.

Fetal Abuse and the Psychobiology of Pregnancy

A vast literature exists on the psychobiology of pregnancy, much of which is highly relevant to fetal abuse. Space permits only two such aspects to be highlighted here. First, several authors (Bibring, 1959; Brazelton, 1973; Caplan, 1961) have independently observed a shift toward more primitive "primary process" thinking and mechanism, which occurs in many pregnant women during the second and third trimesters. There is often an associated increase in lability of affect. Both these phenomena may be hormonally mediated and have been likened to a transient episode of "borderline" functioning (Bibring, 1959). The constellation of stress, primitive psychic functioning, emotional lability, and increased impulsivity could be construed as predisposing to fetal abuse, the unborn child being the victim of displaced or projected hostilities.

Second, the present author (Condon, 1985) and others (Cranley, 1981; Leifer, 1977) have demonstrated the development of emotional "attachment" between most expectant parents and their unborn child during pregnancy. The term "attachment" is often used rather glibly in the literature and the reader is referred elsewhere for discussion of debate over the conceptual difficulties presented by this construct (Sluckin *et al.*, 1983). However, there is reasonable agreement that the pleasure or pain associated with the presence or absence, respectively, of the object of attachment subserves the prime function of attachment, viz., protection of the object, even in the face of threat to the self.

Ambivalence toward the fetus may arise when resentment, stemming from the losses and threats of pregnancy, coexists with feelings of attachment or affection. Some degree of ambivalence is probably ubiquitous, and which aspect of this ambivalence achieves behavioral expression will depend on a variety of conditions, including the strength of the woman's attachment to her unborn child. The case material suggests that women with less antenatal attachment are less able to derive pleasure from interaction with the unborn child in either fantasy or reality and have more difficulty subjugating their own needs to those of the fetus.

Investigation of the determinants of antenatal attachment has barely begun. In the author's study (Condon, 1985) the most powerful correlate of antenatal attachment was a spouse perceived as supportive and involved in the pregnancy. Cranley (1981) has also documented an association between maternal antenatal bonding and social support.

Antenatal attachment can potentially provide a conceptual framework for identifying women at risk of fetal abuse. It can also define a focus for therapeutic intervention in a clinical setting, thus enabling the abuse to be dealt with in the context of the psychological events of pregnancy as a whole, rather than as an isolated, deviant behavior. Finally, it could be argued that strategies aimed at reducing fetal abuse could more profitably focus on the determinants of the dysfunctional maternal-fetal relationship rather than on "education." The latter, although clearly necessary, may be insufficient for a major impact, as illustrated in cases 2 and 3 above.

The determinants for antenatal attachment are complex and include both historical factors, especially the quality of the woman's own mothering, and contemporary aspects, especially the extent to which the woman's social network supports and validates her role as mother.

Fetal Abuse and the Psychology of Aggression

It has long been known that intimacy does not lessen the likelihood of violence; rather, it appears to favor its occurrence. The symbiotic relationship between the mother and the unborn child, with all its vicissitudes of dependency and intimacy, can provide a setting in which ambivalence or hostility can be acted out as assault or maltreatment.

Grant (1979) has proposed a tripartite model of assaultive behavior which can be modified as follows to provide a framework for considering fetal abuse:

1. Violence is facilitated by the victim's being perceived as different from one's own species, race, or culture or as only vaguely defined or lacking in reality. As pregnancy progresses, the mother's concept of the fetus normally advances along a continuum from "inanimate object" through "living thing" to "human being" or "real little person" (Condon, 1985; Lumley, 1972). One would predict that the fetus would acquire more protection as its "humanness" increases, and most investigators do report a reducing consumption of alcohol in pregnant women from the first to the third trimester (Fried, 1980). A woman who retains an inanimate or very vague concept of her fetus may be at a higher risk of fetal abuse, as was evident in case 2 cited above.

2. Assault is more likely if violence is ego-syntonic. The intergenerational transmission of child abuse is well documented (Smith and Pagan, 1975) and a similar progression occurred in cases 1 and 2 cited above. During childhood, such women acquire a model for the expression of violent impulses but lack any model for care-taking or nurturance.

3. Poor impulse control clearly predisposes to assaultive behavior, and the possibility of hormonally mediated alteration in impulse control during pregnancy has been mentioned above. The patient described in case 2 resembles Lion and Penna's (1974) description of patients who, failing to experience any early warning signs of anger, suddenly explode into violent behavior.

Fetal Abuse and Alcohol/Nicotine Use in Pregnancy

Most studies reveal that 25% to 35% of pregnant women smoke throughout pregnancy (Kwok *et al.*, 1983; Streissguth *et al.*, 1983), and one quarter of these smoke more than 20 cigarettes per day. Between one half and two thirds of pregnant women consume some alcohol, and between 2% and 13% of all pregnant women "admit to" heavy consumption (Kwok *et al.*, 1983; Sokol, 1981). There is a strong association between alcohol and cigarette use during pregnancy.

In contrast to the voluminous literature concerned with the effects of alcohol on the fetus, almost nothing

(other than basic demographic data) is known of the characteristics of women who continue to drink or smoke heavily, nor of those who abstain. The study of the subgroup of women who abstain even when pregnancy becomes a *possibility* would seem potentially rewarding. Variation in intellectual awareness of the potential damage to the fetus seems unlikely to constitute a satisfactory explanation of the variation observed. Indeed, current educational programs for pregnant women have largely failed to make significant impact in terms of cigarette smoking (Kwok *et al.*, 1983) and less than expected impact on alcohol intake (Rosett and Weiner, 1981; Streissguth *et al.*, 1983). The distaste that many pregnant women acquire for alcohol, coffee, or cigarettes (Little *et al.*, 1976) must likewise be an incomplete explanation, as illustrated by the subgroup of women who abstain as a result of a mistaken idea that conception has occurred. Moreover, distaste may not equate with abstinence or even reduced intake.

Fetal Abuse and the Family System

No phenomenon of pregnancy, including fetal abuse, occurs in an interpersonal vacuum, and the unborn child can be a significant participant in family dynamics. The literature suggests that expectant fathers are a stressed group (Fein, 1976; Grossman *et al.*, 1980) and studies on child abuse suggest that, although mothers are the most frequent abusers, if time spent with the child is controlled for, fathers are more abusive (Rae-Grant, 1983).

Gelles (1975), reporting on the high prevalence of domestic violence during pregnancy, quotes a case in which the "target area" for the partner's violence shifted from his wife's face to her abdomen upon confirmation of the pregnancy. This was also the target area for the father's violence in case 2 above. The identity of the intended victim in such cases must be considered uncertain. In addition, the partner may derive vicarious gratification from the woman's fetal abuse and thereby consciously or unconsciously collude with or reinforce it.

Adams-Hillard (1985) has reviewed the possible effects of a pregnancy on *wife*-abuse, both increased and decreased incidences having been reported. A full understanding of the possible origins of a male partner's hostile impulses toward a *fetus* would require a review of the psychology of expectant fatherhood, which lies outside the scope of this paper. Only four aspects will be mentioned briefly:

1. The fetus as a rival. Some men may experience the fetus as a rival for their partner's affection or attention, especially if she is highly involved in the pregnancy or, as is common in the third trimester, their sexual relationship should cease. Pregnancy, for the male, is lacking in biological immediacy and hence provides fewer substitute gratifications to offset the demands and sacrifices.

2. "Pregnancy envy." Recent studies of expectant couples have provided some empirical support for the notion that the man may consciously or unconsciously envy the power and creativity inherent in the female's capacity to bear a child (Liebenberg, 1974). A woman's fetal abuse, the antithesis of competent motherhood, may be gratifying to such a man and hence he may collude with it or reinforce it.

3. Psychoanalysts have suggested that the vicissitudes of a man's childhood gender identification may have been such that having a child in some way equates with a loss of masculinity; *i.e.*, involves exchanging a penis for a baby (Ross, 1979). Hence, the fetus may constitute a threat, awakening a variety of primitive anxieties, and may become the victim of retaliation.

4. Either partner may displace hostile impulses toward the other onto the fetus, as was illustrated in case 2. For example, the pregnant woman's representation of the fetus may be as "his" baby.

Conclusions and Implications for Prevention/Management

Table 1 represents an attempt to summarize the attributes characterizing the group of women at high risk of fetal abuse, based on the cases presented and the literature reviewed. In the author's experience a question along the lines: "Some pregnant women find that they get so frustrated and irritated with the pregnancy that they feel like they want to take it out on the baby. Have you ever felt like that?" is not experienced as unduly threatening if inserted into a general interview about the pregnancy and will often produce an affirmative response in the high-risk group. Education about the detrimental effects of smoking and drinking during pregnancy, although clearly necessary, will not be acted upon if there is an emotional obstacle blocking such action. The additional strategy of attempting to identify those at risk, and focusing available resources upon this group, would seem timely.

Clearly, the recognition and treatment of existing fetal abuse is a less desirable strategy than is its prevention in the at-risk group, which in turn is a less optimal intervention than alleviation of the adverse social circumstances that often characterize this group.

If, as seems likely, an abused fetus is at high risk of becoming an abused child, then the identification and successful treatment of a case of fetal abuse may be synonymous with the prevention of subsequent child

TABLE 1
Characteristics Predisposing to Fetal Abuse Protection

	Increased Risk of Fetal Abuse (Low Protection)	Decreased Risk of Fetal Abuse (High Protection)
Attachment to fetus	Low (both partners)	High (both partners)
Concept of pregnancy	Romanticized	Realistic
Concept of fetus	"Thing"/unwanted	"Person"/wanted
Stress levels	High level of "losses" and "threats" of pregnancy	Moderate-low level of "losses" and "threats"
Attitude to pregnancy	Tendency to deny, passivity by both partners	Realistic, active involvement by both partners
Pregnancy symptoms	High level of physical and emotional symptoms (anxiety and depression)	Moderate-low level of symptoms
Personality	Poor impulse control, primitive defenses (especially projection/displacement)	Mature impulse control and defensive structure
Spouse/partner	Perceives fetus as threat. Marital dysfunction	Not threatened by fetus. Stable marriage
Attitude to violence	Ego-syntonic (previous child abuse?)	Ego-dystonic
Models of caring, protection	Lacking—own parenting dysfunctional (especially mothering) Abused as a child (or fetus) herself	Present—own parents perceived as "good"
Psychological tasks of pregnancy	Either not tackled or overwhelmed by them	Appropriate achievement
Perceived family/staff attitude	Interested only in the fetus rather than her	Interested in her as a person

abuse. The treatment of such a case is a most difficult and complex problem for the consultation-liaison psychiatrist and other professionals, involving moral, ethical, and medicolegal issues. Not only is evidence of fetal abuse less available for scrutiny than is that of child abuse, but also the strategy of "removing" the endangered fetus from the high-risk situation is not feasible. In addition, attempts to protect it may come into conflict with the mother's autonomy. Management guidelines will be the subject of a separate paper, the mainstay being an approach based on "mothering the mother."

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A Natural History of the Fetal Alcohol Syndrome

A 10-Year Followup of 11 Patients

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In 1973, 11 children with a similar pattern of altered body development and central nervous system function, all born to chronic alcoholic women who continued to drink heavily during pregnancy, were described in Lancet (Jones et al. 1973; Jones and Smith 1973). Subsequently, children with the fetal alcohol syndrome (FAS) have been identified in every racial group (Clarren and Smith 1978) and in many countries (Dehaene et al. 1977; Majewski et al. 1976; Degard et al. 1979). The teratogenicity of alcohol (the ability to induce malformations) has been confirmed in laboratory studies involving many different species of animals (Abel et al. 1983). However, the long-term outcome and the natural history of children diagnosed as having FAS have not been documented. We recently completed a followup evaluation of the initial 11 children diagnosed as having fetal alcohol syndrome. The purpose of this report is to set forth their present status in terms of mental development, academic performance, and physical condition, to follow their abnormally formed characteristics and their growth status across time, and to document their medical histories over the past 10 years.

The children in the present study (listed in Table 1) include the following: numbers 1 through 8 are presented in the same order as the 8 children described by Jones and colleagues (1973), and numbers 9 through 11 are the 3 children described by Jones and Smith (1973). The medical histories of these children are summarized in Table 2 and their growth curves and intelligence quotient (IQ) scores are presented in Figure 1.

Patient 1 drowned in the bathtub at age 3.5. She had been adopted when she was 15 months old and was reportedly easy to manage, seldom cried, and was neither fearful nor hyperactive. She had a heart murmur which was no longer audible at 15 months. In addition to a congenital hip dislocation, which was treated surgically and casted for one year, she was treated repeatedly for ear infections and had extensive physical therapy.

Patient 2 is a short, thin, prepubescent 10.5-year-old Native American girl who has lived in a stable adoptive home since she was 3 years old. She is in the fifth grade, attends regular classes at school that are supplemented with remedial reading. Achievement testing reveals grade level performance. She is self-sufficient, independent in urban life, and responsible for household chores and shopping. She reportedly has age-appropriate social interactions.

The features of the child's face and head have not changed significantly over the last 10 years. Her palpebral fissures (the length of the eyeslit) remain short (right 2.5 cm., left 2.4 cm.), while her inner canthal distance (the distance measured between the tear ducts of the eyes) is normal at 3.0 cm. Her nose is not disproportionately short, but the frontonasal region (the region of the forehead and nose) is abnormal in that there is deficiency in width and definition of the ala nasae (the "wings" of the nose) and a "teardrop"-shaped philtrum (the groove running between the nose and upper lip). Her midface is flat while her jaw appears clinically of normal size. This disproportion has led to a mild class III malocclusion (an underbite). Her external ears retain their mild irregular shape. The patient continues to have a low-grade heart murmur and has been diagnosed as having an atrial septal (heart) defect. The rest of her exam is normal except for a specific abnormal crease pattern of the palms of her hands which has been described as frequent in fetal alcohol syndrome (Jones et al. 1973; Tillner and Majewski 1978).

The patient had been in good health, although she has had chronic serous otitis media (middle ear congestion). Despite conscientious followup and treatment, she has a fixed 60-decibel conductive hearing loss in the left ear. She is currently undergoing standard orthodontic treatment for malocclusion with selected dental extractions and bracing.

Patient 3 is a short, stocky, sexually mature 14-year-old Native American girl who lives with her natural mother and several brothers and sisters. She is in the seventh grade at school but receiving failing grades and not attending school regularly. Although cooperative and engaging on earlier examinations, as an adolescent this patient is suspicious, guarded, and sullen. She is also a social isolate at school. Family ties remain very strong, but the family itself is socially isolated and very poor but steadfastly refusing help. This patient refused to be seen for an adolescent medical and psychological examination although growth data were available.

Patient 4 is a short, overweight, sexually mature 14-year-old black girl (Figure 2). She has lived in a stable adoptive home since she was 4-5 years old. She has always attended special classes for the re-

Table 1: Demographic and Growth Data: Original 11 FAS Children

Patient No	Race	Sex	Alive in 1983 Child	Alive in 1983 Mom	Birth Data Gest Age	Birth Data Length	Birth Data Weight	Birth Data HC	Birth Data Breech	Follow-Up Data Age	Follow-Up Data Height	Follow-Up Data Weight	Follow-Up Data HC
1	Am Ind	F	–	?	40	45.0	1850	32.0	–	deceased			
2	Am Ind	F	–	–	40	44.5	2500	31	–	10.7	137.0	26.35	50
3	Am Ind	F	–	–	38	47.0	2500	31	–	14.7	143.5	45.00	not taken
4	Black	F	–	–	36	42	1600	29	–	14.2	143.7	45.93	50
5	Black	M	?	?	38	43	1670	–	–	lost to follow-up			
6	Black	M	–	–	34	38	1550	30.5	–	13.9	145.1	31.14	50.5
7	White	F	–	–	44	45.7	2345	32	–	14.4	142.5	35.57	48.5
8	White	M	–	–	37	48.2	2250	35	–	13.2	145.2	32.39	53
9	Am Ind	M	–	–	38	43	2020	29	–	10.1	119.3	19.5	47.8
10	Am Ind	F	–	?	32	38.5	1300	27	–	deceased			
11	Am Ind	F	–	–	7 mos		964	–	–	14.0	128.5	25.85	47

tarded and reads and spells at a second- to third-grade level. She is a happy, outgoing, talkative child with no apparent stranger anxiety and no inhibitions. Because of her poor judgment, she is never left alone. Although she is no longer hyperactive, she continues to have a short attention span.

The patient's facial features are similar to those described in early childhood. The palpebral fissures are short (2.2 cm, bilaterally). She has numerous eye problems including ptosis (drooping eyelids), strabismus (crossed-eyes), severe myopia (nearsightedness), and defects in the optic nerves. She has a moderate malocclusion secondary to flat midface and prominent lower jaw. She continues to have palatine notches. Her external ears are prominent and irregularly shaped. She also has numerous minor skeletal anomalies including radio-ulnar synostosis (fusion of the bones at the elbow), brachydactyly (abnormal shortness of the fingers and toes), camptodactyly (mild contractures of the fourth and fifth digits of both hands), clinodactyly (deflection) of the third and fourth digits of the left hand, and bilateral syndactyly (webbing) of the second and third toes). A cardiac murmur (compatible with a patent ductus arteriosus) was audible until 5 years of age. Since infancy, she has been in reasonable health although she has needed careful ophthalmologic follow-up. Orthodontia with possible oral surgery is indicated but has not yet been undertaken.

Patient 5 was a 17-month-old black male who has been lost to follow-up for 10 years.

Patient 6 is a short, thin, 10.5-year-old black male who has lived with his natural parents and siblings his entire life. He is in the eighth grade and attends regular classes with remedial help in mathematics and English. He is quiet, well behaved, appropriate, cooperative, and no longer hyperactive.

The patient has most of the facial features of the fetal alcohol syndrome except for a normal midface which tends to make his face less typical of the syndrome. His palpebral fissures are short (2.1 cm, bilaterally) while his inner canthal distance is normal (3.3 cm.). He has the typical frontonasal features including epicanthal folds (vertical folds of skin covering the inner corners of the eyes), short nasal tip, and a smooth philtrum. Although he has no malocclusion, he has a wide mouth with irregularly shaped and poorly aligned anterior teeth with an open bite. His external ears are prominent and oddly shaped. He has mild skeletal defects including radio-ulnar Synostosis (fusion) of the bones at the elbow and camptodactyly (mild contractures of the digits), and small toenails. He has been in reasonably good health although he is followed by an optinalmologist for strabismus (crossed eyes) and has allergies. He is currently in orthodontic treatment.

Patient 7 is a 14.5-year-old, short, microcephalic (a condition characterized by an abnormally small head), sexually mature white female who is quiet and compliant. She has lived in a stable adoptive family since she was 6. She has attended special classes for the retarded all her life, and her academic skills are at the first- to second-grade level. Because of her poor judgment and lack of inhibition with strangers, she is never permitted to go out alone in the neighborhood.

With the exception of normal palpebral fissure size (2.6 cm. bilaterally), she has most of the facial features of the fetal alcohol syndrome. Her inner canthal distance is 2.7 cm. She has mild epicanthal folds, a smooth philtrum, and a thin upper lip. Her midface is flat and she has a protruding jaw and a moderate dental malocclusion. She has had major skeletal problems, including bilateral congenital hip dislocations and scoliosis (curvature of the spine). In addition, she has small nails on her hands and feet. Multiple hemangiomas (birthmarks) present in infancy have resolved. A systolic murmur heard in infancy also resolved prior to a full diagnostic evaluation. She has had chronic serous otitis media (middle ear congestion) and still has a mild conductive hearing loss in spite of conscientious care.

Patient 8 is a short, thin, 13-year-old white male who lives alone with his natural father (Figure 3). Although school is becoming increasingly difficult, he attends regular classes with supplemental tutoring. Although his hyperactivity has gradually diminished, he continues to

Table 2. Frequent Medical Problems of Original 11 FAS Children

Intraoral	8/8
Class II malocclusion 5/7, poor dental alignment 3/8, cleft palate 2/11	
Ears	9/9
Chronic otitis media 9/9, permanent hearing loss 3/8	
Eyes	4/8
Optic nerve hypoplasia 2/8, ptosis 2/8, strabismus 4/8, severe myopia 2/8	
Cardiac	8/11
Cardiac murmur interpreted as VSD 8/11, ASD [illegible], PDA [illegible]	
Skeletal	9/11
Congenital dislocated hip 3/8, progressive thoracic scoliosis 1/8, radioulnar synostosis 3/8, flexion contractures 1/9, bilateral halluces valgus 2/9, minor hand anomalies 8/9	
Other	
Death 3/11, weak suck 10/11, prolonged hospitalization after delivery 8/9, failure to thrive 8/9	
Behavioral	
Past hyperactivity 8/8, present hyperactivity 1/8, attention deficit 7/8	
Environmental	
Neglect 8/8, physical abuse 2/8, suspected sexual abuse 1/8	

Note. [illegible]

have an attentional deficit. He is currently repeating seventh grade because of refusal to attend school for 3 months. Present academic functioning is 1 to 4 years below present grade level. He is friendly, uninhibited, and self-sufficient but a loner, and he manifests poor judgment.

His facial features remain typical of the fetal alcohol syndrome. His palpebral fissures are very short (1.9 cm. on the right, 2.0 cm. on the left), while his inner canthal distance is 3.7 cm. He has a unilateral strabismus and the usual midline finding of epicanthal folds, short nasal tip, a smooth philtrum, and a thin upper lip. He has a mild malocclusion. Mild skeletal abnormalities include altered palmar creases, camptodactyly, and halluces valgus (mild anomalies of fingers and toes). Since 1 year of age, he has been healthy although he was hospitalized for a hernia repair and surgical correction of undescended testes at the ages of 3.5 months and 6 months.

Patient 9 is a 16.5-year-old Native American male who is extremely thin and short (Figure 4). Hyperactive to the point of destructiveness, he is also outgoing and friendly to the point of intrusiveness. He has always attended classes for the trainable mentally retarded. He cannot read or write. He has lived in a single foster home where he has received excellent care. Seizures, triggered by both high-pitched noises and hyperventilation and followed by lethargy, were first noted at 8 months. They decreased in frequency and finally stopped by 4 years. A systolic murmur thought to be secondary to a ventricular septal (heart) defect also resolved by 4 years. He has had frequent viral illnesses and diarrhea as well as persistent otitis media (though his hearing is now considered normal). Dental restorative care and extractions preparatory to orthodontia have been performed. He has worn glasses since 2 years of age, is intolerant of light, and is virtually blind in the right eye.

The patient has retained the typical facial features of the fetal alcohol syndrome. He is near-sighted, has astigmatism, and has optic nerve atrophy. He has poor dental alignment, but no malocclusion. There are mild skeletal defects including radio-ulnar synostoses, camptodactyly, and small toenails. Thirteen ribs are present bilaterally (though normally there are 12 on each side).

Patient 10 died when he was 5 days old, after multiple apneic (breathing cessation) episodes. Detailed reports of the malformations and the medical condition of this infant have appeared previously (Clarren et al., 1978; Jones and Smith, 1975).

Patient 11 is a very short, sexually mature 14-year-old Native American girl who has lived in a stable foster home since she was 8 years old. She is mentally retarded and does not speak spontaneously. She is highly distractable but not hyperactive. She is totally trusting and indiscriminate in relating to strangers. She is obedient and compliant but her judgment is too poor to permit her to remain alone.

Physical examination revealed a severely growth-deficient child in good general health. Midline features include marked epicanthal folds, a short nasal tip, a smooth philtrum, and a thin upper lip. Her midface is flat and she has a relative degree of jutting of the jawline with a resulting malocclusion. Her ears are prominent and poorly formed. She has multiple mild skeletal defects and small birthmarks. A systolic heart murmur compatible with a ventricular septal defect resolved spontaneously by the age of 10. Her cleft palate was closed at age 3 with a single operation and she is currently undergoing orthodontic treatment.

Discussion

Followup evaluation 10 years after initial diagnosis of the original 11 children with the fetal alcohol syndrome documents the long-term effects of prenatal exposure to alcohol. Although the degree to which these children are representative of all children with fetal alcohol syndrome is not known, certain generalizations regarding the natural history of the disorder have become evident. These may be helpful in planning for the future of affected individuals.

Growth

As depicted in Figure 1, all children remained growth-deficient over time with respect to height, weight, and head circumference. Although most children initially showed some catching up in linear growth during the first 1.5 years of life, there was a relative decrease in weight and head circumference for most of the children. The failure of the head to continue growing at a normal rate after delivery may explain why some infants who are undiagnosed at birth are later diagnosed at 9 to 12 months of age.

The statistic that gives the best single description of the particular appearance of these children and adolescents with fetal alcohol syndrome is the weight-for-height age depicted in Table 3. Initially, the children were all strikingly underweight for their height, with a weight-for-height age averaging between the 5th and 10th percentile during the preschool years. However, with the onset of puberty, the females developed a relatively more normal weight-for-height age relationship.

Neither of the boys who were between 13 and 14 years of age had reached puberty, and both continued to be underweight for height. The characteristically emaciated appearance of the young child with fetal alcohol syndrome may not be a salient feature in the affected adolescent, at least for females.

Pattern of Malformation

After 10 years, the 8 affected children for whom followup data are available, including 3 who have undergone pubertal

Figure 1. Growth and IQ across time in original FAS children. Height (a), weight (b), and head circumference (c) are reported in standard deviations from the mean. Girls are represented with dashed lines; boys with solid lines. Measurements from five ages were reported when available: birth and the last measurements and the measurements closest to the following ages: 1 to 2 to 3 years; 3 to 4 to 5 years; and 9 to 10 years. All available IQ scores (d) are reported from individual age-appropriate tests of general intelligence and mental development, including the Wechsler Intelligence Scale for Children-Revised, the Wechsler Preschool and Primary Test of Intelligence, the Stanford-Binet Intelligence Scale Form L-M, and the Bayley Scales of Mental Development. Note that the original Stanford-Binet Scores (1) were recalculated because norms applicable to 1973 were published after the 1973 Lancet paper was published. The first "IQ" point for Patient 11 is circled because it was estimated from the Vineland Social Maturity Scale and clinical observation.

Figure 1a. Height in Standard Deviations From the Mean: Original FAS Children

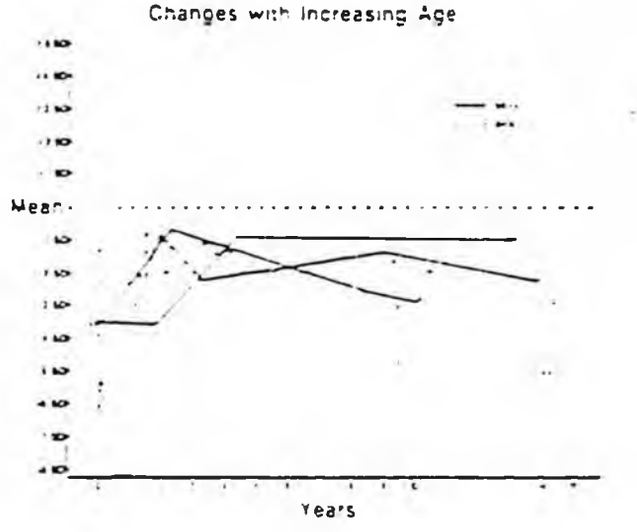

Figure 1b. Weight in Standard Deviations From the Mean: Original FAS Children

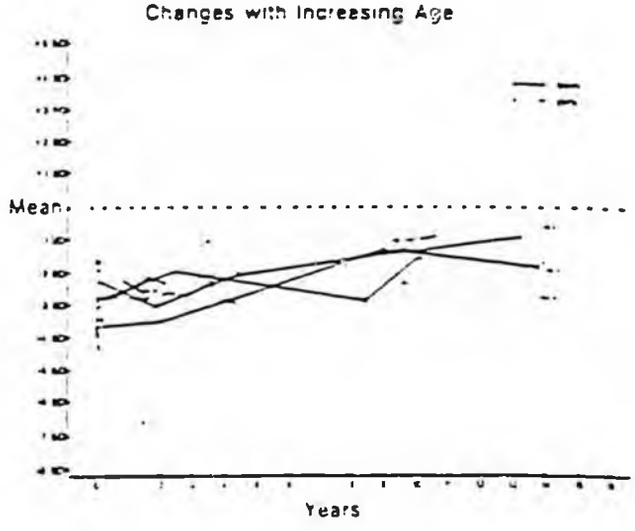

Figure 1c. Head Circumference in Standard Deviations From the Mean: Original FAS Children

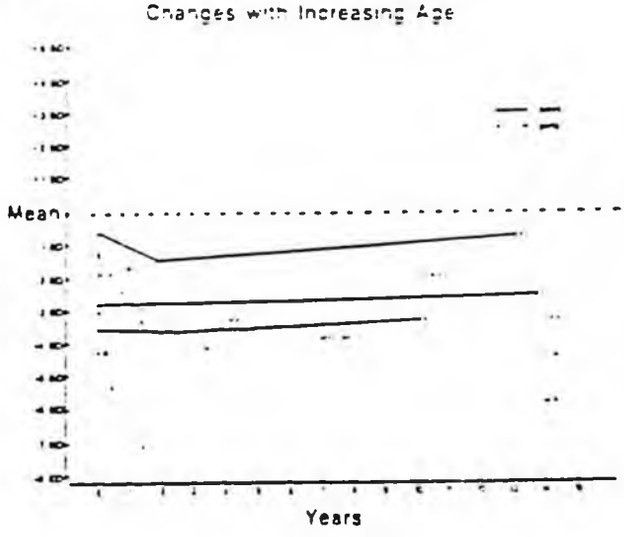

Figure 1d. Successive IQ Scores of Original FAS Children

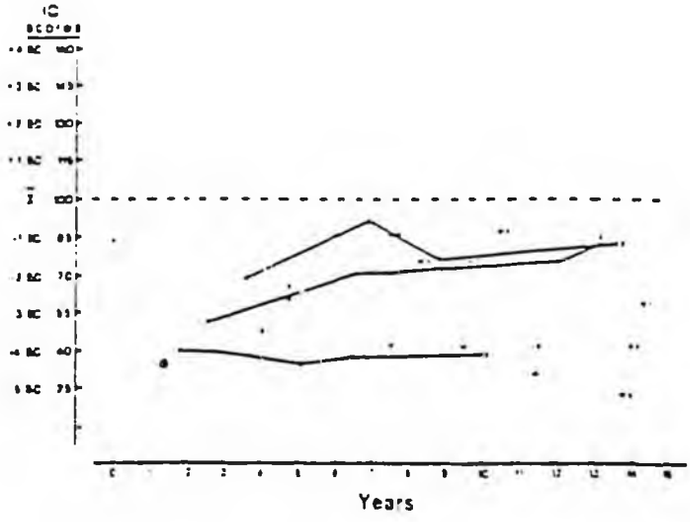

Figure 2. Patient 4 at ages (a) 3 years, 9 months, and (b,c) 14 years, 2 months.

Figure 2a

Figure 2b

Figure 2c

Note the persistence across ages of the short palpebral fissures, hypoplastic philtrum, strabismus, and ptosis; the increased growth of the nose and mandible; and the short, stocky stature often associated with puberty in girls with FAS.

Figure 3. Patient 6 at ages (a) 2 years, 6 months, and (b,c) at 12 years, 2 months.

Figure 3a

Figure 3b

Figure 3c

Note the short palpebral fissures, epicanthal folds, flat midface, hypoplastic philtrum, and thin upper vermillion border. Note also the short, lean-pre-pubertal stature characteristic of young adolescent boys with FAS.

Figure 4. Patient 9 photographed at (a) birth, (b) 5 years, and (c) 8 years

Figure 4a   Figure 4b   Figure 4c

Note the short palpebral fissures, epicanthal folds, short upturned nose, long and hypoplastic philtrum, thin upper lip vermilion, flat midface, hirsutism, and characteristic emaciated appearance of the pre-pubescent FAS child with minimal subcutaneous fat. (Photograph c from Streissguth et al. 1984. CIBA Foundation Monograph #105. Pitman Press, London.)

Table 3. Weight for Height Age at Three Different Ages
Original FAS Children

Patient No.	Preschool 1.5-5 years	Pre-pubertal 9-10	13-14 yrs.	Puberty 13-14 years
Girls				
11	7.5%	5%	—	62%*
4	15 %	37%	—	95%*
7	5 %	50%	—	50%*
3	5 %	15%	—	82%*
2	15 %	38%	—	—
Boys				
9	3.5%	17%	—	—
8	3.5%	10%	20%	—
6	<1 %	10%	17%	—

Note: Height age of each child was determined by noting the chronological age on the growth charts at which the child's actual height fell at the 50th percentile (growth charts from National Center for Health Statistics, NIH). Weight for height age is the percentile at which the child's actual weight fell when plotted against the child's height age. [illegible] girls and boys have been rank-ordered separately by severity of dysmorphology.
*Menarche.

changes, continue to have craniofacial features similar to those previously set forth as typical of the fetal alcohol syndrome. In particular, the short palpebral fissures, smooth philtrum, and flat midface remain constant. However, the patients' noses have taken on a new contour with prominent growth of the nasal bridge and jaw. The short eye openings in the fetal alcohol syndrome were initially interpreted as being secondary to decreased growth of the eyes. Optic nerve defects as well as other anomalies affecting the eyes of five other children at this most recent followup, tend to support this interpretation and are consistent with the work of Stromland (1981). Although the patients continue to resemble each other, the changes in nose and jaw alter the overall facial appearance substantially and may explain the general failure to recognize fetal alcohol syndrome in adolescents and adults.

Heart anomalies consisting of (1) an atrial septal defect in one patient, (2) patent ductus arteriosus in one patient, and (3) systolic murmur interpreted as representing a ventricular septal defect in six patients have all resolved spontane-

[illegible] infant and child development [illegible] significant. One girl with [illegible] has been managed successfully with casting or splinting; two patients with [illegible] third required hip surgery. With the exception of one patient with severe scoliosis requiring surgery, none of the other skeletal or joint anomalies has required surgery. With one exception, they have not interfered with performance.

Disharmonic growth of the midface and lower jaw has led to relative [illegible] of the jaws with malocclusion in five children, while dental malalignment was seen in all patients. Chronic ear problems required medical and surgical procedures in four children, three of whom have suffered permanent conductive hearing loss.

Since infancy, the children have all been in relatively good health. Although immunologic deficiency in children with fetal alcohol syndrome has been reported (Johnson et al., 1981), no obvious increase in the frequency of chronic or recurrent infections has been observed in these children. However, the present children were not evaluated from an immunologic standpoint.

Table 4 Severity of Diagnosis Related to IQ and Performance: Original FAS Children

Patient No.	FAS Diagnosis 1976	FAS Diagnosis 1983	Age 1983	IQ 1973	IQ 1983	Type of Instruction
11	Severe	Severe	14	30	20	Trainable mentally retarded
9	Severe	Severe	10	43	40	Trainable mentally retarded
4	Severe	Severe	14	47	48	Trainable mentally retarded
7	Severe	Mod sev	14	60	57	Self-contained Special Ed Class
8	Mod sev	Mod sev	13	50	80	Regular Class – Special Ed
3	Moderate		16	65	(76)	Regular Class – Special Ed
6	Moderate	Moderate	13	65	81	Regular Class – Special Ed
2		Mod sev	10	83	86	Regular Class – Special Ed

X̄ = 55 61

Note: The patients were scored according to severity of diagnosis by Dr. David W. Smith in 1976 based on severity of dysmorphic characteristics and growth deficiency but without knowledge of IQ scores. [illegible] Patients nos. 2 and 11 were not included in the 1976 followup. Patient No. 3 was last seen at age 16 but the last available IQ exam was from age 8. Patient 2, who had a hearing loss, was also given the Leiter International Intelligence Scale; a comparable IQ score of [illegible] was obtained.

The 1973 IQ scores for patients 9 and 11 were actually obtained in 1977 and 1975 respectively.

Four children, numbers 3, 4, 6 and 7, were given the Stanford-Binet form L-M IQ scale in 1973 before the 1972 norms were published in Jones et al. 1973; their IQ scores were calculated with the old norms, but in the above table their 1973 IQ scores have been recalculated using the more appropriate 1972 norms published in 1973. Later norms have the effect of decreasing an individual's IQ by approximately 10 points.

Performance

None of the eight children had normal intellectual development on followup (Table 4 and Figure 10). Four appeared to be mildly handicapped and four were seriously handicapped. The four mildly handicapped children had IQ scores in the borderline to dull normal range, had gone through school with a combination of regular and remedial classes, and had academic achievement that was at least in line with their intellectual functioning. Two of these four had repeated one grade and were functioning at or below grade level. The remaining two were functioning several grade levels below their placement and were having increasing difficulty with school as they got older. All four of these mildly handicapped children lead relatively normal lives within their own social milieu, appearing to be independent, resourceful, and self-sufficient. Nevertheless, the discrepancy between their self-sufficient manner and their borderline to dull-normal intellectual skills may place them at risk for later social and academic problems. Further followup seems warranted. Two of these four children (both of whom remained with their natural families) already have social, emotional, and school attendance problems.

The remaining four children were seriously handicapped, functioning intellectually in the mildly-to-moderately retarded range. They have never attended regular classes and are progressing through classes for the mentally retarded appropriate to their level of performance. Two of these children can read and write at a primary level, while the remaining two can barely write their own names. Although these latter children were all hyperactive when younger, those who are now adolescents are no longer hyperactive. They all continue to have attentional deficits and are all friendly, outgoing, socially engaging, and uninhibited. The youngest boy (Patient 9) is a severe management problem, but the three severely handicapped adolescent girls (Patients 4, 7, and 11) are compliant and obedient. All four of these latter children need constant surveillance and show little ability to differentiate among strangers and friends, being uncritically trusting in social interchange. They all continue to need sheltered environments.

The severity of diagnosis during the preschool years was highly predictive of the children's relative ranking on IQ scores at the last followup (Table 4). Thus, the children who were the most severely affected in terms of early facial features and growth deficiency had the poorest prognosis for later performance. Likewise, the children who were most mildly affected from the standpoint of growth deficiency and structural development had the best prognosis for later intellectual development.

Environment

The degree to which postnatal environmental factors have influenced the development of these children is difficult to assess. The first 2 years of life were not ideal for seven of these children. Six of them lived intermittently with natural mothers who continued to drink, or they were in temporary custody. The seventh was hospitalized. The one child who has remained in the same stable foster home since birth is among the most retarded. The four most severely handicapped children (whose mothers were unable or unwilling to care for them) have all been in conventional stable families who have provided stimulating and loving care for at least the past 5 years. Of the four mildly handicapped children, two remain with their natural mothers, one remains with his natural father, and one has been

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alcohol-related comorbidity at the time of both initial and followup interviews.

It is anticipated that future morbidity surveys of the United States directly related to collection of alcohol-related data will be able to use this instrument to diagnose clinically defined alcohol abuse and dependence. The demonstration of relative equivalence of method and results based on the ECA program's development of a viable standardized methodology for the epidemiologic study of psychiatric disorder has also set the stage for comparative studies of all sorts. To date, the DIS has been translated into 20 languages, and ongoing research using the DIS and ECA program methodology is being conducted on numerous special populations in the United States (e.g., diabetics, disaster victims, alcoholic patients), in addition to general population surveys in over nine countries including the Republic of China, Peru, Japan, Germany, and Canada. ☐

Turn to page 77 for references.

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A Natural History of the Fetal Alcohol Syndrome: A 10-Year Followup of Initial 11 Patients

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adopted. In this small sample, the differential effects of these diverse environments is not [illegible] in terms of intellectual development, but the caretaking environment does appear important in terms of social and emotional adjustment during adolescence.

The single most differentiating characteristic in the backgrounds of the four most handicapped children (Patients 4, 7, 9 and [illegible]) is that three of their mothers were so severely alcoholic that they had died of alcohol-related causes within 6 years of the birth of these children (Table [illegible]).

Child neglect has been documented at least once during the early years in five of the nine children followed. Two appear to have been the victims of physical abuse (one in a natural home and one in a foster home), and one has been abused sexually (Table 2). For those who remained with their natural mothers, the first years were always tumultuous, with a supportive relative or friend being particularly important as a refuge for the infant when the mother was drinking. Although the risks of child rearing in an alcoholic milieu are well known, these children were often particularly difficult to care for during their early years because of their failure to thrive, feeding difficulties, hyperactivity, and intrusiveness. On the other hand, of the three relinquished at birth by their mothers to state custody, one died in an apparent drowning accident in an adoptive home and another spent the first 1.5 years in a hospital and then had four different foster homes in seven years before finally getting into a stable home environment at 8 years of age.

Conclusions

Followup of these children over a 10-year period has suggested two factors that may well be helpful in predicting the ultimate prognosis for individuals with the fetal alcohol syndrome.

Of greatest predictive significance is the extent and severity of the pattern of malformation. In a previous study that included some of these children (Streissguth et al. 1978), severity of the pattern of malformation and growth deficiency was correlated with degree of intellectual impairment. In this study, the four children with the most striking craniofacial abnormalities (Patients 4, 7, 9 and 11) have the most severe degree of microcephaly (abnormal smallness of the head), the shortest stature, and the most impaired intellectual function. Three of these four infants presented in a breech position at birth, while none of the four moderately affected children did so.

The most predictive factor in the backgrounds of the four most severely handicapped children was the severity of maternal alcoholism. Three of these four mothers had died of alcohol-related causes within 6 years after the birth of the child, suggesting that biological factors associated with the terminal stages of alcoholism may be involved for the most severely handicapped children. Unfortunately, the quality of the later home environment could not overcome the severity of the prenatal insult. Two of the four most severely affected children lived in the most stable foster homes suggesting that the prognosis for children with the most severe fetal alcohol syndrome depends primarily on the extent and severity of the prenatal exposure to alcohol. However, improved social and emotional development was noted in all patients when home environments stabilized. This resulted from decreased maternal drinking, departure of the alcoholic mother, or placement of the child in a stable foster or adoptive home. ☐

This research was originally published in Lancet on [illegible] [illegible], 1985. Turn to page 73 for references.

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Training Professionals to Identify and Treat Pregnant Women Who Drink Heavily

Continued from page 35

aged to discuss their responses to the counselor and her techniques. By comparing this patient with others, viewers are allowed to express frustration, anger, and concern towards patients. The goal is to recognize that the interviewer's unemotional, nonjudgmental, and supportive statements allow her to maintain communication with the patient.

Conclusion

Pregnancy is a time in a woman's life when changes in physiology and social role cause her to think and behave differently. The sense of responsibility for another life increases the mother's receptivity to assistance in overcoming problem drinking. Women are concerned about multiple health issues and will adopt a lifestyle consistent with total health. Professionals must develop new attitudes towards alcohol abuse by pregnant women. Treatment programs with pregnant women report that 60 to 80 percent of heavy drinkers reduce consumption before the third trimester.

The adverse effects of heavy drinking on fetal development have been demonstrated repeatedly in clinical, epidemiological, and experimental programs (Rosett and Weiner 1984). High blood alcohol concentrations represent a risk at all stages of pregnancy. There is no safe time for intoxication. Reduction of heavy drinking

[illegible] prenatal [illegible] pregnancy [illegible] [illegible] benefits can [illegible] whenever alcohol abuse ceases. [illegible] treatment strategies [illegible] the prenatal care represents an effective low-cost method of preventing fetal alcohol syndrome and fetal alcohol effects. The Fetal Alcohol Education Program helps to improve the skills of health care professionals who can facilitate effectively the reduction in drinking among pregnant women. ☐

Turn to page 74 for references.

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An Evaluation of the Pregnancy Health Program

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[illegible] is unresponsive to treatment is at risk herself and is carrying an infant who is at very high risk. This type of patient, seen in all types of alcohol treatment programs, often receives extensive services without a corresponding change in her condition. The women in group 3 are typical of this prototype. All but one had at least four PHP appointments prior to delivery, and total service hours ranged from [illegible] without improvement. The vulnerability of the mother as well as the fetus is becoming evident. For example, a high death rate after delivery has been reported among mothers who have had FAS children (Beattie et al. 1983). The case histories of women in group 3 are consistent with a poor, possibly fatal, prognosis.

Only 10 percent of the cases in this study fit this bleak prototype. By the end of PHP contact, most mothers (86 percent) were judged by independent raters to have improved. This result underscores the importance of identifying women who drink too much and providing effective education and treatment for them before their problem becomes chronic.

Pregnancy is a time when most women seem to decrease their drinking easily (Hook 1976; Larsson 1983; Little et al. 1976) and generally respond well to treatment (Larsson 1983; Rosett et al. 1980) at least in the short run. The data from this study support these findings.

Conclusion

We suggest that pregnancy is an ideal time to intervene in heavy drinking. We have outlined a simple method of screening that will identify those patients at the first prenatal visit. We have also presented evidence that if a heavy drinker receives education, and treatment if needed, she is likely to experience a significant decrease in alcohol consumption beyond that normally expected. Finally, we have reported that women who are identified and treated early have healthier babies.

Prevention of fetal alcohol effects requires intervention in maternal alcohol use at all levels of drinking, from regular use to the most severe alcoholic drinking. But prevention efforts must start earlier and continue longer if they are to be maximally effective. True primary prevention requires women to decrease their drinking before conception. And resolution of any alcohol problem should endure after delivery so that decrease in drinking that occurs during pregnancy is the beginning of a long-term recovery that will benefit both mother and child. ☐

Turn to page 75 for references.

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State Strategies for Prevention of Alcohol-Related Birth Defects

Laura Ronan, M.P.H.

Since the late 1970s, many States have sponsored prevention programs geared specifically to preventing problems associated with drinking alcohol during pregnancy. Evidence that heavy drinking may result in substantial fetal damage and that moderate drinking may also be associated with elevated risk has provided the impetus for such efforts. Many researchers investigating this risk factor suggest that it receive the highest priority possible in the formulation and implementation of information programs, preventive counseling, and followup. They also urge that preventive counseling be initiated before conception and directed toward the adolescent female before alcohol becomes a problem (Elliott and Johnson 1983).

Intensive prevention efforts are vital because there is no known way to reverse or reduce many of the effects of alcohol on the fetus once they have occurred. The New York State Division of Health estimates that infants born with alcohol-related birth defects in a single year cost the State's economy $155 million in lifetime care (Rey 1985). (For additional information on the economic cost of alcohol-related birth defects see article, page 38.)

Many programs implemented at the State level have drawn on the findings of programs previously supported by NIAAA and others. For example, the Fetal Alcohol Demonstration Program that was funded by NIAAA in 1978 and conducted at the University of Washington combined a mass media campaign aimed at the general public with telephone messages, distribution of brochures to populations of women who were pregnant or contemplating pregnancy, counseling sessions for pregnant women, and a training program on drinking and pregnancy for appropriate professionals. Referral services were also provided for pregnant women and mothers with alcohol problems (see article, page 24). A forerunner to the Washington program was a secondary prevention program conducted at the prenatal clinic of Boston City Hospital between 1974 and 1979 (see article, page 32).

In addition, the 1982 NIAAA nationwide public education campaign included a component on alcohol-related birth defects that generated considerable public information activity at State and community levels. Some related campaigns were the direct responsibility of States or of organizations under contract to the State. They undertook public education activities statewide, regionally, and at the local level. In other States, the campaigns were led by either a group of volunteers or a combination of volunteers and contract staff. Many States continue to make available campaign materials such as brochures, public service announcements, and posters.

A Comprehensive Approach

Prevention efforts aimed at reducing alcohol consumption by pregnant women have increased significantly in recent years, but additional efforts are needed to increase awareness and to change attitudes and practices. It is generally agreed that comprehensive programs implemented at the community level are the most successful for educating prospective mothers. The experience of several States demonstrates that such programs may be effectively developed and sponsored by State agencies. Furthermore, State involvement may assure program visibility and the integration of programs delivering maternal and child health services.

Based on the experiences of several States, this article describes the major components of a FAS/FAE prevention program. It is intended to stimulate new programs and innovative ideas, not to prescribe one course of action. The ultimate aim of an FAS/FAE prevention program should be to reduce the number of new cases. In order to do this, it must enhance awareness and foster acceptance of the evidence that consumption of alcohol during pregnancy can have deleterious effects on the fetus. Becky Beardsley, Program Coordinator of the Lincoln Council on Alcoholism & Drugs (LCAD), Fetal Alcohol Syndrome Prevention Program in Lincoln, NE, underscores the importance of bringing assistance to the alcohol-abusing woman rather than concentrating narrowly on the severe consequences to the fetus. In fact, some observers attribute the relative proliferation of programs focused on this particular period in a woman's life—pregnancy—to the view that maternal drinking is a public health program (Little and Ervin 1984).

A prevention program with a comprehensive approach to reducing the incidence of alcohol-related birth defects considers all females of childbearing age or younger, the general public, and helping professionals. The goals of the Pennsylvania Project for Prevention of Fetal Alcohol and Drug Effects, which operated from 1982 to 1983 as an outgrowth of a local two-county project conducted by the Washington-Greene Prevention Corporation from 1980–1982, involved all of these groups. The commitments of this

This infant is a low birth weight baby. State programs aim to increase awareness that maternal alcohol use can result in low birth weight and deleterious fetal effects

project were to encourage women of childbearing age to avoid alcohol and unnecessary drugs during pregnancy; to urge women with drinking problems to seek and accept treatment; to influence health, social service, and education professionals to provide education on alcohol and drug effects to all patients, clients, and students prior to and during pregnancy; and to intervene with high-risk women (Yancosek 1982).

Target Groups

The education of women is vital regardless of the intensity of their drinking, to permit them the opportunity to make informed decisions about alcohol consumption during pregnancy. Becky Beardsley of the Nebraska LCAD Fetal Alcohol Syndrome Prevention Project has distinguished three subgroups of women as target audiences for information and intervention: high-risk, moderate, and low-risk (Table 1). Each of the cells in Table 1 describes a level of risk based on the drinking and/or pregnancy status of the individual. The low-risk cell, for example, describes the person neither currently drinking nor pregnant. Reinforcing the decision not to consume alcohol if pregnant is the thrust of prevention for the low-risk group. Public information efforts, school health education, and health professions curricula are also strategies for reaching women considered at low risk (Beardsley et al. 1985).

Program Structure

The Nebraska LCAD Fetal Alcohol Syndrome Prevention Project utilizes a program framework based on primary, secondary, and tertiary prevention modalities for each stage of the maternal-child health continuum (i.e., preconception, prenatal, intrapartum, and postnatal) (Table 2). Primary prevention encompasses activities that target low- and moderate-risk women. These efforts can include teacher training for junior and senior high school teachers, public information and education, and professional education for health and human service workers. Primary prevention may also entail curriculum development and consultation with curriculum developers associated with educational institutions.

Secondary prevention consists of professional training and consultation with health and human service workers. Training includes information and individual consultation on the identification of high-risk (alcohol- and drug-abusing) women, especially pregnant women, and intervention counseling techniques. Trained personnel may directly assist physicians and other health professionals in directing intervention efforts. Tertiary prevention consists of providing referral information and guidance for alcohol-abusing women and affected children. It might also include a support group for women with FAS/FAE children as well as legislative activities (Beardsley et al. 1985). The program components just identified will be discussed further in the article.

Caregivers in the intrapartum and postnatal periods may need to be reminded of secondary and tertiary prevention. Even a woman who has been drinking during pregnancy should stop doing so to protect her baby from further alcohol-related birth risk during the remainder of the pregnancy

Table 1. Maternal Child Health Care Continuum

Prevention Levels	Preconception	Prenatal	Intrapartum	Postnatal
Primary	1) General Public Information efforts 2) Jr. & Sr. High (curriculum) 3) Medical/nursing schools curriculum maternal alcoholism & FAS/FAE 4) Education geared to young girls	1) Public information media directed toward pregnant women 2) Professional education for health professionals re: alcohol effects on fetus 3) Prenatal literature focusing on alcohol's role in pregnancy	1) Professional education for health professionals re: alcohol effects on fetus	1) Data collection of possible affected child 2) Public information for women in childbearing ages 3) Professional education for postnatal health providers
Secondary	1) Identification & intervention of problem drinking women in childbearing years (esp. adolescent girls)	1) Prof. education to identify & intervene with problem drinking women 2) Physicians to utilize data collection on drinking patterns 3) Documentation of possible alcohol problem for intrapartum & postnatal health care providers' awareness	1) Prof. education to identify & intervene with problem drinking woman 2) Utilization of drinking history to identify possible complications of newborns and problem-drinking woman	1) Prof. education to identify & intervene with problem-drinking woman 2) Utilization of drinking history to identify affected child and problem-drinking woman
Tertiary	1) Referral of women in childbearing years to appropriate alcohol & drug treatment services	1) Referral of problem- drinking woman to alcohol/drug services	1) Referral of problem-drinking woman to alcohol/drug services 2) Prof. education re: referrals for affected child	1) Referral of problem- drinking woman to alcohol/drug services to prevent further affected children of identified mother 2) Referral of affected child to appropriate service 3) Development of support groups for affected families

Source: Beardsley, B., Gillespie, T. and Williams, M.J. Prevention of Fetal Alcohol Syndrome/Fetal Alcohol Effects: A Comprehensive Approach. Paper presented at National Council on Alcoholism Conference, Washington, DC. 1985.

(Rosett and Sander 1979).

In some States, the alcohol and drug abuse division, a governor's commission, a local affiliate of the National Council on Alcoholism, or a categorically funded program has sponsored an FAS prevention program. In Vermont, the program was incorporated from its inception into the department of health's health education-risk reduction program as part of a conscious effort to use existing resources and service delivery systems that would be ongoing (Nystrom 1983). In Nebraska, Maine, and North Carolina, the State councils of developmental disabilities funded countywide pilot projects. It is anticipated that these States will expand their efforts statewide and establish FAS/FAE as a permanent component of their prevention programing.

Local FAS/FAE prevention projects should develop comprehensive programs tailored to the specific needs of the locality. In some States, programs have been implemented at the local level by organizations (e.g., prevention resource centers) under contract to the State. In others, county councils on alcoholism or alcohol services of mental health departments have taken responsibility for implementing programs. Volunteer groups and volunteers working with employed staff have successfully run some program components, such as media efforts and speakers' bureaus. Women with FAS/FAE children have been extremely valuable volunteers.

Advisory Committees

Advisory committees have served as catalysts in some States. In others, they have provided guidance once a prevention program was funded. Networking with other organizations is essential for any prevention program and can be facilitated by an advisory committee with a broad range of representatives. Members can be involved as a group or as individuals in needs assessment, planning, fundraising, program presentation, public relations, and other functions. In addition, the committee can serve the project by providing credibility among the members' specific constituencies. Membership should include representatives from the following groups:

- ☐ Health professionals—obstetricians, pediatricians, drug and alcohol treatment specialists, nurses, obstetrics clinic coordinators, nurses, school nurses, community education specialists, inservice coordinators, hospital and outpatient administrators, and social workers;
- ☐ Community groups—women's organizations, March of Dimes, Association for Retarded Citizens, Mental Health Association, PTA, community drug/alcohol prevention task force, Lamaze and other childbirth groups, LaLeche League, self-help groups;
- ☐ Schools—junior and senior high schools, colleges, nursing, medical, technical;
- ☐ Media—newspapers, radio, TV;
- ☐ Political and government leaders; and
- ☐ Volunteers—other interested groups.

Needs Assessment

In order to define the program's specific objectives and to enable evaluation of the program's efforts, the existing level of knowledge, attitudes, and practices should be measured. Vermont, for example, surveyed a small percentage of prenatal care providers, including the most sophisticated obstetrics practice in the largest city. The Vermont Department of

Table 2. Target Groups of Women in Childbearing Years

DRINKING	PREGNANT: Yes	PREGNANT: No
Yes	**High Risk** *Secondary prevention* (intervention aimed at alcohol/drug abstinence during course of pregnancy. *Tertiary prevention* (referral and support group) to minimize adjustment difficulty.	Appropriate referral would be made to existing agency.
No	**Moderate Risk** Since these women are currently pregnant, not using alcohol/drugs, *primary prevention* efforts aimed at reinforcing that as well as skill to maintain.	**Low Risk** *Primary prevention* efforts at reinforcing a choice of alcohol/drug-free lifestyle while pregnant if woman chooses to become pregnant

Health also conducted a statewide telephone survey of 300 randomly selected women of childbearing age. Only minimal costs, for computer time, were incurred (Nystrom 1983). The Pennsylvania Project for Prevention of Fetal Alcohol and Drug Effects used questionnaires mailed or directly administered to randomly selected women (Yancosek 1982).

In order to determine the extent and the nature of the problem and to obtain a base of information upon which a prevention program could be developed, Maine commissioned a study. The four objectives of the study were:

- To determine the state-of-the-art of the State and national level;
- To identify effective education and prevention strategies and activities;
- To develop a proposal for a long-term prevention model program; and
- To identify constituencies with the duties, responsibilities, or interest in prevention strategies (Mullen and Anderson 1985).

Existing statistics may also be useful in estimating the extent of the problem, although data about the incidence and prevalence of FAS/FAE are often flawed because of misdiagnoses. Information on demographic factors, births, infant deaths, fetal deaths, rate of alcoholism, number of women admitted for treatment, and other data is generally available through the State's division of statistics or a health planning agency. Such information should assist in understanding the effectiveness of current educational efforts and in identifying sources of information and advice related to the effects of drinking alcohol during pregnancy.

Professional Education

Many State FAS/FAE prevention programs have strongly emphasized professional education of physicians and other health care providers. Education of professionals is most effective when directed at both medical and nonmedical personnel concerned with the health and welfare of women and children. The overall goals of such education efforts are to increase knowledge of alcohol-related birth defects, to stimulate awareness and interest in the problem and prevention efforts, and to activate preventive and therapeutic behaviors such as:

- Patient or client education;
- History taking concerning alcohol and drug use;
- Diagnosis of maternal drinking and other drug problems;
- Intervention and and referral for alcoholism and drug treatment; and
- Diagnosis of FAS and other prenatal drug effects in children.

Many State programs have "kicked off" their professional education for physicians and other health professionals with a symposium, a workshop, or a conference. A forum that includes a local pediatrician, an alcohol/drug women's counselor, a family therapist with expertise in the areas of women's alcoholism and FAS/FAE prevention and, if possible, nationally recognized researchers in the field offers a valuable opportunity for introducing the many dimensions of this problem. Typically, physicians prefer to receive information from other physicians in the same specialty.

More extensive training sessions might be held at local hospitals, nursing schools, medical assistant training programs, and conferences sponsored by related organizations. Inservice sessions can be provided to Women, Infant, and Children (WIC) nutritionists, public school nurses, public school teachers, drug/alcohol counselors, Head Start staff, welfare caseworkers, and others concerned with maternal and child health.

As part of the New York State Division of Alcoholism and Alcohol Abuse (NYSDAAA) campaign in 1980, FAS information packets were mailed to 1,000 obstetricians and gynecologists. The packets contained a reprint from a prestigious medical journal describing FAS, an outline of the criteria for the diagnosis of alcoholism, photographs of FAS cases, patient brochures, posters in English and Spanish on drinking while pregnant, a patient alcohol and health self-test, a referral list for problem drinkers, a referral list for affected children, and patient pamphlets on alcohol abuse. In addition to mailing out the information packets, NYSDAAA-sponsored medical conferences and grand rounds around the State on FAS and alcohol-related birth defects. Over three-fourths of the physicians who reported receiving and reading the NYSDAAA FAS information packet considered the items useful. However, data on physicians' intervention efforts suggest that additional efforts are needed to motivate and assist many obstetricians and gynecologists with implementing a system for screening their patients routinely for problem drinking and to identify and refer those who are in need of special treatment for alcohol abuse (Russell et al. 1983).

Referral and Support Services

Once health and other professionals have received training about the problem of alcohol-related birth defects, they may need assistance in counseling, referring, and treating women and children. The Nebraska LCAD Fetal Alcohol Syndrome Prevention Program, for example, has responded to requests for assistance with designing screening and risk assessment tools. The services of qualified program staff have also been made available to assist with intervention and with counseling alcohol-abusing pregnant women. Referral information is provided to professionals who have identified either a woman abusing alcohol/drugs or affected children. A resource center providing up-to-date materials and information (e.g., audiovisuals, books) is also a service of inestimable value to persons in the field.

National Coalition Combats Infant Mortality

The principal threats to infant health are birth defects that can lead to lifelong handicapping conditions and problems associated with low birth weight. Birth defects are responsible for one-sixth of all infant deaths. Each year approximately 240,000 American babies are born with birth defects. In about one-fourth of these cases, the cause is currently thought to be purely genetic; in one-tenth, purely environmental. In the remaining one-third, the cause is unknown (U.S. Department of Health and Human Services 1979). Although many birth defects cannot be prevented, many more might be avoided by providing prenatal information and care to women at higher risk.

Infants with low birth weights are in particular danger; two-thirds of infants who die weigh less than 5 pounds 7 ounces (2,500 grams) at birth. Today, approximately 7 percent of all babies are of low birth weight (U.S. Department of Health and Human Services 1984). Underweight babies are more vulnerable than normal-weight babies to mental retardation, developmental difficulties such as slowness in walking or talking, growth problems, and central nervous system disorders. Again, many preventable maternal factors are associated with low birth weight: lack of adequate prenatal care, poor nutrition, smoking, alcohol and/or drug abuse, age of the mother (especially immaturity), and social and economic background. In addition, women least likely to receive adequate prenatal care are often those most likely to have other risk factors working against a healthy pregnancy.

In the Fall of 1981, seven national agencies and organizations, including the U.S. Public Health Service, founded the Healthy Mothers, Healthy Babies Coalition to improve the health of pregnant women and the health of their unborn and newborn babies. Today, more than 70 voluntary, professional, and government health agencies and organizations belong to this national coalition.

In addition, most States have started their own coalitions to expand the effort on the local level. Achievement of the goals of the network depend largely on provision of high-quality prenatal, obstetrical, and neonatal care; preventive services during the first year of life; professional education; and broad public information activities aimed at pregnant women and their families. Some of the specific goals of the Healthy Mothers, Healthy Babies Coalition are the following:

- ☐ To supply information that encourages healthy habits for pregnant women and women planning pregnancy;
- ☐ To motivate pregnant women to protect their health through regular prenatal care and good nutrition;
- ☐ To increase women's understanding of specific health risks and the importance of taking responsibility for healthy childbearing; and
- ☐ To increase understanding among men of the supportive role they play in pregnancy and infant care.

Since 1981, the coalition has encouraged low-income women to obtain consistent prenatal care and adopt good health behaviors while pregnant. A series of posters and information materials describing healthy behavior during pregnancy and designed especially to reach low-income women were distributed to clinics nationwide. Low-income and other women have been reached through recorded public service announcements narrated by the Surgeon General, produced by the Public Health Service, and distributed to radio stations across the country by local March of Dimes chapters. Other materials include a curriculum guide on education for responsible childbearing, a directory of educational materials on prenatal and infant care, and a handbook on how to start a community coalition similar to Healthy Mothers, Healthy Babies.

The members of the Healthy Mothers, Healthy Babies Coalition make valuable contributions as participants on committees that address such issues as breastfeeding, substance use, genetics, and motivation of low-income women. The substance use subcommittee (membership includes representatives of the National Council on Alcoholism and the National Institute on Alcohol Abuse and Alcoholism) has recently been formed to help reduce the number of alcohol-related birth defects and the proportion of women of childbearing age who smoke during pregnancy. Another of their objectives is to increase awareness of the hazards of pharmaceutical products and other drugs during pregnancy and lactation.

This subcommittee's first project is the development of a resource package that includes both professional and client education material in the area of substance use during pregnancy. Contents of the package include policy statements from major health-related organizations; synopses of landmark research papers; an annotated guide to patient education materials; sample exemplary brochures and posters; and a counseling and referral guide for use by providers. The package is directed to influential health professionals and organizational representatives working in the maternal and child health area and is designed to increase information and counseling for patients as well as to improve recognition and referral of substance abuse problems to appropriate treatment centers. The format of this package is similar to an earlier one developed by the coalition to encourage health professionals to promote breastfeeding among their patients.

During the Spring of 1985, the Coalition's subcommittee on low-income women conducted a survey of 20,000 health care providers and others working with pregnant low-income women to determine effective ways to reach the target population and to encourage women to improve their health and that of their babies. The results of the survey will be compiled to provide a compendium of program descriptions and contact persons. ☐

For further information about the Healthy Mothers, Healthy Babies Coalition and its publications, contact: Executive Secretariat, Healthy Mothers, Healthy Babies, 600 Maryland Ave., S.W., Suite 300-E, Washington, D.C. 20024

Offering consultation services to health professions educators interested in updating their curricula to include FAS/FAE prevention information is another support service provided by the Nebraska project. Some schools may want to include presentations by project staff as well (Beardsley et al. 1985). Nursing schools appear especially receptive and play a key role in disseminating current FAS/FAE information to health professionals.

To ensure that information is accessible, the North Carolina project operates a 24-hour telephone information service available to anyone with a question about FAS or about alcohol consumption during pregnancy. An answering machine records messages received when staff is not available to answer the hotline.

Community Education

Reaching the general public, especially women of childbearing age, with information about alcohol-related birth defects is a major thrust of most FAS/FAE prevention programs. Such public education campaigns should not be limited to women of childbearing age; informed mothers, friends, spouses may also serve as informal educators. Print materials, community education programs, and mass media are complementary and reinforcing modes of communication that reach a broad cross-section of the community.

Posters and pamphlets are the most common print materials developed and distributed by FAS/FAE prevention programs. Many States have received permission from existing programs to adapt materials and messages that have proved effective. The article in this issue on disseminating information (see page 54) suggests appropriate messages for women and physicians. Some excellent locations for placing such materials are doctors' offices, pharmacies, laboratories where pregnancy tests and premarital and pregnancy blood tests are taken, marriage license bureaus, social service agencies, church bulletins, maternity clothing stores, children's clothing stores, shopping mall displays, State liquor stores, supermarkets, family planning services, health clubs, WIC nutrition programs, laundromats, prepared childbirth classes, YWCAs, other women's clubs, beauty shops, and many other places frequented by women (Yancosek 1982).

Presentations that provide more detailed information through the use of speakers and audiovisuals are effective mechanisms for increasing awareness. Such programs can be offered to the membership of existing organizations, clubs, and groups such as childbirth education classes, LaLeche, PTAs, and YWCAs. All presentations should emphasize the positive aspects of healthy pregnancies rather than the negative aspects of birth defects. (Information about films, pamphlets, and other materials may be obtained from the National Clearinghouse for Alcohol Information.) Some communities have established a speaker's bureau composed of experts on various aspects of FAS/FAE who have indicated an interest in making presentations on the subject.

Newspapers, radio, television, and magazines are also useful channels for communicating information about alcohol-related birth defects. In 1982, the National Institute on Alcohol Abuse and Alcoholism (NIAAA) developed radio and TV public service announcements and distributed them nationwide to county drug and alcohol programs and radio and television stations. Newspaper sample articles and detailed talk show interview scripts were also distributed. Some of these materials are still available for distribution by contacting NIAAA. These and similar locally developed materials are the ingredients for a mass media campaign that might be conducted over a 3-month period every year or every other year. The Christmas-Hanukkah season and Mother's Day are particularly appropriate times for such campaigns.

School Programs

Drinking frequency and amount remains at alarmingly high rates among high school women as does the incidence of teenage pregnancy. To ensure that information on alcohol-related birth defects reaches teenagers before alcohol is a problem, it should be incorporated at all levels of education under the heading of preventing developmental disabilities. The Nebraska alcohol-and-drug school curriculum, as well as others in the Nation, includes junior and senior high school units on alcohol, drugs, and pregnancy. Most States, however, do not include such information in the elementary school curriculum. In school systems where alcohol-related birth defects are not addressed, the prevention program might encourage the department of education to develop such a component.

The Maine prevention program worked with four area institutions for higher learning. Activities included 10 FAS/FAE presentations; public service announcements through college radio stations and newspapers; and visual and narrative materials placed in health centers, dormitories, sororities, and fraternities. All human service programs sponsored by these colleges agreed to integrate information about FAS/FAE into their course materials (Mullen and Anderson 1985).

During the 1985-86 fiscal year, Pennsylvania will implement a comprehensive program aimed at increasing awareness among youth about the harmful effects of alcohol consumption during pregnancy. This initiative will include regional workshops for relevant school personnel, the development of a five-unit curriculum for grades 9–12, and a video training tape on screening and interviewing techniques for obstetricians, gynecologists, and nurses.

Conclusion

This discussion has provided an overview of the core activities of an FAS/FAE prevention program. As mentioned earlier, once training and inservices have been provided, a prevention program should continue to provide ongoing services as an information and referral source. Periodic training is, of course, necessary to reach newly identified providers. Those projects that emphasize the health of the mother as well as the fetus will have a full agenda.

Here is a sampling of activities for those interested in pursuing additional prevention strategies:

- ☐ Provision of technical assistance to the State Department of Education curriculum development task force and membership on the Department's task force on chemical dependency and special education;
- ☐ Recruitment, training, and deployment of a core group of physicians interested in the prevention and treatment of FAS/FAE to provide training to their colleagues through hospital departmental staff meetings, regional and State medical association meetings, etc.;
- ☐ Collaboration with the Developmental Disabilities Council to identify groups/agencies with the capacity to support effectively families who are experiencing the trauma of having a disabled child;
- ☐ Establishment of a diagnosis registry for FAS/FAE. ☐

Turn to page 76 for references.

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X.

ALCOHOL RELATED BIRTH DEFECTS: IMPLICATIONS FOR EDUCATION

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ABSTRACT

This article emerges from a larger study of preventive approaches for Alcohol Related Birth Defects (ARBD) prepared for the New York State Department of Education. The author contends that in addition to clearly identifiable Fetal Alcohol Syndrome children, there is a continuum of impairment to the offspring of drinking mother that is dose related and produces serious behavioral/learning deficits. The conti includes young people of normal intelligence who perform below expected lev find school adjustment difficult. School and community agencies need to c studies to determine the nature and extent of impairment and the kind of interventive and preventive action that should be instituted. To that end s article gives information on the background and nature of ARBD and some suggestions to guide development of programs.

Alcohol is a teratogen. Animal and human studies of maternal use of alcohol during pregnancy suggest a continuum of fetal impairment ranging from severe mental retardation and growth abnormalities, what is commonly called the Fetal Alcohol Syndrome (FAS) to lesser physical and mental defects.

Estimates of prevalence of Alcohol Related Birth Defects (ARBD) range from one in every seven to eight hundred births for the full syndrome to three to five in a thousand births for partial FAS effect. Attempts to determine the number of "normal" children suffering from milder forms of impairment lack preciseness, but the figure might be as high as one case in every 150 births. Whatever the count, ARBD joins Down's Syndrome and Spina bifida as leading causes of birth defects.

IMPLICATIONS FOR EDUCATION

Quite obviously, there already exists sufficient information on ARBD to warrant full prevention programs in all schools and special interventive programs for youngsters identified as FAS children. To meet problems associated with

compiled by S. D. Clarren and

lower alcohol related birth defects, communities need to initiate or foster studies analyzing the extent and nature of developmental impairment. There appear to be children sitting in classrooms who are considered normal in intelligence, but are achieving at levels well below the expectations of parents and educators. The profile of such a child would approximate the following description.

1. Scores normally or above on intelligence tests.
2. Does not achieve or work effectively.
3. Tends to be fidgety, hyperactive, inattentive.
4. Has attention deficit disorders.
5. May show some of the facial/physical irregularities common to FAS children.
6. Falls behind other children in terms of intellectual development.

Using a more sophisticated or precise profile, schools, local hospitals (pediatricians and nurses), clinics, and other interested agents might want to study children with those characteristics and those without to compare statistically the incidence and nature of maternal drinking. Those directing the study might then reverse the study by seeking out a specified number of non-drinking or light-drinking mothers, a sample of moderate drinkers, and a group of chronic users and compare data. Findings from both studies could then be viewed against data emerging in the literature. If a positive relationship between maternal drinking and poor learning performance emerged from the study, the school involved would have supporting data for implementation of prevention and intervention programs.

As an aid to school directed action, some ideas basic to ARBD are listed.

1. Increased drinking rates in America over the past three decades, particularly by women, appear to have produced higher incidence of alcohol related birth defects.
2. Alcoholism produces consciously tragic consequences for the individual involved. Maternal alcoholism brings tragedy to the unborn, the innocent.
3. What is often called "social drinking" may actually be rather heavy and steady use of alcohol with negative consequences for the offspring of maternal drinkers.
4. Chronic maternal drinking before and during pregnancy results in morphologic problems for offspring. The first six to eight weeks of gestation are most critical for fetal development. Abstinence or very limited use of alcohol during that period should be the rule. Mothers should also avoid use of alcohol if the child is to be breast fed.
5. Data suggests that abstinance for the greater part of a year prior to conception may be necessary for the alcoholic mother who wishes to minimize risk of ARBD.

6. Approximately one third of the offspring of chronic alcoholic mothers have full FAS effects. Seventy-five per cent have partial effect. Impairment appears to be dose related. Use of cigarettes, caffeine, and other drugs as well as poor nutritional habits increase the risk of damage to offspring.
7. Most attention has been given to children with full or partial FAS impairments. It is conceivable that the more significant problem for education is the larger number of unidentified children suffering alcohol-related behavioral and learning disorders and resultant school or learning difficulties.
8. Small quantities of alcohol can produce reduced birth weight and behavioral problems in offspring. Perhaps 30 to 40 per cent of prospective mothers believe that moderate, occasional, or "special occasion" heavy drinking during pregnancy is safe.
9. Pregnant women tend to drink less during pregnancy, particularly during the first trimester. The decrease is directly proportional to the amount of alcohol consumed prior to pregnancy. Chronic drinkers continue to drink more heavily than moderate users. Binge drinking (five drinks or more on an occasion) increases in heavy drinkers even though overall consumption may be reduced.
10. Though studies of paternal drinking are not conclusive, there is some evidence that drinking by fathers may be related to impairment in offspring. More study is needed.
11. Schools have the largest concentrated community of prospective parents. These young people ought to be assessing information for themselves and helping to educate their peers and elders.
12. Schools have the plant, equipment, educators, and on-going health oriented programs as resource bases for effective prevention programs.
13. Teaching about ARBD and the effects of teratogenic agents generally may have effective motivating value for youngsters in school-based health education programs.
14. Schools could broaden educational efforts by incorporating ARBD modules in various continuing education programs.
15. Schools should take the lead in attempts to foster unified community action programs which would tie together the efforts and resources of the university, community and school.
16. Alcohol-related birth defects cut across racial, class and environmental factors. Maternal drinking before and during pregnancy needs no help in producing obvious and subtle developmental problems for children.

It is encouraging to note television and radio programming aimed at problems associated with maternal drinking. It is discouraging to report that family clinics often do not collect data on the drinking habits of the prospective mothers they serve or that they make little use of the data once in hand. Obstetricians are

reluctant to question too strenuously the [illegible] patterns of patients. Consequently, follow-up of a "normal" child born of a drinking mother gets lost in the transfer from maternity ward to family doctor or pediatrician.

School administrators are generally aware of fetal alcohol problems but there is minimal transfer of that awareness to the implications of those problems for child development and school programming. Efforts by the author to locate schools with significant prevention/intervention programs went unrewarded. School officials turn away from suggestions that they spearhead, encourage, or involve themselves in studies designed to analyze the consequences of maternal drinking for education. They are interested but only at the cognitive level. Hopefully, data emerging from childhood studies being conducted at pediatric centers and emphasis through the media will move school officials to bolder activity.

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How Alcohol Affects the Developing Fetus

Some observations about the normal and abnormal physiology of the pregnant woman who drinks. These reflections make it clear why we should all read the Holy Bible more carefully.

by CORTEZ F. ENLOE, JR., M.D.

When Dr. Iber wrote in the January February, 1971 issue of *Nutrition Today* that "In Alcoholism, The Liver Sets the Pace," he helped us understand why drinking more than a moderate amount of alcohol causes the beverage to escape the detoxifying system of the liver and reach the developing fetus. The fetal alcohol syndrome or FAS, as it has since come to be known, had not been recognized at the time of Dr. Iber's report. There can be little doubt, however, that as he pointed out, the rate at which the liver can spare the body the damage of alcohol is "a linear function of time." He provided us with the clue to the fact that once alcohol consumption reaches a stage in which the alcohol blood level in the portal circulatory system between the digestive tract and the liver exceeds the capacity of the liver to detoxify it, trouble is sure to occur. The excess alcohol passes on into the general circulation and the person becomes drunk. And drunkenness is a primary cause of crime, of automobile accidents, of fatal crashes by private airplanes, and, now it seems, it may also be a principal cause of mental retardation and birth defects by making the fetus drunk. This then is reason enough to look at the pathologic physiology in the pregnant woman who drinks.

Dr. Enloe is the editor of Nutrition Today *magazine.*

At first blush one could easily be suspected of trivializing a serious matter when they observe that the pregnant woman who craves the psychologic release of a cocktail would do well to eat while she drinks. There is sound medical reasoning behind this advice because by eating as she sips, she slows the absorption of alcohol, or ethyl alcohol, or to be exact, ethanol, to use the contraction, from her stomach into the portal circulatory system. The slower the absorption rate, the better the chance that the liver will be able to break down the alcohol and keep it out of the general circulation.

As Dr. Iber pointed out, the moment one takes a drink, the alcohol that first reaches the stomach is quickly absorbed. However, if one then nibbles a bit of cheese or a mini-frankfurter hors d'oeuvre absorption is slowed. And the greasier the tidbit the better, because the presence of fat slows absorption of alcohol through gastric mucosa. By these willful acts—sipping drinks slowly and eating all the while—the liver, which has only a limited capacity to detoxify and metabolize any agent, is given an opportunity to reduce alcohol from the stomach into innocuous acetaldehyde and acetic acid, and these two substances subsequently break down into carbon dioxide and water. This chain of events is clearly established. It is only part of the routine activity of the liver, a large, busy factory alive with metabolic chemical reactions that break down nutrients and other chemicals absorbed from the stomach and intestine into less complex units so the body can use or dispose of them.

PORTAL PROTECTION

This emphasizes the virtues of the portal system because through its vessels everything that leaves the stomach or the small intestine must first go to the liver before it can pass into the body's general circulatory system. However, as Dr. Iber pointed out, the trouble is that the liver's capacity is limited and inflexible. As he told us, in the case of alcohol, the liver can handle about ten milliliters an hour. Or, to put it another way, it means that it will take the liver of the average person from five to six hours to fully oxidize the alcohol in four ounces of whiskey or two and one half pints of beer. This is why three drinks at lunch puts President Carter's mythical executive off his beat for the afternoon. This can only be avoided if one were to spread their alcohol intake of such drinks evenly over four hours' time, an unlikely event because then they would get little or no kick from drink at all.

The trouble begins when the liver receives more alcohol than it can handle. It simply lets the excess pass into the general circulation and picks out that which it can detoxify at its leisurely pace as it passes back through the liver. Thus it permits the host to enjoy the intoxicating pleasures of alcohol until the organ has time to pick it up and reduce it to carbon dioxide and water. If the amount is such that the transfer of acetaldehyde exceeds

the body's capacity, the acetaldehyde concentration increases and that's what causes a hangover.

The blood-alcohol curve chart dramatically depicts the effect of food on absorption rates of various spirits. The chart was compiled by one of the greatest practical pharmacologists, Chauncey D. Leake, Ph.D. (For more information about Dr. Leake, see the May/June, 1975 issue of *Nutrition Today*.)

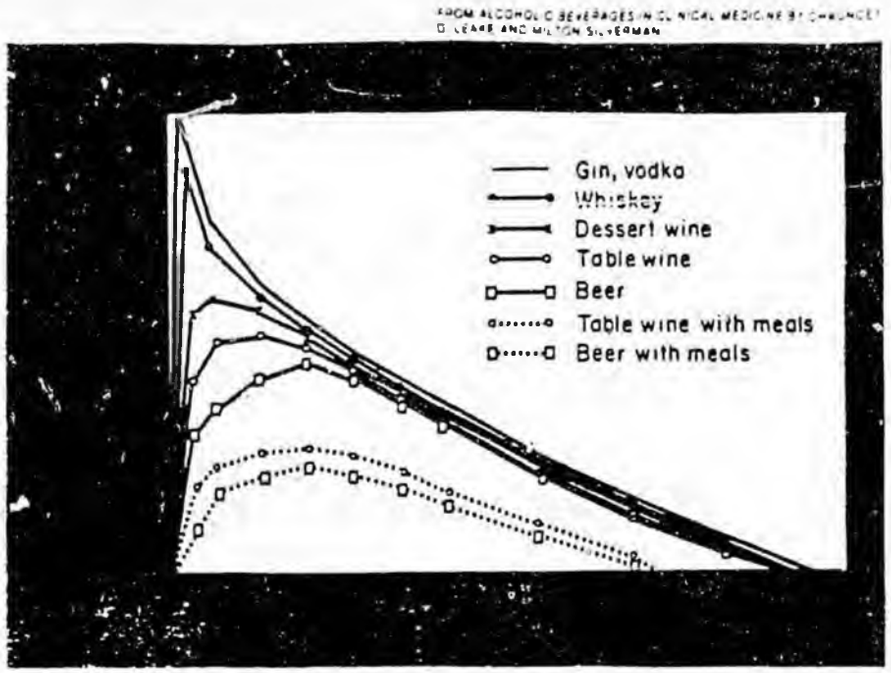
The alcohol that circulates freely in the blood waiting to be detoxified reaches all of the body's organs and has a special affinity for the brain and the person becomes intoxicated. In the case of the pregnant woman something else also occurs. In her case there's also the baby growing within her body to be thought of. The simple answer is that it too receives its share of alcohol. The amount of the concentration of alcohol that the baby is bathed in, and keep in mind that we are speaking of raw ethyl alcohol, regardless of whether it comes from wine, spirits, or beer, depends on three things. First, how much the mother drinks, of what kind of alcoholic beverages the mother has consumed; second, in what period of time she drinks it; and third, whether she slows the emptying time of her stomach by eating as she drinks. If she has sipped a martini containing, say, one and one-half ounces of gin over a period of two hours—an unlikely feat for a martini drinker—all the while nibbling on cheese hors d'oeuvres, the baby may not be damaged. Any faster drinking, or no food of consequence, however, and the fetus is sure to get an alcohol bath.

BATHTUB GIN

This point was made very clearly long, long ago when, as Dr. Iber tells us, it was clearly stated in the Bible as an admonition to pregnant women.

As is so often the case in medical discovery, now that we know what happens in the fetal alcohol syndrome, looking upon the basic effect of alcohol on the tissues, it is hard to understand why medical scientists were so slow in realizing that ethyl alcohol is bound to injure the virtually defenseless tissues in the developing fetus.

Consider this fact, that we physicians overlooked. In the very first university courses in general chemistry, students are taught that alcohol is a dehydrating agent. It has an inexplicable capacity to absorb water without markedly increasing its own volume. As anyone who made "bathtub gin" during the prohibition era knows, one has to use *more* than a pint of water and a pint of ethyl alcohol in order to obtain a quart of gin. Here two pints don't make a quart because the alcohol absorbs some of the water. (Chemistry will ignore the few drops of juniper juice that are added for flavor!) This phenomena is usually demonstrated in beginning college chemistry when the instructor will mystify his young audience by taking a beaker with 100 milliliters of water and a beaker with 100 milliliters of alcohol, mixes them in a large graduate and lo and behold the resulting volume is not 200 milliliters but only about 185 milliliters. The alcohol behaving like a liquid sponge has simply absorbed some of the water. This ability of alcohol to absorb water is the reason that it stings abraded tissue. It simply draws some of the water out of it. It is the reason why raw alcohol will irritate the lining of the stomach after sufficient exposure and explains why drunkards frequently suffer from gastritis. It is also as good a reason as we can think of why the brain of a child of a drunken mother is smaller than the brain of a normal child. In an autopsy, as accompanying photographs show, the brain of the child that has been exposed to alcohol can best be described as appearing desiccated. It may also be a reasonable biochemical explanation why that same child is retarded. They simply do not have the same amount of brain tissues as do normal children because alcohol has withdrawn some of the fluid from the developing brain cells and they have died or remain functionless.



Typical blood-alcohol curves resulting from ingestion of various spirits, wines and beer, each at amounts equivalent to 0.6 gm of alcohol per kilogram of body weight.

BIOLOGICAL COMPUTER

In the adult, alcohol damages the brain cells in a similar manner. In so doing it slows the passage of nerve impulses. The neurological reticulum of the brain is particularly affected. This is the part of the organ which can be compared to a biological computer that receives the signals of the remainder of the brain, coordinates them, and sends them back to their proper place. In the fetus this is the portion of the brain that first develops. In the adult, when alcohol depresses the activity of the reticulum the signals going to the cortex, which regulates thought, become disorganized. This is the reason that a drink or two releases man from his inhibitions. This slight disorganization, which enhances release from serious thought, is what has made alcohol attractive to man since the beginning of time. After loss of inhibitions, another drink or two will begin to affect the motor process. This explains why the person who drinks first loses tempermental restraint and says more than he ought to before he reaches the stage where his speech becomes slurred and his motor coordination causes him to have trouble putting one foot properly in front of the other.

The fetus doesn't think or walk. Nonetheless, it is reasonable to suppose that the developing reticulum or the mental computer that is constantly bathed in ethyl alcohol soon adapts to that milieu. Short circuits develop and no amount of education in later life can realign them.

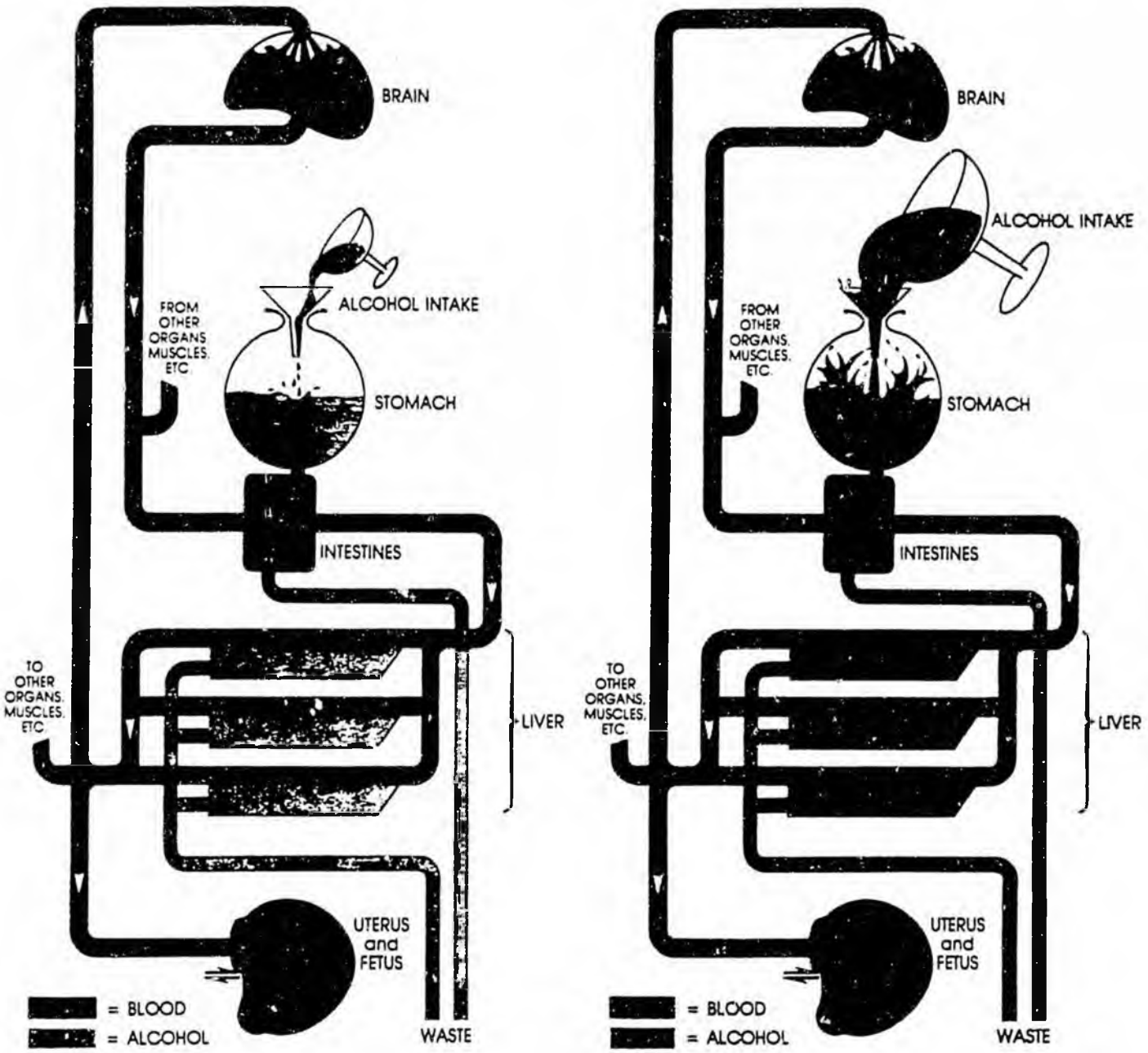
In making this adaptation to the alcohol environment the cells are following a pattern of growth and behavior that is one of the established facts of human physiology. They are doing the same thing that the muscles of the arm do when it is put into a sling. Those muscles, being unused, quickly begin to atrophy and waste away. Once the sling is removed, the muscles have to be retrained by physical rehabilitation.

THE CELL'S WISDOM

We can see the same phenomenon at work in the endocrine system. Give a normal animal or woman large doses of

Low rate of alcohol intake. The liver is able to "filter" the mother's blood, removing the alcohol before it can enter her circulatory system and affect her brain and the fetus

High rate of alcohol intake. The threshold of the liver's ability to treat the continuing high level of alcohol in the blood is surpassed. As the blood enters the mother's circulatory system it continues to carry alcohol with it, suffusing her brain and the fetus with this toxic substance.



Schematic diagrams showing the threshold characteristic of the liver's ability to metabolize alcohol carried in the blood. When the threshold is exceeded—when the liver cannot cope—the alcohol carried through the mother's circulatory system suffuses her brain and the fetus.

female sex hormone over a period of time, then suddenly withdraw it, and it will be observed that the ovaries have ceased to produce their normal amounts of estrogen.

This habit of a cell to lose its basic function when that function is distorted or replaced by external factors, is one of the dangers of giving excessive amounts of cortisone to the person who still has a functioning adrenal cortex that manufactures the same hormone.

It is reasonable, therefore, to suspect when the cells of the developing fetal reticulum are bathed with desiccating alcohol they soon adapt to that state wherein the abnormal becomes to them the normal. This might be called the phenomenon of the wisdom of the cell.

The fact that the brain in both the adult and the developing baby has a rich supply of blood means that a majority of the alcohol-laden blood soon reaches the most easily damaged area. In the case of the fetus, we have known for some time that the alcohol in the blood of the mother easily crosses the barrier from the decidua (the temporary lining that forms in the mother's uterus to hold the placenta of the baby in place) into the placenta and thus heads for the organ that has the highest coefficient of affinity for alcohol of any organ in the body.

NATURE'S WONDERS

Nature does many wondrous things to protect the growing fetus from the careless behavior of the mother in whose womb it nestles. The uterus is a mighty muscular fortress that protects the infant from even the most extraordinary mechanical injury. One might have thought that nature would have made the placenta a bit more discriminating and not let the alcohol cross the barrier into the baby's tissues, but this is not the case. It seems that nature might have provided this protection because there is not intermingling of the mother's blood and fetal blood. One of the first things that occurs when the ova of the female is inseminated by the sperm of the male and cell division and growth begins is that a circulatory system begins to form. This can be seen in the fetus that is only a few days old, when it is little more than a small cluster of cells. This very primitive circulatory system begins immediately to carry nutrients to the cluster and to deliver metabolic waste back to the mother so it can be discharged. The waste, for example, goes back to the placenta, which is partial to the fetus although it is connected to the fetus by the long umbilical cord villi that extend out from the placenta into the blood rich decidua and the chemistry is such that a discharge and interchange takes place. On the inward bound voyage vitamins, minerals, proteins in assimilable state, carbohydrates, fats, oxygens, and other nutrients cross the barrier into the fetus. In the outward bound trip the arteries of the fetus waste products from its own metabolism to the villi from which they cross the barrier and are picked up and carried away by the venous system of the mother to be discharged by urination, defecation, and respiration.

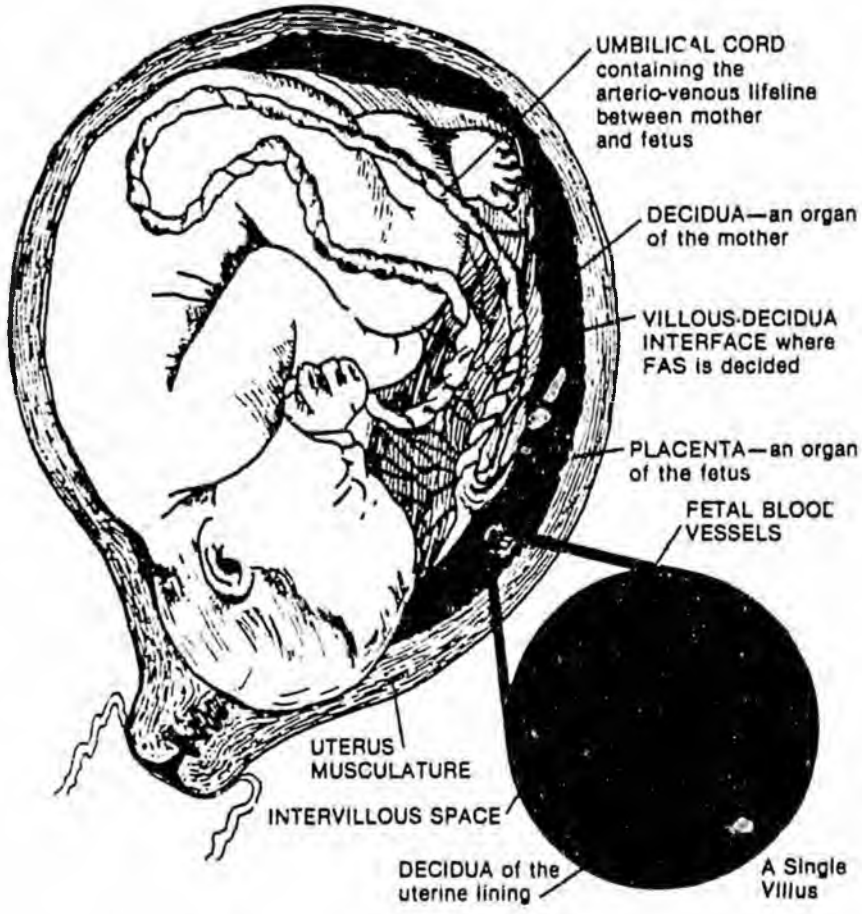
OTHER TOXICANTS

Unfortunately the fetus also passes along many drugs, at least one of which, thalidomide, an otherwise perfect sedative, has terrifyingly harmful effects on the fetus, as we learned from the sad experiences of the early 1960s. The placenta also offers no barrier to some gas products which are of no benefit to the baby. This is why smoking by a pregnant woman carries with it certain hazards that we do not yet understand. We know this because research has shown that shortly after a pregnant woman inhales the smoke of a cigarette, methemoglobin can be identified in fetal blood. No one is sure what damage this abnormal hemoglobin can do, but the informed suppositions leave no room for comfort. The only thing that is certain at the present state of our knowledge is that this is not pure hemoglobin circulating in the fetal vessels, but is an abnormal substance.

The same can be said about the pregnant woman drinking caffeine-bearing coffee. This alkaloid also passes the placental barrier interchange. Again, the state of our knowledge does not provide evidence that for the pregnant woman to drink a modest amount of coffee is harmful. The knowledge, however, does raise the question of whether the fetus can withstand the impact of the same serum concentration of the caffeine as does the fully developed human body. We have a long way to go before we have certain knowledge of what drugs and stimulants the pregnant woman can safely consume.

We don't know how to account for the way that alcohol selectively disfigures the infant anatomically. That too must be left to further research.

The organs of even a young child are composed of cells that are mature. This, to us, means that the cellular systems are highly developed and have practiced patterns of metabolic behavior and chemical interchange. The developing cells of the fetus are not old enough to have the protection of such experience. We know now the mechanisms by which some of these permanent changes take place. Considering these facts, the wonder is that drunken babies born of drunken mothers are not complete idiots. The ability of the delicate tissues to withstand the day-in and day-out bath of a strong dehydrating agent is a tribute to nature. As we have seen, the placenta, a wonderfully organized temporary organ, exercises little or no filtering effect to protect the fetus. Since the cellular structure of the infant is immature and fragile, it is not too much to say that a drunken mother carries in her swollen uterus a drunken baby. After she has become drunk she usually has a hangover. That will pass away in a few hours. For the fetus, the hangover may last a lifetime.



The fetus when it is about to become a baby. Note that the fetal blood vessels do not make contact with the mother's circulatory system. Thus all exchange must transpire through the decidual and villous cell walls. They determine what shall and what shall not pass. Ethyl alcohol, unfortunately, is allowed to pass.

This is a teaching aid article. Price and delivery dates are available on request. For institutions and anti-alcohol programs, bulk prices will be available at a discount. Ordering information will be ready by January 1, for delivery after February 1.

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ALCOHOL AND PREGNANCY

THIS IS A TEACHING AID ARTICLE

Fetal Alcohol Syndrome

An astute, perceptive authority has recently discovered a large gap in medical and nutrition knowledge. He may also have found a way to prevent the greatest single cause of birth defects.

by FRANK L. IBER, M.D.

Considering how long men and women have been drinking alcoholic beverages, it is surprising that it is only seven years now since the medical profession first realized – no, awakened would be a better word – to the fact that when the pregnant woman drinks she may be causing her baby to suffer irreversible birth defects.

Medical researchers have not yet had time to learn all of the answers to questions raised by the discovery that a direct association between alcohol and birth defects exists. However, such a gap offers no solace, nor does it offer a reason to discount the existence of this connection. It can now be stated with the utmost conviction that while all of the defects caused by drinking have not yet been identified, we do know

- that the ingestion of alcoholic beverages (ethanol, ethyl alcohol) interferes with normal pregnancy,
- that the effects on the fetus are permanent,
- that whether they occur or not is a matter of the basic metabolism of both the pregnant woman and the fetus,
- and, worst of all, that the deleterious effects of alcohol in pregnancy may be more prevalent in the western society than we now recognize.

Drinking under any circumstances interferes with many complex systems of the human body in both men and women, so it should not be surprising to us today to learn that drinking during pregnancy harms the unborn child. For some reason this possibility was ignored by the medical profession. We certainly had plenty of warning. Way back in biblical times Judaic observations as set down in the Holy Bible spoke of the then prevalent belief that alcohol would cause birth defects. In the book of Judges, 13:7, for example, it says "behold, thou shalt conceive and bear a son, and now drink no wine or strong drink." This, it turned out, is better medical advice than physicians have been giving since.

Then in the middle of the last century, Charles Dickens, the British novelist, observed that children born of mothers who were chronically drunk were frequently mentally defective. This good advice, like so many of Dickens' social observations, was ignored by the medical profession.

This sad state of affairs persisted until 1973 when a remarkably perceptive Seattle physician noticed that babies born of alcoholic women were frequently and uniformly malformed and often grew to become children who were mentally retarded.

The physician is David W. Smith, M.D., of the Department of Pediatrics of the University of Washington in Seattle. It was Dr. Smith who first noticed the phenomena. He was the first to describe it accurately, and it was he who named this scourge of babies today the fetal alcohol syndrome or FAS for short.

We don't yet know to what extent the defects are dependent on the amount of alcohol consumed, but it does appear that the pregnant woman does not have to be a full-blown alcoholic in order to give birth to a baby that grows up retarded or a child that exhibits one or more of the characteristic FAS deformities when it is born. It does seem reasonable to believe that drinking any amount of alcohol in excess of the level to detoxify it will put the fetus at risk.

In the alcoholic mother-to-be alcohol evokes its harm in part because she has a tolerance to many of the behavioral effects that prompt less experienced drinkers to curtail their intake before they suffer the flagrant symptoms of drunkenness. Alcoholics, on the other hand, usually get their intake up to more than 100 grams of ethanol a day. This is equivalent to at least eight beers, a little less than a pint of whiskey, or more than a bottle of wine. This amounts to about half of the caloric intake in such drinkers. Thus the likelihood of malnutrition (which also affects the fetus) is enhanced. Furthermore, the addiction causes many things to occur that influence her sexuality, fertility and, as we now know, thanks to Dr. Smith and his perceptive colleagues, her pregnancy. As for sexual behavior, light drinking increases sexual desire but heavy drinking impairs it. It impairs judgment, a fact

Dr. Iber is a professor of medicine and chief of gastroenterology at the University of Maryland Hospital School of Medicine. He is also the chief of the alcoholism service at the Loch Raven Veterans Administration Medical Center.

Dr. Iber wrote for Nutrition Today *readers in our January/February, 1971 issue: "In Alcoholism, the Liver Sets the Pace." The 1971 article, as well as the article appearing here, are also available as teaching aids.*

Characteristic Anatomical Defects that are Signs of the Fetal Alcohol Syndrome

Small head circumference

Low nasal bridge

Epicanthic folds

Short palpebral fissures, obscure the canthus, or inner corner of the eye, a normal feature in certain species of the Mongolian race

Short nose

Small midface

Indistinct philtrum, an underdeveloped groove in the center of the upper lip between the nose and the lip edge

Thin reddish upper lip

Epicanthus is a characteristic of the eye where a vertical fold of skin extends from the root of the nose to the inner termination of the eyebrow, sometimes covering the inner canthus. It's presence is normal in certain of the Mongolian races but a telling [illegible] in FAS

David W. Smith, M.D. is a pediatrician from Seattle to whom the world is indebted for having been the first to identify and catalog the signs and symptoms of the fetal alcohol syndrome. He shares the credit with many associates.

that could certainly cause her to neglect to take contraceptive pills, and make the alcoholic all the more likely to become pregnant. Add to this the fact that the addiction is expensive. For some women who do not have the money, it makes it easier for them to sell their sexual favors to support their addiction. Menstruation, ovulation, fertility, and even the ability to carry a pregnancy are heavily burdened by excessive drinking. Despite all of these impediments, however, alcoholic women all too frequently do become pregnant. Whether more addicts have more unwanted pregnancies than do normal women I do not know, but the circumstances are certainly stacked for that to be so. Given the widespread use of alcohol by women of child-bearing age and the connection between the habit and FAS, the outlook is not bright.

Consider this. In North America, nine out of ten women of child-bearing age are said to drink occasionally. The most reliable statistics also indicate that seven out of every ten of these women drink regularly, which is to say that they have a cocktail every evening, for example. Most surprising of all is that one out of twenty women in this same critical age group is a confirmed alcoholic. So we can see that social behavior and custom add to the likelihood of FAS.

LABORATORY RESEARCH

In the search to explain the phenomenon Dr. David Smith observed in human infants, animal studies have since been done. This laboratory research shows clearly that it is the alcohol and not the

An editorial about Dr. Smith and his discovery will be found on page 16.

The pathologic physiology of alcohol and the fetus are discussed by C. F. Enloe Jr., in a separate article appearing on page 12 of this issue.

activities of the mother that cause birth defects. Alcohol interferes with organ development, even when the nutritional status of the animal is maintained in a fully adequate manner.

Two types of experiments have been conducted.

Since animals will not voluntarily consume half of their total calories as ethyl alcohol, it has been necessary to mix the alcohol in a liquid diet so that the animal is left no choice but to consume the alcohol in the food or starve. Most species of experimental animals cooperate. When such diets are fed to female rats, mice, hamsters, and chimpanzees that have mated, they produce offspring whose brain is underdeveloped and whose heart, limbs, and kidneys are frequently malformed. When the dose is changed the number of malformations varies likewise. One may assume that such teratogenic defects are related to the intensity of the exposure to alcohol. These effects appear to be most marked if alcohol is added to the animal's diet during the period of pregnancy when organs are being formed. On the other hand, curiously enough in an additional experiment such effects have been seen with regularity when alcohol is administered and the blood-alcohol level of the animal is elevated immediately prior to conception.

Male chauvinists will be relieved to learn that no deleterious effects have been observed in offspring conceived when the male's alcoholic blood level is elevated, a not entirely infrequent occurrence. Thus it can be said that it is the amount of alcohol circulating in the woman's blood that's crucial.

The most exciting recent data reveals new (and disturbing) information about the learning ability of rats and mice born of mothers who have been on diets containing only relatively low levels of alcohol. Anatomically, such infant animals appear in every way to be normal. However, when tested at various stages in later life, it becomes obvious that their learning ability is impaired. Mice experiments just mentioned offer persuasive evidence that the degree of impairment appears to correlate with the amount of alcohol that the mother ingests. It ranges from slight to marked impairment in the ability to learn as demonstrated in such standard tests as shock avoidance, maze running, and complex tasks of adaption experiments that are well characterized in rats. This evidence should be a solemn warning to the seven out of ten women who are not alcoholics but who have a drink or two each day.

Animal experiments using miniature swine who ingest alcohol readily with food, and who are also fecund, have also produced interesting results. From such models important pieces of information have been gleaned. For example, alcohol-drinking sows reproduce more frequently. And, as is now to be expected, their offspring are more severely affected with FAS. In one experiment with miniature pigs, one out of four animals in the first litter was severely deformed. In the second litter three out of five pigs showed FAS. In this model, at least, there is a clear dose response, a curve that demonstrates a direct relationship between the amount of alcohol ingested and the severity of the damage to the offspring. Figure 1 summarizes these ideas.

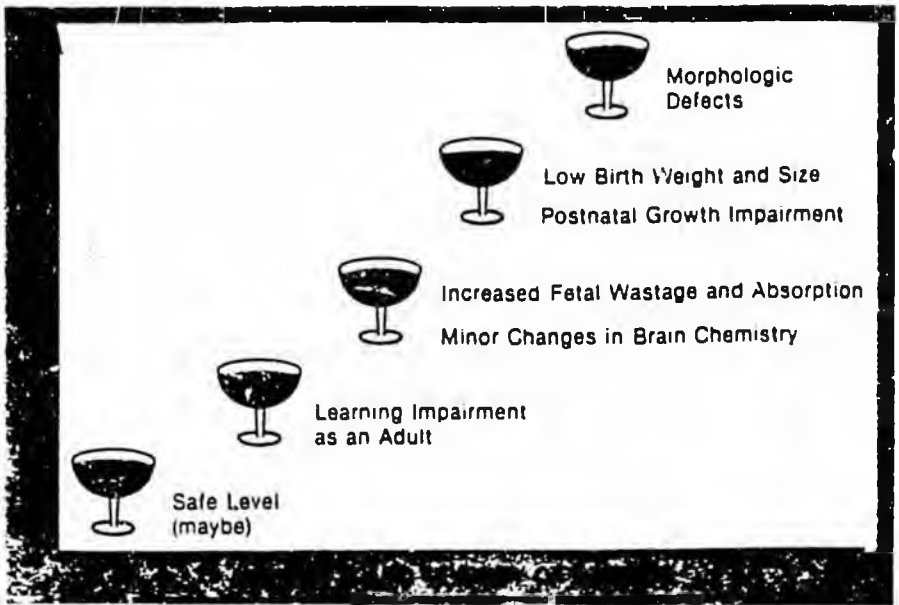


Figure 2. Incidence of the full fetal alcohol syndrome for each 1,000 live births in America

EFFECTS OF FAS

FAS in its most exquisite, full-blown development is revealed in a child by numerous defects in cranio-facial development, in prenatal and postnatal growth, and mental insufficiency. None of these defects correct themselves as the child grows older. Table 1 lists these major features.

This is the type of infant that is frequently born to women who, careful interrogation reveals, admit to having five or more drinks a day (i.e., 60 grams or more of alcohol) throughout pregnancy.

In twins born to alcoholic women some curious inconsistencies have been noticed. For example, three pairs of fraternal twins (those from separate eggs) have been observed in which one twin exhibited all of the physical deformities of the syndrome while the other twin was apparently normal. We do not know whether the second twin showed decreased mental acuity in later life. This suggests that the genetic susceptibility may be important. Otherwise at the present state of our knowledge this inconsistency defies explanation.

The only known affected identical twins, which is to say those from one egg, were equally deformed.

We do not yet know how prevalent the FAS is in America (fig. 2). The main reason is that recognition of the existence of the syndrome is so new that not all physicians have had time to become experienced in recognizing its signs and symptoms. In Seattle, where the syndrome was first defined, and pediatricians have been alert for the longest time, it is estimated that approximately one child is born with FAS in each nine hundred live births. Similar observations in New York City indicate that the incidence is one in each four hundred births. The data suggests that FAS occurs about as frequently as the trisomy 21 Down's Syndrome. Given the fact that it most usually causes mental impairment, the prevalence of FAS may make it the most common birth defect of which we are currently aware. For example, of over eighteen women in Brooklyn, New York, who were identified as having been heavy drinkers during pregnancy, twelve

TABLE 1

Major Features of Fetal Alcohol Syndrome Observed in 245 Advanced Cases

FEATURE	MANIFESTATION	
	Present in over 80% of patients	Present in 50% of patients
Brain injury		
Intellectual	Clear mental retardation	
Neurological	Too small head (microcephaly)	Poor coordination Hypotonia
Behavioral	Irritable in infancy	Hyperactive in childhood
Growth impairment		
Prenatal	Significant reduction in weight and height	
Postnatal	Significant reduction in weight and height	Disproportionately decreased fat stores
Facial Characteristics		
Head circumference	Too small	
Eyes	Short palpebral fissure	
Nose	Hypoplastic philtrum	
Maxilla		Short upturned Hypoplastic
Mouth	Thinned upper vermilion Retrognathia in infancy	Micrognathia or prognathia in adolescence

FROM REF. 9

gave birth to FAS damaged babies. Five of these babies had every one of the deformities of the head and face (i.e., the full syndrome). In other studies of alcoholic mothers from two and one-half to nine percent produced babies with full FAS. From thirty-three to thirty-eight percent produced babies with some of the minor abnormalities. In both such studies, however, mothers who were not alcoholics had less than ten percent of even the minor abnormalities. Thus various studies show that three to twenty-nine percent of the children born to mothers who drink heavily during pregnancy have full FAS, and at least one out of three of the babies in all of these studies have minor congenital abnormalities. Careful mental testing of such children at one year of age would probably lead to the recognition of brain damage in even more children. No doubt in later life an additional group would exhibit learning impairments which are of course difficult if not impossible to detect in the newborn.

The basis of the evidence in these studies that have just been described is the result of interviews where mothers were asked about their alcohol intake. It is not surprising that these women are reluctant to admit to drinking; nevertheless, one of every three women interviewed has been recorded as a moderate drinker. Mothers of deformed infants naturally loathe to admit that their weakness as manifested by drinking might be responsible for the deformities of their child. No study has yet overcome this problem.

Complex epidemiological studies of pregnant women enrolled in prepaid medical care plans, who were followed regularly with self-administered or volunteer-administered questionnaires about their drinking and smoking habits, indicate that spontaneous abortion is also higher in women who take more than two alcoholic drinks a day, as compared to those who respond that they do not drink. The risk to the child of a woman who drinks only once in a while and who then goes on a one night spree, by exposing the fetus at, say, a critical stage of brain development, is not fully considered in most studies, which speak of only average intake. Thus, the full FAS which occurs most frequently in the offspring of alcoholic women who have five or more drinks a day is only the tip of the iceburg of fetal alcohol damage.

Alcoholic women, like alcoholic men, frequently abuse the use of other toxic substances that can affect the fetus. They take more drugs, such as tranquilizers, drink more coffee, and smoke more cigarettes than do other people. They usually consume an unbalanced diet, and have been noted to be deficient in vitamins, minerals, and protein. For this reason the human data relevant to the damaged

PHOTOS COURTESY A. P. STREISSGUTH M.D.

The fetal alcohol syndrome is no respecter of age. Here is the same child at birth (left), at 8 months (center), and at 4½ years of age (right). This child's IQ was from 40 to 45 at each evaluation from 8 months on

viewed with skepticism by many observers when it was first reported. However, the peculiar combination of abnormalities of prenatal and postnatal growth and mental retardation, along with the highly specific animal data, lend strong support to the hypothesis that the FAS is indeed a well defined syndrome that is due directly to alcohol consumption. Epidemiologic investigations about the use of nicotine, caffeine, tranquilizers such as diazepam (Valium), and malnutrition fail to reveal the pattern of FAS when alcohol is not involved.

The original report of FAS by Dr. Smith in 1973 was followed in the short period of three years by the identification of forty-one such affected children in the Seattle area alone. By 1978, five years after the first report, eighty-five children were observed and identified in the university city of Tuebingen, Germany. More than three hundred such affected children have been reported from the major alcohol-using countries of the world. As more nurses, physicians, teachers, and the public become aware of what to look for, we expect that the incidence of recognition will soar. It is now estimated that in the western world throughout which the pattern of alcohol consumption by women is fairly uniform, and where it can be said that the incidence of alcoholism in women is about the same, of every thousand live births one or two will exhibit the full syndrome. Some evidence of the syndrome will be seen in as many as six of every thousand children. There has not yet been time to learn how many children will show some mental retardation in later life because their mothers drink. If the rate is, let's say, only two FAS babies per thousand live births in the United States and Canada, then the number of children so affected is very great. It means that in the United States alone there are at least twelve thousand

PHOTOS COURTESY A. P. STREISSGUTH M.D.

The fetal alcohol syndrome is no respecter of

A characteristic feature of FAS is a smaller head circumference (sketch) than usual (outline)

children born each year with an anatomical and mental deformity and that twelve hundred such babies enter Canadian society each year.

Like all other substances that cause the birth of physically and mentally abnormal offspring, the effect of alcohol is varied by a combination of genetic susceptibility, maternal nutrition or malnutrition, and the intensity of the insult to which the fetus is subjected. As has been said earlier, with only one or two exceptions the advanced syndrome *appears* to occur only in mothers who consume a reasonably large amount of alcohol daily throughout pregnancy or who, from time to time, go on binges of extreme consumption. The mean intake of seventy-two grams of ethyl alcohol daily for those mothers in whom this intake can be measured reveals just how heavily they do drink. In some other studies, the complete syndrome has been noted in those who have four or five drinks a day and average at least forty-five drinks a month. These data should be no comfort to the woman who may have three or four drinks in one evening while she is pregnant and then no more for a day or two, because no data yet exists that indicates a safe level of alcohol consumption during pregnancy. It is quite clear from the animal data measuring impaired learning, and in laboratory species that have been observed, that injury occurs even when lesser amounts of alcohol are consumed than those needed to produce the anatomical deformities of the head and face.

The syndrome in its full blown form has major elements that are easily observed and can be set forth in the accompanying figures and charts. To meet these requirements there must be present elements of brain injury traceable to deficiency in intellectual and neurological growth. These are clearly apparent at age one and thereafter, but are not perceptible in the first year of life. Even at birth, however, it is easy to see that the child with FAS is too small, is not long enough, nor does it weigh enough for an estimated gestational age.

The circumference of its head is even smaller than it should be for the reduced size. These are impairments that remain throughout life. There is no such thing as the FAS child catching up.

This is a teaching aid article. Price and delivery dates are available on request. For institutions and anti-alcohol programs, bulk prices will be available at a discount. Ordering information will be ready by January 1, for delivery after February 1.

Figure three shows a weight and height graph for the syndrome with data obtained during the first year of life in several of these children. In contrast to most other forms of low birth weight and height there is no postnatal catch-up growth. These infants are repeatedly evaluated for failure to thrive and at all times in subsequent growth they remain more than 2SD below the average, with weight usually being more severely impaired. The impaired adipose tissue deposits results in these children remaining skinny. Most studies of the reasons for the impaired size is a prenatal insult to cell proliferation leading to diminished numbers of fetal cells.

The best known symptoms of FAS are the abnormal features one can observe in the face (table 1). They are best understood by postulating that the brain and the part of the face dependent upon a brain of normal size just did not develop adequately to fill out the face. The eyes are too close together. There is the fold that covers the inner corner of each eye, a phenomenon that is normal in

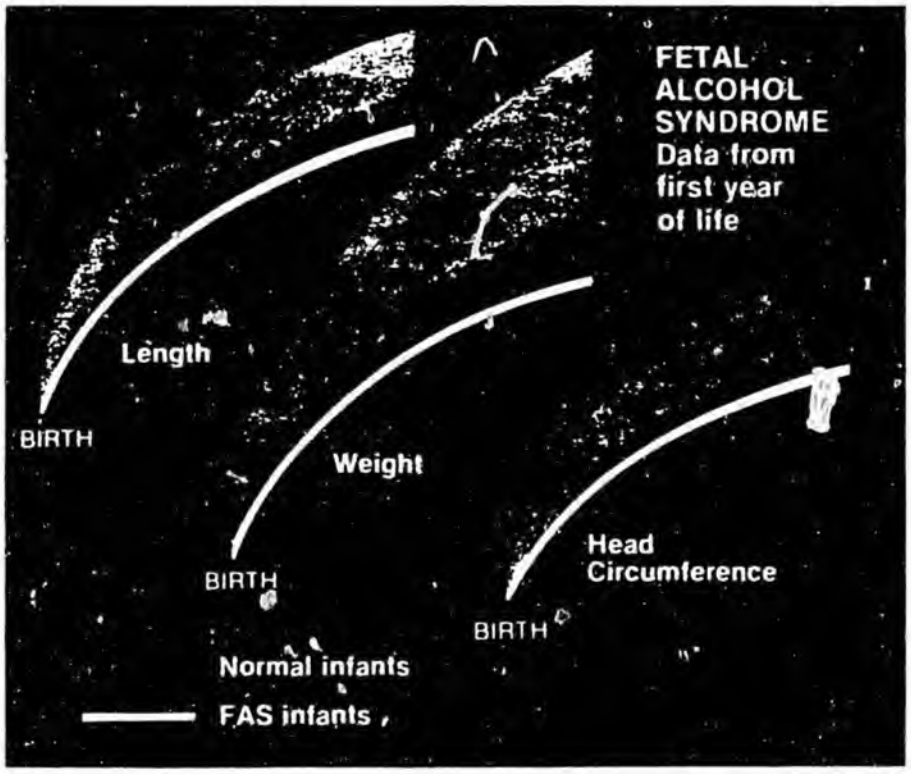
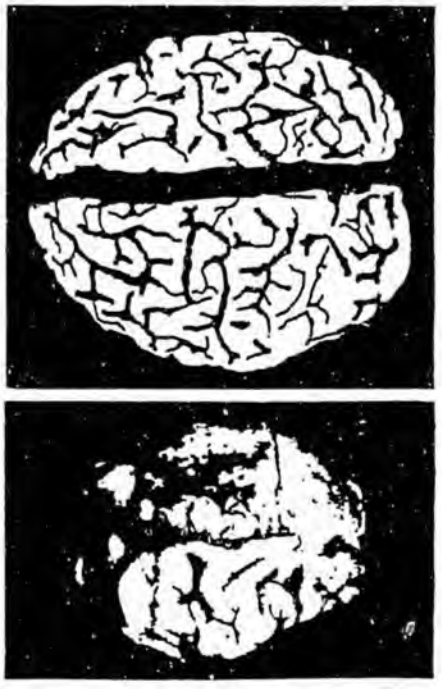


Figure 3. Growth Chart

PHOTO COURTESY S. K. CLARREN, M.D.



Compare the size of the brain of a normal newborn infant with that of an infant with FAS who died five days after birth (lower specimen). The affected brain exhibits a gyral pattern obscured by a leptomeningeal neuroglial heterotopia.

PHOTO COURTESY HEW

The anatomical defects of fetal alcohol syndrome last a lifetime, as shown by this patient who is seventeen years old.

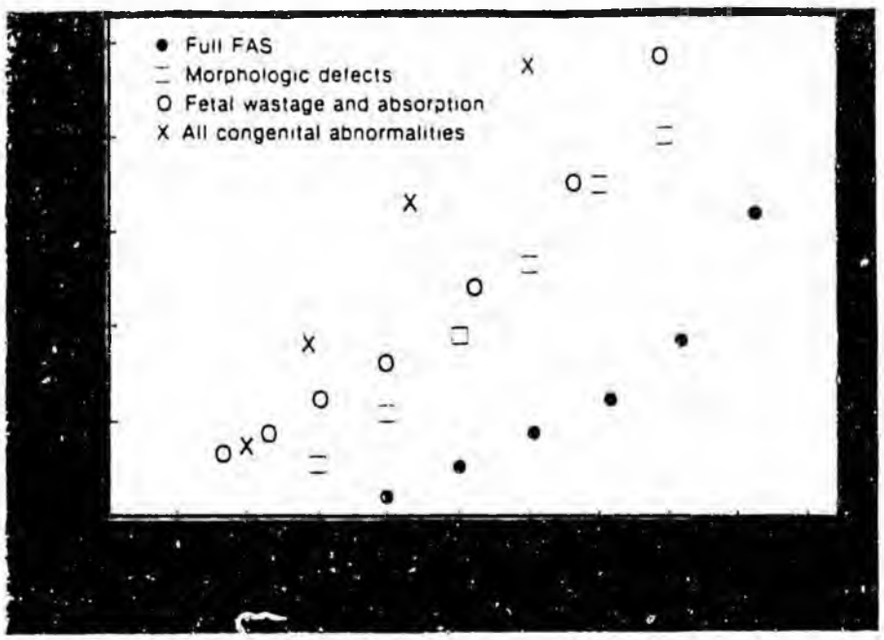


Figure 4. Probable relationship of daily alcohol consumption during pregnancy to the occurence of birth defects.

people of the mongoloid race (and for what reason we do not know). There is virtually no bridge to the nose just before the forehead and the organ itself sits too close to the upper lip. The normal pair of ridges divided by a small valley that extends from the bottom of the nostril septum to the upper lip is absent, and there is a turned upper vermilioned border.

The syndrome is now well characterized in an accumulation of reports that have appeared in the world's literature (table 1).

Studies comparing the intelligence with the prominence of the facial characteristics within the group of fetal alcohol syndrome patients indicate clearly that the more severe the facial characteristics, the more severe the impairment of mental function suggesting that alcohol is responsible for both. A few careful autopsy studies of the brain structure in the fetal alcohol syndrome exist and the cortical cells of the cerebellum and the cerebrum show the most marked abnormalities.

Animal data supports these observations with the findings of cerebral cortical developmental and myelination changes in the fetus exposed to alcohol.

In addition to the facial characteristics noted in the patient illustration and in figure 1 there are many others that are frequent, but a little less common. In the eyes, ptosis, strabismus, and epicanthal folds over the inner angle of the eye are often seen; myopia is a bit rarer. Both posterior rotation and poorly formed ears are seen. In the mouth prominent lateral palatine ridges, cleft lip, cleft palate, and small teeth with faulty enamel are observed. Atrial and ventricular septal defects in the heart have been observed. There are aberrant palmar creases, pectus excavatum, and many other hypoplastic bone and joint abnormalities. Available follow-up studies indicate that the abnormalities are permanent; there is little evidence that the child grows out of it or overcomes the defect.

SAFE CONSUMPTION?

The question is frequently asked, "What is a safe level for alcohol consumption in the pregnant woman?" The most conservative answer is that the thoughtful women contemplating pregnancy would avoid all alcohol from the time of conception until the child is born. The hardest scientific data on the striking structural changes that make up the clear facial characteristics of the fetal alcohol syndrome is that four or five drinks daily should be avoided to possibly forgo the full blown syndrome. The available animal data indicates clearly that one-fifth of the level of alcohol needed to produce major morphological changes will surely produce learning impairment in adults born of alcoholic dams even though they are morphologically normal. Under this circumstance, any alcohol amount approaching one drink each day of pregnancy is of the magnitude to produce this form of damage. The prudent conclusion is that alcohol is undesirable during pregnancy.

It seems clear that the unborn child has the most sensitive of all tissues to alcohol injury. In adults, fifty grams of alcohol per day seems capable of producing liver damage if utilized over many years; lesser amounts of alcohol seem safe. In contrast, half this amount of alcohol to the pregnant woman taken through pregnancy will produce mental changes in the newborn. These ideas are summarized in figure 4.

The fetal alcohol syndrome is emerging as the most prevalent single cause of mental impairment in the Western world. Many exciting programs to recognize drinking in obstetrics and gynecology practices, to educate mothers-to-be of this hazard, and possibly even to label this hazard on alcoholic beverages are under discussion. This syndrome now clearly described in its advanced form will shortly enter the prevention phase. We all await – what really works.

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The thanks of everyone, everywhere, should go to Dr. David Smith for his perception in being the first to make us all aware of the signs and symptoms of the fetal alcohol syndrome. – Ed.