

# Fetal Alcohol Spectrum Disorders



## Yesterday

- Alcohol's ability to cause birth defects was recognized more than three decades ago by U.S. researchers, and it is now the leading known environmental teratogen (an agent capable of causing physical birth defects). In a 1981 advisory, the U.S. Surgeon General suggested that pregnant women should limit their alcohol intake – although no recommended level of intake was specified.
- Fetal alcohol syndrome (FAS) is one of the most serious consequences of heavy drinking during pregnancy. FAS is a devastating constellation of birth defects characterized by craniofacial malformations, neurological and motor deficits, intrauterine growth retardation, learning disabilities, and behavioral and social deficits.
- While the prevalence of FAS in the U.S. is between 0.5-2.0 cases per 1000 births, it is more common in other parts of the world. For example, in parts of South Africa where heavy drinking prevails, the incidence of FAS exceeds 60 cases per 1000 individuals.
- It is estimated that for every child born with FAS, three additional children are born who may not have the physical characteristics of FAS but who, as a result of prenatal alcohol exposure, still experience neurobehavioral deficits that affect learning and behavior.

## Today

- The umbrella term "Fetal Alcohol Spectrum Disorders (FASD)" is now used to characterize the full range of prenatal alcohol damage varying from mild to severe and encompassing a broad array of physical defects and cognitive, behavioral, and emotional deficits.
- The earliest stages of life are periods of great vulnerability to the adverse effects of alcohol. Embryonic and fetal development are characterized by rapid, but well-synchronized patterns of gene expression, which makes the embryo/fetus particularly vulnerable to harm from alcohol.
- Research shows that patterns of exposure known to place a fetus at greatest risk for FASD include drinking four or more drinks per occasion, and drinking more than seven drinks per week. The outcomes attributable to prenatal alcohol exposure for the children of women drinking in this manner include deficits in growth, behavior, and neurocognition, including deficits in arithmetic, language and memory, visual-spatial abilities, attention, and speed of information processing.
- Imaging and neurobehavioral research in individuals with FAS and FASD reveals that some brain regions appear to be most sensitive to prenatal alcohol while other areas apparently are spared adverse effects. Particularly vulnerable regions include the frontal cortex, hippocampus, corpus callosum, and components of the cerebellum, including the anterior vermis.
- Despite a number of prevention efforts, including point of sale warning signs and bottle labeling, national surveillance data indicate that in 2005, 12% of pregnant women admitted drinking alcohol in the previous month and 2% were binge drinking. Data from prenatal clinics and postnatal studies suggest that 20-30% of women drink at some time during pregnancy. A majority of women in the U.S. reduce or abstain from alcohol once pregnancy is recognized but almost half of pregnancies in the U.S. are unplanned. More than 12% of women who are not using contraception and are at risk of becoming pregnant drink at levels that exceed 7 drinks per week or 4 or more drinks per occasion.
- In a 2005 update of the Surgeon General's advisory of 1981, the U.S. Surgeon General advised pregnant women and women who may become pregnant to abstain from drinking alcohol to eliminate the chance of giving birth to a baby with FASD.
- The Surgeon General's 2005 advisory states:
  - A pregnant woman should not drink alcohol during pregnancy.

- A pregnant woman who already has consumed alcohol during her pregnancy should stop in order to minimize further risk.
  - A woman who is considering becoming pregnant should abstain from alcohol.
  - Health professionals should routinely inquire 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.
  - Health professionals may offer brief office-based interventions to women at risk for an alcohol-exposed pregnancy or who are drinking during pregnancy, or may refer them to an alcohol treatment specialist. Women who continue to have difficulty refraining from alcohol after a brief intervention and those who are alcohol dependent should be referred to an alcohol treatment specialist.
- A number of effective tools are available for assessment of at-risk drinking and intervention guidelines for women of childbearing age. Currently, NIH and other agencies and organizations recommend that primary care providers screen all women of childbearing age for alcohol use.

## Tomorrow

- Ongoing NIH research seeks to find more effective ways to prevent and treat FASD. The broadest approach involves universal prevention measures targeted to the global community of men and women, and conveys general education on risks and information to abstain from alcohol in pregnancy.
- Current research also includes multilevel interventions involving case management of high risk individuals and brief interventions using motivational interviewing and community reinforcement.
- Screening, brief intervention, and referral for treatment (SBIRT) (<http://sbirt.samhsa.gov/>) approaches have emerged as a significant tool for addressing alcohol and other substance use in primary and prenatal care settings. SBIRT has been endorsed by the NIH, the American College of Obstetricians and Gynecologists, and other federal agencies and professional societies. Ongoing NIH research on

computer-delivered brief interventions is beginning to show promising effects in the area of prenatal substance use, with early results suggesting that computer-delivered SBIRT may be implemented efficiently and at low cost in community settings.

- Other ongoing efforts to minimize the damage caused by prenatal alcohol exposure include studies of pharmacological intervention during pregnancy. This approach may be applicable when there is alcohol exposure before a woman recognizes that she is pregnant, or otherwise fails to stop drinking during the pregnancy.
- Early-stage clinical trials are underway to assess the ability of choline supplementation as well as several behavioral interventions to mitigate learning and behavioral deficits in children with FASD. In addition, basic science investigations are exploring a number of other potential therapeutic interventions, such as dietary choline supplementation during pregnancy to prevent FASD.
- Researchers are also using animal models of FASD to explore several promising approaches to reversing or ameliorating neurobehavioral deficits. For example, recent animal studies examining the effects of neonatal binge alcohol exposure on the performance of a motor task suggest that complex motor skill training may help reverse performance deficits resulting from such exposure.
- NIAAA also seeks to launch an initiative to establish more precise estimates of FASD prevalence through creation of a standardized diagnostic system among affected children. While multiple studies designed to examine the risk factors for and effects of FASD have estimated the overall prevalence of FASD in the U.S., results of these studies suggest disparities due to relatively high rates of FASD in selected heavily drinking groups. There is a substantial need to determine a more accurate prevalence of FASD in broader communities exhibiting more variable risk.

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