Understanding Fetal Alcohol Syndrome and Fetal Alcohol Spectrum Disorders

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Learning objectives

- Define fetal alcohol syndrome and fetal alcohol spectrum disorders.
- List the prevalence of fetal alcohol syndrome and fetal alcohol spectrum disorders.
- List the risk factors for fetal alcohol syndrome and fetal alcohol spectrum disorders.
- Describe the characteristics of children with fetal alcohol syndrome and fetal alcohol spectrum disorders.
- Describe the mechanism(s) of action of alcohol on fetal development.
- Identify the continuum of effects from maternal prenatal consumption of alcohol.
- Identify the secondary conditions associated with fetal alcohol syndrome and fetal alcohol spectrum disorders.
- Describe the basics of identification, referral and diagnosis of fetal alcohol syndrome and fetal alcohol spectrum disorders.
- List the services appropriate for fetal alcohol spectrum disorders patients and their families.
- Identify the range of interventions and treatments available for individuals with FAS and FASDs.
- Describe the prevention of fetal alcohol spectrum disorders.

DEFINITIONS

Fetal alcohol syndrome

According to the Centers for Disease Control (CDC), one of the most severe effects of drinking during pregnancy is fetal alcohol syndrome (FAS). FAS is the leading known preventable cause of mental retardation and is one of the leading known preventable cause of birth defects. If a woman drinks alcohol during her pregnancy, her baby can be born with FAS, an incurable, lifelong condition that causes a variety of physical and mental disabilities.

FAS is characterized by:
- Abnormal facial features.
- Growth deficiencies.
- Central nervous system (CNS) problems.

People with FAS might have problems with:
- Learning.
- Memory.
- Attention span.
- Communication.
- Vision.
- Hearing.
- A combination of these.

These problems often lead to difficulties in school as well as problems getting along with others. FAS is a permanent condition with no known cure at present. FAS affects every aspect of an individual’s life and the lives of his or her family or caregivers.

Fetal alcohol spectrum disorders

The CDC also notes that prenatal exposure to alcohol can cause a range of disorders, known as fetal alcohol spectrum disorders (FASDs). Fetal alcohol spectrum disorders is an umbrella term describing the range of effects that can occur in an individual whose mother drank alcohol during pregnancy. These effects include physical, mental, behavioral and learning disabilities with possible lifelong implications.

The term FASDs is not intended for use as a clinical diagnosis. Neither fetal alcohol syndrome nor fetal alcohol spectrum disorders is listed in the American Psychiatric Associations Diagnostic and Statistical Manual – IV (DSM-IV-TR) and exists as an Axis III diagnosis for mental health professionals.

FASDs include FAS as well as other conditions in which individuals have some, but not all, of the clinical signs of FAS. Three terms most often used are fetal alcohol effects (FAE), alcohol-related neurodevelopmental disorder (ARND), and alcohol-related birth defects (ARBD). The term fetal alcohol effects has been used to describe behavioral and cognitive problems in children who were...
prenatally exposed to alcohol, but who do not have the
typical diagnostic features of fetal alcohol syndrome. In
1996, the Institute of Medicine replaced fetal alcohol effects
with the terms alcohol-related neurodevelopment disorder
and alcohol-related birth defects. Children with ARND
might have functional or mental problems linked to prenatal
alcohol exposure. These include behavioral or cognitive
abnormalities or a combination of both. They also might have
physical problems with the heart, kidneys, bones, and hearing.

All fetal alcohol spectrum disorders are 100 percent preventable
if a woman does not drink alcohol while she is pregnant.

Prevalence

The reported rates of FAS vary widely. These different rates
depend on the population studied and the surveillance methods
used. CDC studies show FAS rates ranging from 0.2 to 1.5 per
1,000 live births in different areas of the United States. Other
FASDs are believed to occur approximately three times as often
as FAS.

Other studies reflecting a variety of ascertainment
methodologies have produced estimates ranging from 0.5 to
2.0 cases per 1,000 live births. Such rates are comparable with
or are above other common developmental disabilities such
as Down syndrome or spina bifida. Using the CDC estimates,
among the approximately 4 million infants born each year, an
estimated 1,000 to 6,000 will be born with FAS. Studies of
particularly vulnerable populations yield prevalence estimates
that far exceed those of other common disabilities.

Some disadvantaged groups, Native Americans and other
minorities have been documented to have rates as high as three
to five children with fetal alcohol syndrome per 1,000 births.
Available data also suggests that poverty is strongly associated
with women’s alcohol use before and during pregnancy, leading
to an excess of children with FAS in impoverished groups.

The magnitude of the problem is even greater when the
risk of FAS is considered by looking at the rate of alcohol-
exposed pregnancies. In 1999, over half of all U.S. women
of childbearing age reported alcohol consumption in the
past month. The large majority of these women drank only
occasionally, but 15 percent could have been classified as
moderate or heavy drinkers. During that same period, 13
percent of women reported consuming five or more drinks on
one occasion (binge drinking) in the past month. Given that
nearly half of all U.S. pregnancies are unintended, and that
millions of fertile women are sexually active while not using
adequate contraception, it is estimated that 2 percent of women
could be at risk for an alcohol-exposed pregnancy annually.

More recently, higher rates have been found among subgroups
of women, such as those treated for alcohol and drug problems,
and women who have been incarcerated. Alcohol-related risk
factors include drinking during pregnancy, pattern of alcohol
use, alcohol dependence, use of multiple substances, having
had a previous alcohol-exposed pregnancy, and having a partner
or family member who drinks heavily. Women who receive
little or no prenatal care, are unemployed, are socially transient,
have lost children to foster or adoptive care because of neglect,
abuse, or abandonment are more likely to have high alcohol
use patterns that could affect a pregnancy. National survey data
indicate that, while the percentage of women who abstain from
alcohol use during pregnancy has increased slightly in recent
years, 13 percent of women continue to use alcohol during
pregnancy. Among pregnant women, approximately three
percent report binge drinking (i.e., five or more drinks on any
one occasion) or frequent drinking (i.e., seven or more drinks
per week or five or more drinks on any one occasion).

Clearly, current prevalence rates of affected individuals and
alcohol-exposed pregnancies indicate that the magnitude of the
problem of FAS is a significant public health concern. However,
because of the challenges of establishing accurate and timely
prevalence information, the magnitude could be even greater
than current data indicate.

Another set of statistics provided by The National Organization
on Fetal Alcohol Syndrome reports that FASD affects 1 in 100
live births or as many as 40,000 infants each year. Further, they
report that an individual with fetal alcohol syndrome can incur
a lifetime health cost of over $800,000 in present day dollars.
The latest data on fetal alcohol syndrome estimates the total
cost to the United States at $5.4 billion, with direct costs at $3.9
billion and indirect costs accounting for another $1.5 billion.
In Canada, the estimated costs of all FAS individuals currently
alive exceeds Canada’s national debt.

Risk factors

One common misconception is that FASD is associated with
certain ethnic, cultural, or racial backgrounds. Instead, available
data suggest that risk factors for prenatal alcohol exposure
include:
- Higher maternal age.
- Lower education level.
- Prenatal exposure to cocaine and smoking.
- Custody changes.
- Lower socioeconomic status.
- Paternal drinking and drug use at the time of pregnancy.
- Reduced access to prenatal and postnatal care and services.
- Inadequate nutrition and a poor developmental environment
  (e.g., stress, abuse, neglect).

In one study of birth mothers of children with full FAS, the
researchers found that the mothers came from diverse racial,
cultural, educational, and economic backgrounds. They were
often beset with untreated or undertreated behavioral health
concerns, were often socially isolated, were often victims of
physical or emotional abuse and they often had histories of
severe childhood sexual abuse.
The most important risk factor for development of FASD is related to:

- High blood-alcohol concentration.
- The timing of exposure during fetal development.
- The pattern of consumption, i.e., binge drinking (four or more drinks per occasion).
- The frequency of use.

Although, at present, there seems to be no definite threshold of exposure, there appears to be a dose-response relation. The greater amount of alcohol consumed during the course of a pregnancy, the higher the probability of the development of FASDs.

Below is a CDC chart showing patterns of binge drinking among children-bearing age women in the United States.

**Characteristics of children with FAS and other FASDs**

FAS is the severe-end of a spectrum of effects that can occur when a woman drinks during pregnancy. Fetal death is the most extreme outcome. FAS is a disorder characterized by abnormal facial features and growth and central nervous system (CNS) problems. The facial feature issue is due to the fact that alcohol is a mid-line teratogen. If a pregnant woman drinks alcohol but her child does not have all of the symptoms of FAS, it is possible that her child has another FASD, such as alcohol-related neurodevelopmental disorder (ARND). Children with ARND do not have full FAS but might demonstrate learning and behavioral problems caused by prenatal exposure to alcohol. Examples of these problems are difficulties with mathematical skills, difficulties with memory or attention, poor school performance, and poor impulse control and/or judgment.

Children with FASDs might have the following characteristics or exhibit the following behaviors:

- Small size for gestational age or small stature in relation to peers.
- Facial abnormalities such as small eye openings.
- Poor coordination.
- Hyperactive behavior.
- Learning disabilities.
- Developmental disabilities (e.g., speech and language delays).
- Mental retardation or low IQ.
- Problems with daily living.
- Poor reasoning and judgment skills.
- Sleep and sucking disturbances in infancy.

Children with FASDs are at risk for:

- Psychiatric problems.
- Criminal behavior.
- Unemployment.
- Incomplete education.

These are secondary conditions that an individual is not born with but might acquire as a result of FAS or a related disorder. These conditions can be very serious, but there are protective factors that have been found to help individuals with FASDs. For example, a child who is diagnosed early in life can be placed in appropriate educational classes and given access to social services that can help the child and his or her family.

Children with FASDs who receive special education are more likely to achieve their developmental and educational potential. In addition, children with FASDs need a loving, nurturing, and stable home life to avoid disruptions, transient lifestyles, or harmful relationships. Children with FASDs who live in abusive or unstable homes or who become involved in youth violence are much more likely than those who do not have such negative experiences to develop secondary conditions.
Mechanism of action of alcohol on fetal development

Alcohol is able to permeate the placenta and enter fetal circulatory system, thereby causing developmental abnormalities. Ethanol impairs placental blood flow to the fetus by constricting blood vessels which is known to induce hypoxia and fetal malnutrition. Alcohol rapidly crosses the placenta and blood-brain barrier of the fetus. The damage produced depends on gestational period, dosage, and chronicity of abuse. There are many proposed, but not yet proven, mechanisms of ethanol. These include altered neural crest cell migration and increased neural crest cell death or general cell death by superoxide radial lysis of cells and mitochondrial cell dysfunction. These in turn, may inhibit growth factors regulating cell proliferation and survival; effect glial cells, development of neurotransmitter systems and cell adhesion; and alter development regulation of gene expression. (Department of Environmental and Public Health, University of Wisconsin at Eau Claire)

Continuum of effects that can result from maternal prenatal consumption of alcohol

Most certainly, the single most common effect seen from fetal alcohol exposure is an increase in spontaneous abortions, commonly known as miscarriages. Babies can also be born at low birth weight, birth length, and with a small head circumference resulting from prenatal alcohol exposure. Some of the other effects caused by maternal drinking range from an increase in the number of stillbirths, decreased apgar scores at birth, an increase in the number of birth defects, increased developmental delays, decreased IQ scores, to fetal alcohol syndrome and an increased death rate. (Creative Consultants Inc.)

The presence of birth defects is dependent on:
- Dosage (how much is used).
- Timing of exposure (when is it used?).
- Individual factors of mother and child.
- Genetic factors.
- Nutritional factors.
- Metabolic factors.

As reported earlier, alcohol is a teratogen, as are a number of other things including, crack cocaine, heroin, X-rays, etc. The dosage of the exposure to a teratogen is important. Usually, the less exposure, the better off the fetus will be in the long term. The timing of the teratogenic exposure is of vital importance. Prenatal exposure to alcohol causes different problems at different times, dependent strictly upon the timing of the exposure.

The individual factors of the mother and exposed fetus are also important and one of the reasons why researchers have not been able to determine when and how much would be safe to drink. Since these individual factors cannot be determined, the only way to prevent FAS and other FASDs is for a pregnant woman to abstain from the use of all alcoholic beverages during her pregnancy.

Secondary conditions associated with FAS
The CDC has noted a number of secondary conditions that have been found to be associated with FAS:

Mental health problems
Several studies have shown an increased risk for cognitive disorders, psychiatric illness, or psychological dysfunction among individuals with FAS. The most frequently diagnosed disorders are:
- Attention problems (including attention deficit/hyperactivity disorder (ADHD).
- Conduct disorder.
- Alcohol or drug dependence.
- Depression.
- Psychotic episodes.

Other psychiatric problems, such as anxiety disorders, eating disorders, and post traumatic stress disorder, have also been reported for some patients.

Disrupted school experience
Children with FAS are more likely than most children to be suspended, expelled or drop out of school. Difficulty getting along with other children, poor relationships with teachers and truancy are some of the reasons that lead to their removal from the school setting. Many children with FAS remain in school but have negative experiences because of their behavioral challenges. As with many of the behavioral issues associated with FASD, prenatal exposure to alcohol is believed to disrupt proper development of the executive functioning in children.

Trouble with the law
Teenagers and adults with FAS are more likely than those who do not have FAS to have interactions with police, authorities, or the judicial system. Difficulty controlling anger and frustration combined with problems understanding the motives of others result in many individuals with FAS being involved in violent or explosive situations. People with FAS can be very easy to persuade and manipulate, which can lead to their taking part in illegal acts without being aware of it.
Inappropriate sexual behavior
Individuals with FAS are more likely than individuals who do not have FAS to exhibit inappropriate sexual behavior, such as inappropriate advances and inappropriate touching. Being a victim of violence increases the risk of participating in sexually inappropriate behavior.

Alcohol and drug problems
Studies suggest that more than a third of individuals with FAS have had problems with alcohol or drugs, with more than half of those requiring some form of inpatient treatment.

Dependent living and problems with employment over age 21
Adults with FAS generally have difficulty sustaining employment or living independently as productive members of their communities.

Identification, Referral, and Diagnosis

Initial identification
Initial recognition that a child or older individual has a potential problem can come from many sources. Often, parents notice differences between a child and his or her siblings. School systems, including Head Start and day care staff, interact with a large number of children and often recognize when someone is having difficulty. Social service professionals, such as WIC clinic staff, social workers, and foster care agencies frequently recognize children and individuals having difficulty and needing evaluation. And finally, health care providers (particularly pediatricians) often are the first to screen for and detect problems. Obstetricians, who might be aware of a maternal substance abuse problem, might refer a newborn.

Recognition of many of the problems associated with FAS, such as facial abnormalities, growth delay, developmental differences between a child and his or her siblings. It is assumed that triggers, such as maternal alcohol use will emerge from the contact. Recognition of a potential problem should lead the provider, regardless of specific profession, to facilitate getting the person and his or her family to the appropriate next step.

Referral
The referral process is initiated at the point a clinician starts to have suspicions of an alcohol-related disorder for a child. This process is facilitated by thorough knowledge of the physical and neurodevelopmental domains affected in individuals with FAS, as well as characteristics that could trigger a referral. In making a referral for a complete diagnostic evaluation for FAS, it is helpful for the referring provider to gather and document specific data related to the FAS criteria. These data will assist the provider in making the decision to diagnose the child or to refer the child to a multidisciplinary evaluation team for a confirmed diagnosis. In addition, these data could be forwarded to the multidisciplinary evaluation team to guide the diagnostic process. A complete review of systems, noting features consistent with FAS, would be most productive.

Diagnosis
At this stage, the child would be presented to a multidisciplinary team who would engage in a more thorough assessment of the child using FAS diagnostic procedures to evaluate dysmorphia and growth parameters, as well as obtain appropriate neurodevelopmental evaluation data. Once a diagnosis is made, an intervention plan would be developed using a multidisciplinary team approach. A variety of specialists could contribute to the multidisciplinary team, including dysmorphologists, developmental pediatricians, psychiatrists, psychologists, social workers and educational specialists. Other clinicians, such as pediatricians and family practitioners, also might make the FAS diagnosis, with appropriate training in use of these guidelines. In many rural and less populated regions, these clinicians must make the diagnosis for many types of birth defects and developmental disabilities. Many of these evaluation services are available within the community setting; for example school systems could provide neurocognitive assessments.

Counselor issues related to initial identification and referral
Counselors are often reluctant to explore issues related to prenatal exposure to alcohol, especially with biological mothers and other family members. They may be fearful of the reaction they will get or fear that the child’s historian will not be willing to provide accurate information regarding fetal exposure to alcohol. Mental health professionals may have to work with a
mother’s denial and shame over having possibly caused harm to their child. To get an accurate history the counselor must be able to suspend judgment and provide a safe place for the mother/caregiver/historian to provide important details.

Another issue that can keep counselors from diagnosing a child with FAS or one of the FASDs is the fear that they will “label”

**Diagnostic categories**

The diagnosis is based, largely, on maternal history of alcohol consumption during pregnancy, abnormalities involving facial features, growth deficiency and central nervous system dysfunction. The Institute of Medicine developed the following criteria to diagnose fetal alcohol related problems.

1. **FAS with confirmed maternal alcohol exposure:**
   - Patients in this category have the classic triad of growth retardation, characteristic facial dysmorphology and neurodevelopmental abnormalities. This is often defined as full-blown FAS.

2. **FAS without confirmed maternal alcohol exposure:**
   - If the triad described in category 1 is present, a diagnosis of FAS is possible even without confirmed maternal drinking.

3. **Partial FAS with confirmed maternal alcohol exposure:**
   - Such patients may have only some of the characteristic facial anomalies plus growth retardation or central nervous system neurodevelopmental abnormalities or behavioral/cognitive abnormalities.

4. **FAS with confirmed maternal alcohol exposure and alcohol related birth defects:**
   - Patients in this category will have some congenital anomalies as a result of alcohol toxicity.

5. **FAS with confirmed maternal alcohol exposure and alcohol related neurodevelopmental disorder:**
   - Patients in this category will have evidence of central nervous system neurodevelopmental abnormalities or a complex pattern of behavioral/cognitive abnormalities, or both, but not necessarily any obvious physical changes.

**DIAGNOSTIC CRITERIA**

**Dysmorphia**

Human congenital malformations are referred to as dysmorphic features or dysmorphia. The CDC notes that dysmorphia occurs when normal morphogenesis is interrupted, creating a particular feature which is shaped, sized or positioned outside the normal range of development. Alcohol is a mid-line teratogen that often results in dysmorphia through interference with nerve cell development and functioning, alterations in the ability of cells to grow and survive, increased formation of cell-damaging free radicals, altered pathways of biochemical signals within cells, and altered expression of certain genes and genetic information. In short, alcohol has been shown to interfere with fetal nerve cell development and function in a variety of ways.

In first describing the dysmorphic features of FAS, Jones and colleagues focused on short palpebral fissure, maxillary hypoplasia (with prognathism), and the presence of epicanthal folds that were observed for a majority of the children described. However, other features also were noted for some patients, including altered palmar fexional crease patterns (i.e., hockeystick crease), cardiac anomalies, joint disability, overlapping fingers, ear anomalies, hemangiomas, ptosis, hypoplastic nails and pectus deformities. Over the next 30 years, additional features described included: microcephaly, short nose, smooth philtrum with thin vermilion border, cleft lip, micrognathia, protruding auricles, short or webbed neck, vertebra and rib anomalies, short metacarpal bones, menigomyelocele, hydrocephalus and hypoplastic labia majora.

Despite the heterogeneity of expression for dysmorphic features related to prenatal exposure to alcohol, core facial dysmorphia have emerged through human and animal studies. Experimental studies with a mouse model and primates indicate that the facial dysmorphia observed for individuals with FAS are the result of disturbances of cellular migration during organogenesis along the midline of the face. Using anthropomorphic measurements of all facial features, clinical researchers have confirmed the midline feature abnormalities. Studies of clinic-referred samples also support these features as discriminant for FAS. Based on these scientific findings and the extensive clinical experience of the SWG, the following facial dysmorphic features were determined to meet the dysmorphia criteria essential for FAS (based on racial norms):

- Smooth philtrum – (measured as 4 or 5 on Lip-Philtrum Guide*).
- Thin vermilion border – (measured as 4 or 5 on Lip-Philtrum Guide) (i.e., upper lip).
- Small palpebral fissures – (measured as 10th percentile according to age and racial norms).

The individual must exhibit all three characteristic facial features; however, additional features also can be present. For example, maxillary hypoplasia is often noted for individuals with FAS as well as those associated features described previously. Cross-sectional and longitudinal studies indicate that many features can change with age or development. After puberty, the characteristic facial features associated with FAS can become more difficult to detect. However, recent findings indicate that these three key features remain for the majority of individuals with FAS.
A characteristic pattern of mild facial anomalies, including small eye openings (i.e., short palpebral fissures), a thin upper lip, or flattened ridges between the base of the nose and the upper lip (i.e., a flattened philtrum) are associated with FAS.


Services appropriate for FASD individuals and their families

The 2004 CDC Fetal Alcohol Syndrome Guidelines for Referral and Diagnosis indicates that diagnosis is never an endpoint for any individual with a developmental disability and his or her family. This is particularly true for individuals with FAS, their families, and their community. As described in the framework section, the FAS diagnosis and the diagnostic process (especially the neuropsychological assessment) are part of a continuum of care that identifies and facilitates appropriate health care, education and community services. The learning and life skills affected by prenatal exposure vary greatly among individuals, depending on the amount of alcohol exposure and the timing and pattern of exposure, as well as each individual’s current and past environment. As a result, the services needed for individuals with FAS and their families vary according to what parts of the brain have been affected, the age or level of maturation of the person, the health or functioning of the family, and the overall environment in which the person is living. Thus, service needs for any particular individual and his or her family can be quite individualistic.

General Needs

Helpful interventions should include those that stabilize home placement, strengthen the parent-child dyad, and improve parent-child interaction. One method for accomplishing this goal is to increase the understanding of the disorder by parents, teachers, law enforcement personnel and other professionals who might become involved with the affected individual. Children with FAS often need unique parenting because of their difficulty with cause-and-effect reasoning and other executive functioning skills.

Caregiver education should highlight and explain differences in the thought processes of children with FAS from typically developing children and children with other developmental disabilities. This would enable parents to avoid potentially difficult situations (e.g., avoiding overly stimulating environments) and better manage problems when they do arise. Overall, a better functioning family that results from caregiver education promotes the stable, nurturing home that has been shown to be a positive protective factor for children with FAS.

Beyond the home environment, other professionals also need increased education and information concerning FAS. Parents can facilitate this understanding by learning to become advocates for their child. Such advocacy includes both linking families with needed community resources and making sure that the child receives maximum benefit from that service. Because the myriad of service systems is confusing and inconsistent across states, families must be educated about them at the local level. The world of social and educational services can be overwhelming, confusing and inconsistent, and usually has a unique vocabulary that must be learned. Thus, it is important that along with a diagnosis, clinicians need to help caregivers in learning about available services, how to determine which services are appropriate for their child, and how to work productively with service providers.

Many prenatally exposed infants and children enter the foster or adoptive care system at an early age. A recent study estimated that the prevalence of children with FAS (or a related disorder) in the foster care system is 10 times that of the general
population. However, while protective service agencies (PSAs) might have information about a child’s prenatal history, staff members are generally not knowledgeable about FAS, do not understand the impact of the child’s having FAS, or do not communicate the child’s FAS status to other service systems. As a result, foster and adoptive families are most often not educated about the long-term effects and are unprepared to meet their child’s needs. However, most PSAs require foster parents to take a specified number of educational courses annually. These courses should include education about the effects and developmental needs of the child with FAS since the majority of foster parents will encounter at least one child with FAS or a related disorder during their time as a foster parent.

The assessment process is integral to a well-developed treatment plan. As has been emphasized in these guidelines, part of the diagnostic process is a comprehensive neuropsychological assessment, not only to establish CNS abnormalities for the diagnosis, but also to develop the best treatment plan possible. Such a treatment plan minimizes risk factors for lifelong negative consequences and promotes protective factors that maximize developmental potential. Clinicians and service providers must ensure that assessments include communication and social skills, emotional maturity, verbal and comprehension abilities, language usage, and, if appropriate, referral for medication assessments. Finally, it is the responsibility of the community at large to ensure that children with disabilities, including children with FAS, have access to and are assimilated into school, recreational and social activities.

Intervening with children and/or adolescents with fetal alcohol syndrome or alcohol-related neurodevelopmental disorders

Several organizations are working together with the CDC through a collaborative effort to identify, develop, and evaluate effective strategies for intervening with children with FAS/ARND and their families. Through these interventions, researchers are trying to help children with FAS/ARND develop to their full potential, prevent secondary conditions, and provide education and support to caregivers and families.

**Funded projects include:**

**Marcus Institute, Atlanta, Ga**

This intervention focuses on behavioral regulation training (BRT) as a readiness-for-learning strategy, and math skills for improving cognition. BRT teaches parents ways to modify the child’s environment to reduce excess stimulation, use appropriate social reinforcement and communicate choices rather than commands. All children in the study population diagnosed with FAS or ARND and their families participate in the BRT and are taught self-awareness, decision-making and verbalization of situations and actions. In addition, intervention participants receive individualized math skills training, a common area of significant disability for children with FAS/ARND. The intervention is designed for children ages 3 through 9.

**University of Washington, Seattle, Wash**

The purpose of this project is to explore two intervention models for school-age children. One consists of an individualized, supportive, behavioral consultation intervention for school-age children (ages 5 through 11) with FAS or ARND. Consultation includes FAS education, emotional/practical support, teaching child management strategies specific to children with FAS/ARND, advocacy assistance and school consultation. The second intervention is a school-based social communication intervention provided directly to children with FAS/ARND. This intervention targets critical deficits in social communication and peer relations and is designed to teach children (aged 8 through 12 years) how to use an interactive checklist to guide them through resolution of peer conflicts. An intervention and a control group will be compared using pre- and post-test measures, with post-tests occurring at the conclusion of the intervention and at a nine month follow-up.

**University of California, Los Angeles**

This project focuses on parent-assisted social skills training, with particular attention to development of best friend relationships. Children (ages 6 through 8) receiving the intervention participate in didactic training sessions, behavior rehearsal, and coaching to reduce maladaptive behaviors and promote pro-social interaction skills. Simultaneously, parents are taught about core deficits of FAS and ARND and given the companion information to their children’s intervention. A control group receives standard community care and both groups of participants are re-evaluated at four months post-intervention.

**University of Oklahoma Health Services Center, Oklahoma City, Okla**

This project uses parent child interaction therapy (PCIT) to intervene with parents and their children (ages 2 through 7) who have been diagnosed with FAS or ARND. The treatment group receives 90-minute group sessions once a week for 14 weeks. Behavioral specialists conduct group sessions with parents to teach them appropriate and effective behaviors and interaction techniques. Parent-child interactions are observed and individualized guidance is provided. The control group receives standard referrals and services along with participation in a parent support group. Pre- and post-test comparisons will be made between groups at the conclusion of the intervention and at 6-, 12- and 18-month follow-ups.

**Children’s Research Triangle, Chicago, Ill**

This intervention proposes to develop a program of neurocognitive habilitation within a systematic intervention strategy for children with prenatal alcohol exposure. The target population is children (ages 6 through 12) diagnosed with FAS or ARND, currently in the care of the Illinois welfare system. Children and their families are randomly selected into two groups. Children and families participating in the treatment group receive 12 weeks of neurocognitive habilitation and psychotherapy services, along with family education and case management services. Children and families participating in the control group will receive the current standard of care through existing community and school-based agencies. Pre- and post-test measures will be analyzed for each group and post-test follow-up will occur at 12 and 24 months.
What do we know about prevention of FASDs?

FASDs are completely preventable—if a woman does not drink alcohol while she is pregnant or could become pregnant. If a woman is drinking during pregnancy, it is never too late for her to stop. The sooner a woman stops drinking, the better it will be for both her baby and herself. If a woman is not able to stop drinking, she should contact her doctor, local Alcoholics Anonymous, or local alcohol treatment center. The Substance Abuse and Mental Health Services Administration has a substance abuse treatment facility locator. This locator helps people find drug and alcohol treatment programs in their area. If a woman is sexually active and is not using an effective form of birth control, she should not drink alcohol. She could become pregnant and not know it for several weeks or more.

Mothers are not the only ones who can prevent FASDs. The father’s role is also important in helping the mother abstain from drinking alcohol during pregnancy. He can encourage her not drinking alcohol by avoiding social situations that involve drinking and by not drinking alcohol himself. Significant others, family members, schools, health and social service organizations, and communities can also help prevent FASDs through education and intervention.

Surgeon general’s advisory on alcohol use in pregnancy

In February of 2005, United States Surgeon General Richard H. Carmona released the following advisory on alcohol use in pregnancy:

Thirty-two years ago, United States researchers first recognized Fetal Alcohol Syndrome (FAS). FAS is characterized by growth deficiencies (or decreased growth), abnormal facial features (specific facial features), and central nervous system (or brain) abnormalities. FAS falls under the spectrum of adverse outcomes caused by prenatal alcohol exposure called Fetal Alcohol Spectrum Disorders (FASD). The discovery of FAS led to considerable public education and awareness initiatives informing women to limit the amount of alcohol they consume while pregnant. But since that time, more has been learned about the effects of alcohol on a fetus. It is now clear that no amount of alcohol can be considered safe.

I now wish to emphasize to prospective parents, health care practitioners, and all childbearing-aged women, especially those who are pregnant, the importance of not drinking alcohol if a woman is pregnant or considering becoming pregnant.

For these reasons:

- A pregnant woman should not drink alcohol during pregnancy.
- A pregnant woman who has already consumed alcohol during her pregnancy should stop in order to minimize further risk.

In February 2005, the U.S. surgeon general issued an advisory on alcohol use in pregnancy to raise public awareness about this important health concern. Based on the current, best science available, we now know the following:

- Alcohol consumed during pregnancy increases the risk of alcohol-related birth defects, including growth deficiencies, facial abnormalities, central nervous system impairment, behavioral disorders and impaired intellectual development.
- No amount of alcohol consumption can be considered safe during pregnancy.
- Alcohol can damage a fetus at any stage of pregnancy. Damage can occur in the earliest weeks of pregnancy, even before a woman knows that she is pregnant.
- The cognitive deficits and behavioral problems resulting from prenatal alcohol exposure are lifelong.
- Alcohol-related birth defects are completely preventable.

To reduce prenatal alcohol exposure, prevention efforts should target not only pregnant women who are currently drinking, but also women who could become pregnant, are drinking at high-risk levels and are having unprotected sex.

Bibliography

1. What are the characteristics of fetal alcohol syndrome?
   a. Abnormal facial features.
   b. Growth deficiencies.
   c. Central nervous system (CNS) problems.
   d. All of the above.

2. How many children does the National Organization on Fetal Alcohol Syndrome report are born with FASD per year?
   a. 20,000.
   b. 40,000.
   c. 50,000.
   d. 100,000.

3. Which of the following is not considered a risk factor for fetal alcohol spectrum disorder?
   a. Higher maternal age.
   b. Ethnic background.
   c. Lower education level.
   d. Lower socioeconomic status.

4. Based on these scientific findings and the extensive clinical experience, the following facial dysmorphic features were determined to meet the dysmorphia criteria essential for FAS (based on racial norms):
   a. Smooth philtrum, thin vermilion border and maxillary hypoplasia.
   b. Small eye openings, a thin upper lip and a flattened philtrum.
   c. Smooth philtrum, thin vermilion border and small palpebral fissures.
   d. None of the above.

5. Several organizations are working together with the CDC through a collaborative effort to identify, develop, and evaluate effective strategies for intervening with children with FAS/ARND and their families. Which of the following is a funded project?
   a. Children's Research Triangle.
   b. Children’s Miracle Network.
   c. Federal Drug Administration.
   d. The Kiwanis Club.