Fetal Alcohol Syndrome

Fetal Alcohol Syndrome (FAS) and Fetal Alcohol Effects (FAE) refer to a group of physical and mental birth defects resulting from prenatal exposure to alcohol. FAS is the leading known 100% preventable cause of mental retardation and birth defects. Alcohol consumption during pregnancy can result in spontaneous abortion, organ dysfunction, growth deficiencies before and after birth, central nervous system dysfunction resulting in learning disabilities and lower IQ, and physical malformations in the face and cranial areas. In addition, children may also experience both behavioral and mental problems, which progress into adulthood (NOFAS, 2001). Pictures of children with FAS are pasted below. More information these children can be obtained by clicking on each picture.

Children with FAS

The diagnosis of FAS is based on four criteria: prenatal alcohol exposure (confirmed and unconfirmed), growth retardation, facial characteristics, and neurodevelopmental problems (Stratton et. al, 1996). Some children who are adversely affected by maternal alcohol use do not meet all four of these criteria. These children may have an isolated physical abnormality and be classified as having an alcohol-related birth defect (ARBD) (Walsh, 1997). Other children may have neurodevelopmental abnormalities, such as problems with cognitive development (intelligence, communication skills, memory, and learning ability), visual/spatial skills, and motor development. These children are classified as having an alcohol-related neurodevelopmental disorder (ARND). The term

"Fetal Alcohol Effects" has been replaced by terms ARBD and ARND in medical practice, although FAE still appears in educational and research materials.

Babies affected by alcohol can exhibit one or several of the alcohol related birth defects and neurodevelopmental disorders. FAS and ARBD/ARND are widely under-diagnosed. Some experts believe that between 1/3 and 2/3 of all special education children have been irreversibly affected by alcohol in some way. At least 5,000 infants are born each year with FAS; another 50,000 children show symptoms of ARBD/ARND (National Clearinghouse for Alcohol and Drug Information, 2000).

SCREENING

One of the major concerns with FAS, ARND and ARBD is that physicians have not been proficient in recognizing and treating substance-abusing women, and their sensitivity to issues related to this population. A national panel convened by the Josiah Macy Jr. Foundation found that most doctors do not even try to identify problems by asking patients questions about alcohol and drug habits, and do not know how to respond if they do find evidence of abuse or dependency. This panel called for an increase in mandatory training on substance abuse for medical residents as the first step toward improving treatment. One study in four U.S. Southern communities found only 65% of women were asked by a physician or nurse about alcohol or drug use during their most recent pregnancy (Geshan 1993). Further, although most of the women who were asked acknowledged substance use or abuse, only 3% were referred to treatment

One study used multiple logistic models to identify characteristics of pregnant women who are at an increased risk for alcohol use. They found that pregnant women who had a high risk for alcohol use were college educated, had annual household incomes of $50,000 or more, were unmarried, employed, or students, or smokers (Ebrahim et al. 1998). Those at high risk for consuming alcohol frequently were more likely to be smokers or unmarried.

When a pregnant woman drinks alcohol, it rapidly crosses the placenta, and enters the baby's blood stream. The brain and central nervous system of the unborn child are especially sensitive to alcohol. In the unborn baby's immature body, alcohol is broken down much more slowly than in an adult's body. As a result, blood alcohol levels are even higher and remain elevated longer than in the mother's blood. This can cause the baby to suffer lifelong damage. In 1993, American women aged 15-44 made over 52 million visits to obstetrician-gynecologists. With more than 4 million deliveries a year and with several visits for each pregnancy, a substantial number of those contacts were prenatal. These prenatal visits provide a unique opportunity for clinical intervention for physicians because approximately 760,000 of the 4 million women who give birth each year drink alcohol, 820,000 smoke cigarettes, and 500,000 use illicit drugs during pregnancy (Reid, 1996). Early diagnosis is important in preventing secondary disabilities and in identifying women that may be at risk of having another child with FAS (Barr and Streissguth 2001 and Burd et al. 2000).

The American Academy of Pediatrics recommends that discussions about substance

abuse be a part of routine health care starting with the first prenatal visit (1998). Yet, in one recent survey, only 1% of OB/GYN physicians reported asking about alcohol use at every prenatal visit (Diekman 2000).

Despite attempts to increase public awareness of risks involved, increasing numbers of women are drinking during pregnancy (Ebrahim et.al. 1996). The National Household Survey on Drug Abuse reported in 2001 that 12.4% of pregnant women aged 15-44 years used alcohol and 3.9 percent were binge drinkers, despite recommendations for abstinence (SAHMSA 2001).

One method of assuring that substance use by pregnant women is properly identified is to utilize a brief and effective prenatal screening questionnaire that would be standard for the first visit by all pregnant women reporting to their OB-GYN. In the cases where substance use is identified, clinicians would be able to counsel and manage the health problem. It is essential that physicians maintain a proactive role in identifying substance use during pregnancy. Because there is no established safe amount of alcohol that can be consumed during pregnancy, prevention is key. There is no cure for FAS or ARBD/ARND. Once the damage is done, it cannot be undone; however, FAS is the only cause of birth defects that can be completely prevented (NIAAA, 1999a). Future cases of FAS and other alcohol related defects and disorders are unlikely to be prevented if women are not screened and cases are not identified. The risk of having a child with FAS for each pregnancy is 75% among women who have already had a child with FAS (Burd et al .2000).

PREVENTION

It is very important that medical students and physicians develop the knowledge, skills, and attitudes required to deal with a problem of this magnitude. Increased emphasis on substance use and abuse in medical school curriculums help to increase physicians' comfort level with addressing substance use with pregnant women. However, required number of hours of training in substance abuse issues in residency training programs remains very low (Isaacson 2000). Among physicians, psychiatrist report receiving the most training and OB/GYN's the least, with a mean of 40 hours and 10 hours reported, respectively (Friedman, 2000).

In a recent study, researchers found that of the obstetrical textbooks published in the last two decades, only 17% of the texts contained a consistent recommendation that pregnant women should not drink alcohol. (Loop et al, 2002) Not only is training of health care providers an important step, but also broader community education is vital. Many women do not receive adequate prenatal and antenatal care. The key to prevention of FAS is to screen all women of childbearing age for alcohol use to identify those at risk and then to use appropriate counseling techniques to reduce or eliminate drinking before conception.

Because more than 50 percent of pregnancies are unplanned or unintended at the time of conception, it's important that this message is not only relayed to expectant mothers, but also women of childbearing potential. During the first few weeks of pregnancy, a woman may not know that she is pregnant and may drink alcohol during the onset of gestation. For that reason, it is important that women of child bearing potential be careful of their

alcohol intake. (NIAAA, 1999b)

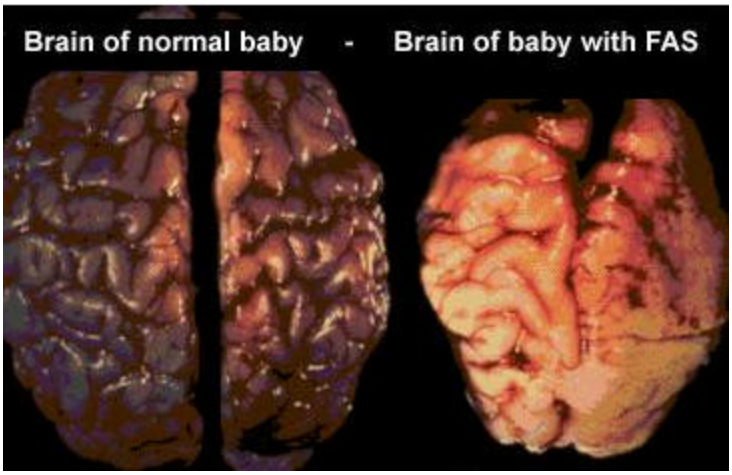
Moderate drinking for non-pregnant women is defined as no more than 1 drink per day (12oz. beer, 5oz. wine, 1.5oz. of distilled spirits). The National Institute on Alcohol Abuse and Alcoholism provides guidelines for identification and treatment of women who drink above recommended limits (1999b).

STEP I the physician should ask about alcohol use: frequency, binge use, tolerance, family concerns. If consumption is > 7 drinks per week or > 3 per occasion, then **STEP II** would follow. This step assesses for alcohol related problems: medical, behavioral, withdrawal, employment, accidents, legal and family concerns. **STEP III** involves advising appropriate action: relating health problems to alcohol use, discussing risks during pregnancy, engaging patient in process, providing educational materials outlining healthy choices, establishing goals to reduce or alleviate drinking and referring patient to specialized treatment, if needed. At this stage of the process, physicians should be able to identify alcohol dependence vs. at risk/problem drinking. Those found to be alcohol dependent should be: advised to abstain, referred to specialist and offered additional resources. For those found to be at-risk/problem: advise to cut down, establish drinking goal, advise pregnant women to abstain, as well as offer additional resources. **STEP IV**: Follow Patient Progress. Following this guide has been found to reduce alcohol use in women by 20-30 percent (NIAAA, 1999b).

ALCOHOL AND THE DEVELOPING BRAIN

Alcohol is a teratogen and is toxic to a baby's developing brain. Damage can occur in

various regions of the brain. The picture below presents a side-by-side comparison of a normal brain at six weeks old and the brain of a baby with FAS at six weeks old. The areas affected by alcohol exposure depend on which areas are developing at the time the alcohol is consumed. Since the brain and the central nervous system are developing throughout the entire pregnancy, the baby's brain is always vulnerable to damage from alcohol exposure.



Not all damage from alcohol exposure is seen on brain scans, as damage can cause lesions too small to be detected, yet large enough to cause significant disabilities.

ALCOHOL EXPOSURE DURING STAGES OF PREGNANCY

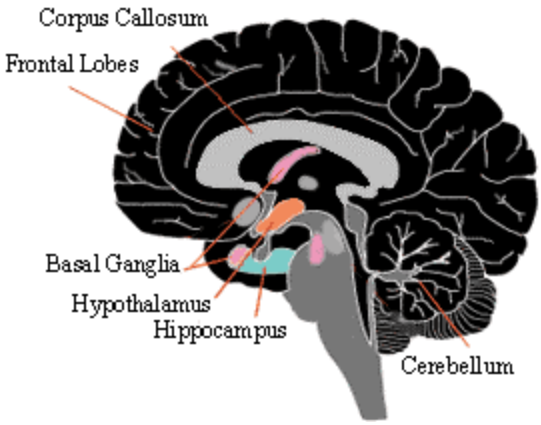
During the first trimester, alcohol interferes with the migration and organization of brain cells (Clarren and Streissguth 1978). The fetus is most susceptible to the teratogenic effects of alcohol (or any other teratogenic substance) during organogenesis in the first trimester. (Windham et al, 1997) Human studies have suggested that alcohol may increase the risk of spontaneous abortion in the first trimester but not in the second.

(Kesmodel 2000).

Heavy drinking during the second trimester, particularly from the 10th to 20th week after conception, seems to cause more clinical features of FAS than at other times during pregnancy.

During the third trimester, according to Dr. Claire D. Coles, the hippocampus is greatly affected, which leads to problems with encoding visual and auditory information (reading and math). (N & T, 1991) It has been recently shown that alcohol intake in the third trimester seems to be of far more importance in relation to pre-term delivery than intake in the second trimester (Kesmodel et al. 2000).

The regions of the brain that might be affected by prenatal alcohol exposure in terms of ability to function include:



Corpus Callosum - a band of nerve fibers that forms the major communication link between the right and left halves of the brain. Prenatal alcohol exposure is the most common cause of impaired development or complete absence of the corpus callosum, Approximately 7 percent of children with FAS may lack a corpus callosum, an incidence 20 times higher than that in the general

population. (Riley et al, 1995)

Hippocampus - plays an important role in memory.

Hypothalamus - controls emotions, appetite, pain sensation, and temperature.

Cerebellum - controls behavior and memory, coordination and movement.

Basal Ganglia - affects spatial memory, behaviors like perseveration, and the ability to switch modes, work toward goals, predict behavioral outcomes, affects time perception.

Frontal Lobes - controls judgment and impulses. The most noteworthy damage to the brain probably occurs in the prefrontal cortex, which controls Executive Functions (Kellerman, 2002). See table.

Executive Functions	
Executive functions of the prefrontal cortex:	Effects of alcohol exposure on behaviors related to executive functions:
• inhibition • planning • time perception • internal ordering • working memory • self-monitoring • verbal self-regulation • motor control • regulation of emotion • motivation	• socially inappropriate behavior, as if inebriated • inability to apply consequences from past actions • difficulty with abstract concepts or time and money • like files out of order, difficulty processing info. • storing and/or retrieving information • needs frequent cues, requires "policing" by others • needs to talk to self out loud, needs feedback • fine motor skills more affected than gross motor • moody "roller coaster" emotions, exaggerated • apparent lack of remorse, need external motivators

(Source: http://www.come-over.to/FAS/FASbrain.htm)

Prenatal alcohol exposure can cause significant difficulties even in children without full FAS. Gusella and Fried found that even light drinking (average one-quarter ounce of absolute alcohol daily) can have adverse affects on the child's verbal language and comprehension skills (1984). Mattson and Riley report that children exposed to alcohol

but who do not have a diagnosis of FAS have many of the same neurological abnormalities as children who have been diagnosed with full FAS.

Alcohol exposure may damage some parts of the brain, while other parts appear unaffected. Some children will have neurological problems in just a few brain areas. The behavioral problems of children exposed to alcohol are often related to brain dysfunction. Attention problems often result from prenatal alcohol exposure. Often, FAS is misdiagnosed as attention deficit hyperactivity disorder (ADHD) and treated inappropriately. Coles and colleagues found that children with ADHD exhibited difficulty focusing and sustaining attention over time. In contrast, children who were exposed to alcohol prenatally were able to focus and maintain, but displayed difficulty in shifting attention from one task to another (Coles et al, 1997). Many children with FAS disorders have attachment issues, display inappropriate behaviors, have poor judgment, have difficulty controlling impulses, and are emotionally immature. Abuse and neglect can exacerbate behavior problems in FAS. Many FAS children will require close supervision for the rest of their lives.

ECONOMIC EFFECTS

Drinking while pregnant can cause far-reaching and costly problems. According to a U.S. government report, it costs taxpayers $2.1 billion to treat individuals with FAS disorders for just one year. The annual costs for special education and juvenile justice is and additional $1.2 billion per year for children with FAS and other alcohol related defects and disorders.

That actual lifetime costs for one particular child with FAS is almost five million dollars(Streissguth, 1996). This includes a per child cost of $1,496,000 for medical costs, $530,000 for psychiatric care, $354,000 for foster care, $12,000 for orthodontia, $6,000 for respite care, $240,000 for special education, $624,000 for supported employment, $360,000 for SSI, and $1,376,000 for residential placement. The $5 million figure does not include opportunity costs, which are probably considerable. Costs of residential care range from $2,000 per month for a group home to $4,500 per month for prison to $24,000 per month for psychiatric hospital care. (Streissguth, 1996) Studies show that 60% of individuals with FAS/ARND end up in an institution (mental health facility or prison). Social costs not analyzed here include the poor quality of life of the individual with FAS and lost income of the individual and of the stay-at-home caregiver. Most individuals with FAS have a lower IQ than normal, but not low enough to qualify for services for the disabled. However, only 10 percent of the individuals can achieve independence; most adults with FAS require long-term support with close supervision for the rest of their lives. (Kellerman, 2001)

Fetal Alcohol Syndrome is 100% preventable if a woman does not drink during pregnancy. The incidence of FAS can be reduced through education and intervention in a primary care setting. The key to prevention of FAS is to screen all women of childbearing age for alcohol use to identify those at risk and then to use appropriate counseling techniques to reduce or eliminate drinking before conception. It is also important that pregnant women are consistently and repeatedly advised not to drink

alcohol and that women who report drinking or problem drinking during pregnancy are offered brief intervention and treatment.

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Fetal Alcohol Syndrome (FAS) CME test

1. Which of the following statements about alcohol consumption during stages of pregnancy is NOT true?

a. There are no teratogenic effects of alcohol consumption in the first trimester of pregnancy.

b. Heavy drinking during the second trimester seems to cause more clinical features of FAS than at other times during pregnancy.

c. During the third trimester, the hippocampus is greatly affected, which leads to problems with encoding visual and auditory information (reading and math).

d. Alcohol intake in the third trimester seems to be of far more importance in relation to pre-term delivery than intake in the second trimester.

2. The diagnosis of Fetal Alcohol Syndrome is based on which criteria?

a. Prenatal Alcohol Exposure (confirmed and unconfirmed)
b. Growth Retardation
c. Facial Characteristics
d. Neurodevelopmental Problems
e. All of the Above

3. Birth Defects related to maternal alcohol abuse include all of the following EXCEPT:

a. Microcephaly
b. Small Palpebral Fissures
c. Small Ears
d. Flat Nasal Bridge

4. Approximately how many children are born each year with FAS?

a. 500
b. 50
c. 5,000
d. 50,000

5. Which statement best describes the difference between children prenatally- exposed to alcohol and those diagnosed with ADHD?

Children diagnosed with ADHD exhibit impulse control problems, where prenatally-exposed children do not.

Prenatally-exposed children score higher on aptitude test than do those diagnosed with ADHD.

Children with ADHD exhibit difficulty focusing and sustaining attention over time; In contrast, children who are exposed to alcohol prenatally are able to focus and maintain, but display difficulty in shifting attention from one task to another.

Children with ADHD outgrow their problems while children prenatally-exposed to alcohol do not.