

Fetal Alcohol Spectrum Disorders

Competency-Based Curriculum Development Guide

for Medical and Allied Health Education and Practice



U.S. Department of Health and Human Services
Centers for Disease Control and Prevention
National Center on Birth Defects and
Developmental Disabilities

FASD Regional Training Centers

National Organization on Fetal
Alcohol Syndrome (NOFAS)



Competency I: Foundation

The health care student or provider will be able to demonstrate knowledge of the historical, biomedical, and clinical background of fetal alcohol syndrome (FAS) and other disorders related to prenatal exposure to alcohol, known collectively as fetal alcohol spectrum disorders (FASDs).

This is a foundational competency for the entire curriculum. This competency should be addressed in all settings and for all audiences unless they have prior knowledge of the content related to this competency.

Learning Goals

(Learning objectives for each goal can be found at the end of this chapter.)

- I-A Describe the basic biomedical foundation of FAS.
- I-B Explain the basic clinical issues related to FASDs.
- I-C Provide an overview of the epidemiological and psycho-social-cultural aspects of FASDs

Content Outline for Competency I

I. Basic biomedical foundation

- A. Scope of the issue
- B. Recognition of the issue
- C. Effects of alcohol on the developing embryo and fetus
- D. Characteristics of FAS

II. Clinical issues

- A. Prevention of alcohol-exposed pregnancies
- B. Screening and diagnosis of persons with FAS
- C. Treatments and therapies for persons with FASDs

III. Epidemiological and psycho-social-cultural aspects of FASDs

- A. Prevalence of FASDs
- B. Monitoring prenatal alcohol exposure
- C. Costs of FASDs
- D. Psychosocial and cultural effects

Also included in this chapter are:

- Suggested learning activities.
- References and helpful websites.
- Chart of all learning goals and objectives for this competency.

I. Basic Biomedical Foundation

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A. Scope of the Issue

Alcohol use is an entrenched institution in the United States and many other countries. Worldwide use and subsequent abuse of alcohol is increasing. In the United States, as many as 74% of individuals over the age of 15 years consume alcohol (Babor, 2003). The amount of alcohol consumed by each person is increasing; among people who report binge drinking, the number of binge episodes has increased (Babor, 2003). Further, alcohol consumption and binge drinking are being initiated at a younger age, a key predictor of adult alcohol abuse and dependency (NIAAA, 2000).

Historically, women have been less likely to drink alcohol than men; however, that discrepancy is quickly disappearing. More than half of all women of childbearing age (18–44 years of age) report some alcohol use, and one in eight reports binge drinking in the past month. Many of these women are sexually active and often do not take effective measures to prevent pregnancy. These women are at high risk for an alcohol-exposed pregnancy (AEP) as they might continue drinking early in pregnancy at levels that are harmful to the fetus (Centers for Disease Control and Prevention [CDC], 2002a; Department of Agriculture & U.S. Department of Health and Human Services, 2000; Floyd et al., 2007; Tsai & Floyd, 2004).

Although most women reduce alcohol consumption after learning that they are pregnant (CDC, 1995), in the United States, 10% of pregnant women report consuming any alcohol and 2%–4% report binge drinking (Tsai & Floyd, 2004; Substance Abuse and Mental Health Services Administration [SAMHSA], 2002). In these findings, binge drinking was defined as consuming five or more drinks on any one occasion. More recently, the definition of binge drinking for women has been changed to four or more drinks on any one occasion (NIAAA, 2005).

Human and animal studies have clearly demonstrated that prenatal exposure to alcohol is harmful to the fetus, resulting in physical malformations, growth problems, or abnormal functioning of the central nervous system. These negative effects are lifelong and serious. Children born with prenatal alcohol exposure might have a range of problems, from subclinical effects to full fetal alcohol syndrome (FAS), conditions that result in significant morbidity and mortality (NIAAA, 2000).

B. Recognition of the Issue

Paul Lemoine of France first described the effects of prenatal alcohol exposure in the medical literature in 1968. This sentinel article was later translated to English (Lemoine, Harousseau, Borteyru, & Menuet, 2003).

The most important breakthrough in the understanding and documenting of FAS in the United States came through the work of Drs. Jones and Smith and their colleagues (1973). They recognized and described a cohort of children who had similar facial dysmorphology and who had all been exposed to excessive amounts of alcohol in utero. Common to all children was a

distinctive constellation of physical abnormalities, growth retardation, central nervous system damage, and prenatal alcohol exposure. Researchers determined that all the children in the study had suffered teratogenic damage due to maternal alcohol consumption during the gestational period. The term fetal alcohol syndrome (FAS) was introduced to describe the resulting condition.

Beyond the medical and research literature, FAS and the dangers of prenatal alcohol exposure were brought to public awareness by the book *The Broken Cord* (Dorris, 1989). This book describes the author's experiences with his adopted son, Adam, who had FAS. He explained the negative consequences of prenatal alcohol exposure in a way that could be understood by the general public, rather than by medical professionals with particular specialties.

As researchers have looked at cases historically diagnosed as mental retardation and related conditions, they have found that many might have actually been cases of FAS and other alcohol-related effects. A striking example of this fact was presented by Karp and his colleagues in 1995. They looked at work done by Henry Goddard, an American psychologist and eugenicist. In 1912, Goddard published a book regarding the inheritance of "feeble-mindedness," a general, early-20th century term referring to a variety of mental disabilities, including mental retardation and learning disabilities. This book followed the genealogy of the Kallikak family and compared two sides of the family tree: the "normal" side and the "feeble-minded" side. A re-analysis of family history, medical records, and photographs suggests that FAS and prenatal alcohol exposure better explain the Kallikak family history of disabilities than does genetics (Goddard, 1912; Karp, Quazi, Moller, Angelo, & Davis, 1995).

In 1981, the U.S. Surgeon General issued a public health advisory warning that alcohol use during pregnancy could cause birth defects (Food and Drug Administration, 1981). This warning was reissued by the Surgeon General in 2005 (Office of the Surgeon General, 2005).

Surgeon General's Advisory on Alcohol Use in Pregnancy

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.

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.

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.
- A woman who is considering becoming pregnant should abstain from alcohol.

Recognizing that nearly half of all births in the United States are unplanned, women of childbearing age should consult their physician and take steps to reduce the possibility of prenatal alcohol exposure.

Health professionals should inquire routinely about alcohol consumption by women of childbearing age, inform them of the risks of alcohol consumption during pregnancy, and advise them not to drink alcoholic beverages during pregnancy.

Source: Office of the Surgeon General, U.S. Department of Health and Human Services. (2005). *Advisory on alcohol use in pregnancy*.

C. Effects of Alcohol on the Developing Embryo and Fetus

All maternal systems are vulnerable to alcohol. A developing embryo or fetus, which relies on the mother's systems, is equally vulnerable. Although the adverse mechanisms of prenatal alcohol exposure are not completely understood, the harmful effects are evident. As a pregnant woman consumes alcohol and her blood alcohol level rises, the alcohol freely crosses the placenta. The embryo or fetus is exposed to the same blood alcohol levels as the mother. However, the baby's

liver and other organs are not yet fully developed or functioning during gestation. Thus, the fetus is unable to detoxify any of the alcohol before it reaches and acts upon emerging cells and organs.

Discussions about drinking during pregnancy most often center on the amount of alcohol consumed. Some individuals, including some clinicians, believe that small amounts pose no risks. However, as reflected in the Surgeon General's advisory, there is no known safe amount of alcohol during pregnancy (Goodlett & West, 1992). Maternal intake of about one drink/day or more is associated with reduced birth weight and intrauterine growth restriction, spontaneous abortion, preterm delivery, and stillbirth. Furthermore, varying degrees of prenatal alcohol exposure have been found to be associated with disrupted neuropsychological functions like attention, learning and memory, visual perceptual and visual motor skills, language, and executive functions (Bertrand et al., 2004).

Another misconception is that some types of alcohol are okay or less harmful than others; specifically, beer or wine is viewed as acceptable or less risky than hard liquor. This belief is false. A 12-ounce can of beer containing 5% absolute alcohol (aa) has the same amount of alcohol as a 5-ounce glass of wine (12% aa), a 4-ounce glass of fortified wine (15% aa), or a 1.5-ounce shot of hard liquor or spirits (40% aa) (NIAAA, 2005).

Finally, no period of pregnancy appears to be safe for drinking. Damage can occur at any point after conception. Major morphological abnormalities caused by alcohol can occur in the first trimester. In the second trimester, there is an increased risk of spontaneous abortion. In the third trimester rapid fetal growth makes this a vulnerable period for height, weight, and brain growth. The brain can be affected during all trimesters (Goodlett & West, 1992).

Areas in the fetus known to be affected by alcohol include skeletal structures, organs, central nervous system, and related rates of growth. Alcohol interacts with the developing central nervous system through multiple actions, including (NIAAA, 2000):

- Interfering with the normal proliferation of nerve cells.
- Increasing the formation of cell-damaging molecular fragments (free radicals).
- Altering the cell's ability to produce or regulate cell growth, division, and survival.
- Impairing the development and function of cells that guide the migration of nerve cells to their proper places (astrocytes).
- Interfering with the normal adhesion of cells.
- Altering the formation of axons.
- Altering cell membranes.
- Altering the pathways of biochemical or electrical signals within cells.
- Altering the regulation of calcium levels in the cell.
- Altering the expression of certain genes.

No single mechanism can explain all the harmful effects of alcohol on the developing fetus. The fetus prenatally exposed to alcohol is affected by a three-way interaction between amount (dose),

timing, and subsequent postnatal environment (e.g., quality of home environment, exposure to violence, eligibility for services).

Competency IV provides an in-depth description of the biological effects of alcohol on the developing fetus.

D. Characteristics of FAS

The characteristics of FAS have been well documented. They include dysmorphia (especially facial features), growth restriction, and central nervous system (CNS)–related abnormalities (Jones, 2006).

Dysmorphic features are outward signs of abnormal cell development and processes during the implantation, embryonic, or fetal states of gestation. They are most often clues, rather than formal diagnoses. The cardinal dysmorphic features of FAS are (a) short palpebral fissures, (b) thin vermilion border (upper lip), and (c) smooth philtrum. Additional associated facial features include a flattened midface, epicanthal folds, low nasal bridge, minor ear abnormalities, and micrognathia. Nonfacial dysmorphia include cardiac anomalies, joint abnormalities, ear anomalies, ptosis, hypoplastic nails, pectus carinatum or excavatum, and altered palmar flexional crease patterns (i.e., hockeystick crease) (Bertrand et al., 2004).

Growth is affected on several levels. Both pre- and postnatal growth is limited. The primary parameters of growth that need to be impaired to meet the growth retardation criteria for a diagnosis of FAS are height, weight, or both. Typically, children with FAS are small for their gestational age. They are typically of short stature, are underweight (failure to thrive), and have height or weight discrepancies. Multiple organic factors can lead to growth deficiencies (e.g., disruption of endocrine function leading to poor weight gain) (Bertrand et al., 2004).

Fetal alcohol exposure affects all regions of the brain, though some regions appear more vulnerable than others. Through magnetic resonance imaging and additional technology, researchers have been able to document an overall reduction in brain size in children with FAS. Further, several brain structures seem to be particularly susceptible to damage from prenatal alcohol exposure, including areas surrounding the interhemispheric fissure, the corpus callosum, the cerebellum, and the basal ganglia. (NIAAA, 2000).

Adverse effects on brain structures and development result in negative CNS effects and a wide variety of potential functional deficits. These can include cognitive deficits (e.g., specific learning disabilities, poor academic achievement, discrepancy between verbal and nonverbal skills, slowed movements or reaction to people and stimuli); executive functioning deficits (e.g., poor organization and planning skills, concrete thinking, lack of inhibition, poor judgment); motor functioning delays or deficits (e.g., delayed motor milestones, clumsiness, balance problems, tremors, poor dexterity, difficulty with writing or drawing); attention and hyperactivity problems (e.g., distractability, overactivity, difficulty completing tasks, trouble with transitions); and social skills problems (e.g., lack of stranger fear, vulnerability to being taken advantage of, immaturity, superficial interactions, inappropriate choice of friends, poor social cognition) (Bertrand et al., 2004).

Functional abilities vary greatly across individuals with FASDs since there is variation in the dose and timing of exposure as well as postnatal environmental influence, as noted previously. However, functional deficits from prenatal alcohol exposure are lifelong disorders that children never outgrow. Some of the negative consequences of these deficits include disrupted school experiences, legal problems, incarceration, mental health problems, substance abuse, inappropriate sexual behavior, dependent living, and poor employment history. Often these types of problems are referred to as secondary conditions (Streissguth, Barr, Kogan, & Bookstein, 1996).

II. Clinical Issues

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A. Prevention of Alcohol-Exposed Pregnancies

All physicians need to participate in primary prevention efforts regardless of medical specialty. Contributions of the physician include providing information about the dangers of drinking during pregnancy, screening women for risk of an alcohol-exposed pregnancy, and referring women with alcohol problems for appropriate treatment.

Strategies aimed at preventing alcohol-exposed pregnancies include the following:

- **Universal prevention efforts** aim to educate the public about the dangers of alcohol use during pregnancy. Prevention strategies include warning labels on alcoholic beverages, public service announcements, and mass media campaigns.
- **Selective prevention interventions** target individuals or a subgroup of the population who are at increased risk for having an alcohol-exposed pregnancy, meaning all women of childbearing age who drink alcohol. Prevention strategies include screening women for alcohol use and providing brief intervention for women at risk for an alcohol-exposed pregnancy. Alcohol screening instruments include the TWEAK, T-ACE, CAGE, and AUDIT.
- **Indicated prevention interventions** target women at highest risk for giving birth to a child with an FASD, including women who have previously given birth to a child with an FASD or a woman who has a known history of alcohol abuse or dependence. Prevention strategies include alcohol treatment and measures to prevent pregnancy (Hankin, 2002).

Please see Competency II and *Fetal Alcohol Syndrome: Guidelines for Referral and Diagnosis* (Bertrand et al., 2004) for more information about screening and treatment of women.

B. Screening and Diagnosis of Persons with FAS

Many terms are used to describe the continuum of effects that result from prenatal exposure to alcohol, including fetal alcohol effects, alcohol-related birth defects, and alcohol-related neurodevelopmental disorder. A more recent term that has been introduced is fetal alcohol spectrum disorders (FASDs). It is an umbrella term describing the range of effects that can occur in an individual whose mother drank alcohol during pregnancy. These effects can include physical, mental, behavioral, and/or learning disabilities with possible lifelong implications. This term is not intended for use as a clinical diagnosis.

The screening of children and persons with possible effects from prenatal alcohol exposure is an important step in the identification of FASDs. Various health and education professionals often formally and informally screen. The purpose of such screening is to identify triggers—conditions known to be related to the presence of FAS or other related disorders. If enough triggers are present, referral to determine diagnosis is the next step.

Clear diagnostic criteria for FAS and instructions on their use can help health care providers better identify children with this condition. Currently, guidelines for referral and diagnosis are available only for FAS, but work continues to develop such guidelines for other conditions within the spectrum. A diagnosis of FAS is best made within the context of a multidisciplinary assessment of the individual.

The major components of the diagnostic criteria for FAS are:

- **Facial dysmorphism:** smooth philtrum, thin vermilion border, and small palpebral fissures (at or below 10th percentile).
- **Growth problems:** Confirmed prenatal or postnatal height or weight, or both, at or below the 10th percentile.
- **Central nervous system abnormalities:** Documented structural, neurological, or functional problems in areas associated with prenatal alcohol exposure (e.g., attention, math, executive functioning).

To receive the diagnosis of FAS, an individual must have documentation of all three components of the diagnostic criteria (i.e., dysmorphism, growth deficits, and a CNS abnormality). In addition, the diagnosis should be characterized by the information available about exposure history as either (a) confirmed prenatal alcohol exposure or (b) unknown prenatal alcohol exposure.

Because individual features are not unique to any specific syndrome, a process of differential diagnosis is essential for assessing all components of the diagnostic criteria. Other syndromes also exhibit facial dysmorphic traits that overlap with FAS, and there are some syndromes in which a constellation of features gives a “gestalt” that is similar to that of FAS. These syndromes should particularly be considered when completing the differential diagnosis: Aarskog syndrome, Williams syndrome, Noonan syndrome, Dubowitz syndrome, Cornelia de Lange syndrome, toluene embryopathy, fetal dilantin syndrome, fetal valproate syndrome, and maternal PKU fetal effects (Bertrand et al., 2004). Many genetic syndromes have growth issues related to their diagnosis. And most importantly, many environmental factors can lead to growth problems, including poor nutrition, abuse and neglect, or even depression.

The most challenging component for differential diagnosis is CNS abnormalities. Individuals with many other conditions have functional deficits that are similar to those of FAS at a general level, but they are not completely identical. For example, both children with FAS and children with attention-deficit/hyperactivity disorder (ADHD) have diagnosable attention problems, but children with FAS have difficulty with flexibility of attention and encoding information, whereas children with ADHD have problems with focus and sustaining attention. Even more challenging is distinguishing between presenting CNS abnormalities resulting from prenatal alcohol exposure and similar CNS abnormalities resulting from psychosocial factors (e.g., abuse and neglect, disruptive care giving, or lack of opportunities).

In addition to establishing the presence of FAS, a complete diagnosis needs to identify and specify other disorders that can co-exist with FAS. These include autism, conduct disorders, oppositional defiant disorder, anxiety disorders, adjustment disorders, sleep disorders, and depression (Bertrand et al., 2004).

Please see Competency V and *Fetal Alcohol Syndrome: Guidelines for Referral and Diagnosis* (Bertrand et al., 2004) for more information about screening, diagnosis, and assessment of FAS.

C. Treatments and Therapies for Persons with FASDs

Diagnosis is part of a continuum of care that identifies and facilitates appropriate health care, education, and community services as needed. Early intervention is critical in the treatment of any disorder. This means providing treatment not only for young children, but also for older individuals as soon as problems are identified. In addition, some protective factors against secondary conditions have been identified: a stable and nurturing home environment during the school years, early diagnosis (before 6 years of age), absence of exposure to violence, consistency in caregivers, and eligibility for social and educational services (Streissguth, Barr, Kogan, & Bookstein, 1996).

Because any individual with an FASD is the product of a unique interaction of dose and timing of alcohol exposure as well as experiences, the service needs of affected individuals and their families can differ significantly. However, some general areas of service and specific services have been identified that are universally beneficial, including a nurturing and structured care giving environment, parent and service provider education about FASDs, and a thorough multidisciplinary evaluation to identify individual strengths and weaknesses (Streissguth, 1997). Families and caregivers are essential in the treatment planning process (Mitchell, 2002).

The heterogeneous nature of persons with FASDs makes an interdisciplinary team approach extremely important. Depending on the needs of the person with an FASD, the treatment team might include a dysmorphologist; geneticist; neurologist; primary care physician; pediatrician; ophthalmologist; ear, nose, and throat specialist; immunologist; plastic surgeon (if cleft lip or palate exists); endocrinologist; gastroenterologist; psychiatrist; psychologist; social worker; special educator; nutritionist; audiologist; speech-language pathologist; occupational therapist; and physical therapist.

Please see Competency VI for information about treatment and case management for persons with FASDs.

III. Epidemiological and Psychosocial and Cultural Aspects of FASDs

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A. Prevalence of FASDs

CDC reports FAS prevalence rates from 0.2 to 1.5 cases per 1,000 births across various populations in certain parts of the United States (CDC, 2002b). These rates are comparable to or greater than other common developmental disabilities such as Down syndrome or spina bifida (May & Gossage, 2001). Of the approximately 4 million infants born each year, an estimated 1,000 to 6,000 will be born with FAS (Bertrand et al., 2004). Some researchers have estimated the rates of the full range of FASDs to be as high as 9 or 10 per 1,000 live births (May & Gossage, 2001; Sampson et al., 1997). This translates to about 40,000 alcohol-affected births per year in the United States (Lupton, Burd, & Harwood, 2004).

Disadvantaged groups, American Indians/Alaska Natives, and other minorities have been documented to have prevalence rates as high as 3 to 5 cases of FAS per 1,000 children (Sampson et al., 1997). Among children in foster care, the prevalence rate for FAS is 15 cases per 1,000 children (Astley, Stachowiak, Clarren, & Clausen, 2002). Finally, among individuals in the juvenile justice system, more than 200 per 1,000 20% were found to have FAS or a related disorder (Fast, Conry, & Looock, 1999).

As noted previously, alcohol consumption is a worldwide public health issue. As would be expected, countries that have high rates of alcohol consumption also have high rates of FAS. In Russia, which has very high rates of alcoholism, prevalence of FAS among children in orphanages is estimated to be 15 cases per 1,000 (Miller et al., 2006). In South Africa, the production and sale of alcohol is promoted as an important economic activity. South Africa has the highest reported birth prevalence for FAS with reports of 41 to 46 cases per 1,000 live births. Rates of FAS are particularly high in rural areas of South Africa where many workers are involved in wine production (May et al., 2007; Viljoen et al., 2005).

Although true differences in rates for FAS certainly exist, some of the variation might be due to challenges in estimating FAS prevalence. First, no specific and uniformly accepted diagnostic criteria have been available for FAS. Second, FAS diagnosis is based on clinical examination of features, but not all children with FAS look or act the same. Third, many primary care providers lack knowledge of and have misconceptions about FAS. Fourth, there are no diagnostic criteria to distinguish FAS from other prenatal alcohol-related conditions (Bertrand et al., 2004). Finally, studies in the United States have used a record review methodology, which clearly underestimates the prevalence of the disorder. This is demonstrated by a recent study in Italy, which used a direct evaluation method for school children and found rates of 4 to 7 cases per 1,000 children (May et al., 2006).

Additional information and references are available in *Fetal Alcohol Syndrome: Guidelines for Referral and Diagnosis* (Bertrand et al., 2004).

B. Monitoring Prenatal Alcohol Exposure

As noted previously, in the United States, 10% of pregnant women report consuming any alcohol, and 2%–4% report binge drinking (Tsai & Floyd, 2004; Substance Abuse and Mental Health Services Administration [SAMHSA], 2002). More than half of all women of childbearing age (18–44 years of age) report some alcohol use, and one in eight reports binge drinking in the past month (CDC, 2002a; Tsai & Floyd, 2004).

The risk of a woman giving birth to a child with an FASD depends on multiple factors, such as the pattern, volume, timing, and duration of alcohol use. Additional maternal risk factors might include age, race, ethnicity, socioeconomic status, nutrition, alcohol metabolism, genetic sensitivity to alcohol, and possible interactions among these factors (Tsai, Floyd, Green, & Boyle, 2007).

C. Costs of FASDs

The costs of FASDs are beginning to be understood and formally addressed. To date, cost estimates are only available for FAS. Annual costs associated with FAS in the United States are estimated to be approximately \$4 billion (Lupton et al., 2004). In 2002, the estimated lifetime cost for one individual with FAS was \$2 million. This is an average for all people with FAS. Those with severe problems, such as profound mental retardation, have much higher costs (Lupton et al., 2004).

D. Psychosocial and Cultural Effects

Like any medical condition, FASDs substantially increase the burden on society and its resources. FASDs are considered birth defects and developmental disabilities, and persons with these conditions have increased health care needs from birth through adulthood. In addition, individuals with FASDs are at very high risk for injury, unintended pregnancy, and sexually transmitted infections.

The most severe impact arises from functional problems, including mental health difficulties, disrupted school and job experiences, trouble with the law, difficulties with independent living, substance abuse, problems with parenting, and more (Bertrand et al., 2004; Streissguth et al., 1996). Everyday needs such as transportation, job assistance, and housing compete within already overburdened social services. Some individuals with FASDs qualify for federal assistance, such as Medicaid, Supplemental Security Income (SSI), and Section 8 Housing subsidies.

FASDs have serious and often devastating effects on the patient and family (Streissguth, 1997). Disabilities are experienced by the affected person from infancy through adulthood. Many families face complex situations and might present with numerous health and social problems. Parents of individuals with an FASD report clinically elevated levels of stress (Paley, O'Connor, Frankel & Marquardt, 2006). FASDs raise unique treatment issues and the need for family support within many systems, including medical and health care, early intervention and education, juvenile justice and corrections, substance abuse treatment, mental health, and social services.

Thus, FASDs are a major public health problem with significant costs, both in terms of the long-standing suffering of children and families of all ethnicities, and in marked economic loss of billions of dollars in the United States and societies around the world. However, FASDs and the related increased burdens can be avoided because FASDs are completely preventable.

Competencies III, V, and VI have more information about the impact of FASDs on psychosocial and cultural issues.

Suggested Learning Activities

- Use descriptive case studies to discuss effects of FASDs (see supplemental materials available online).
- Use the “Critical Stages of Development” chart to illustrate fetal development and the effects of teratogens at different stages of development (see Competency IV, Figure 4.1).
- Use the drawing “Facies in Fetal Alcohol Syndrome” from Streissguth & Little (1994) to have groups identify related facial features.
- Use case studies to identify treatment options.
- Lead a discussion of costs of FASDs to individuals and society.
- Have small groups develop a list of challenges in addressing FASDs, then list societal benefits in addressing alcohol use. Have small groups share with the large group to share ideas and generate discussion.

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Websites

Federal Government Sites

- CDC's Fetal Alcohol Spectrum Disorders website: <http://www.cdc.gov/ncbddd/fas/>
- National Institute on Alcohol Abuse and Alcoholism: <http://www.niaaa.nih.gov/>
- National Institute on Drug Abuse: <http://www.nida.nih.gov/>
- Substance Abuse and Mental Health Services Administration, Center for Substance Abuse and Prevention (CSAP): <http://prevention.samhsa.gov/>
- SAMHSA's FASD Center for Excellence: <http://fasdcenter.samhsa.gov>

Organizations

- March of Dimes: <http://www.marchofdimes.com>
- National Organization on Fetal Alcohol Syndrome (NOFAS): <http://www.nofas.org>
- The Arc of the United States: <http://www.thearc.org>

University Sites

- Fetal Alcohol and Drug Unit of the University of Washington: <http://depts.washington.edu/fadu/>
- Fetal Alcohol Syndrome Diagnostic & Prevention Network, University of Washington: <http://depts.washington.edu/fasdpn/>

Learning Goals and Related Objectives

Goal I-A: Describe the basic biomedical foundation of FAS

Learning Objectives

<p>Level 1 The learner will be able to...</p>	<p>Level 2 The learner will be able to...</p>	<p>Level 3 The learner will be able to...</p>
<ul style="list-style-type: none"> ▪ Describe the different ways that FAS was characterized before its actual documentation and classification. (K) ▪ Explain the historical impact of Jones, et al. in the description and identification of FAS in 1973. (K) ▪ Explain the effects of alcohol on the developing embryo and fetus. (K) ▪ Describe characteristics associated with FAS. (K) 	<ul style="list-style-type: none"> ▪ Explain the need to understand the basic biomedical foundation of FAS in order to best provide services. (A) 	<ul style="list-style-type: none"> ▪ Explain to other health professionals about the basic biomedical foundation of FAS. (S)

A=Attitude-based objective; K=Knowledge-based objective; S=Skill-based objective

Level 1. Medical and allied health students or professionals who need basic background information on FASDs for their education, work, or both.

Level 2. Medical and allied health practitioners who need to use the information to provide services.

Level 3. Medical and allied health professionals who educate and train other professionals about FASDs.

Goal I-B: Explain the basic clinical issues related to FASDs

Learning Objectives

Level 1 The learner will be able to...	Level 2 The learner will be able to...	Level 3 The learner will be able to...
<ul style="list-style-type: none"> ▪ Define the basic terminology related to FASDs. (K) ▪ Describe characteristics associated with risk of an alcohol-exposed pregnancy. (K) ▪ Provide an overview of the screening, diagnostic, and assessment processes of FAS. (K) 	<ul style="list-style-type: none"> ▪ Recognize characteristics associated with risk of an alcohol-exposed pregnancy. (S) ▪ Recognize characteristics associated with FAS and related conditions. (S) 	<ul style="list-style-type: none"> ▪ Explain to other health professionals about the basic clinical issues related to FASDs. (S)

A=Attitude-based objective; K=Knowledge-based objective; S=Skill-based objective

Level 1. Medical and allied health students or professionals who need basic background information on FASDs for their education, work, or both.

Level 2. Medical and allied health practitioners who need to use the information to provide services.

Level 3. Medical and allied health professionals who educate and train other professionals about FASDs.

Goal I-C: Provide an overview of the epidemiological and psycho-social-cultural aspects of FASDs

Learning Objectives

Level 1 The learner will be able to...	Level 2 The learner will be able to...	Level 3 The learner will be able to...
<ul style="list-style-type: none"> ▪ Indicate the basic epidemiological data regarding FASDs. (K) ▪ Summarize the economic costs over a lifetime associated with FAS. (K) ▪ Summarize the psycho-social-cultural aspects related to FASDs. (K) 	<ul style="list-style-type: none"> ▪ Same as Level 1. 	<ul style="list-style-type: none"> ▪ Explain to other health professionals about the epidemiological and psycho-social-cultural aspects of FASDs. (S)

A=Attitude-based objective; K=Knowledge-based objective; S=Skill-based objective

Level 1. Medical and allied health students or professionals who need basic background information on FASDs for their education, work, or both.

Level 2. Medical and allied health practitioners who need to use the information to provide services.

Level 3. Medical and allied health professionals who educate and train other professionals about FASDs.