

# Prenatal Exposure to Alcohol

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*Fetal Alcohol Syndrome (FAS) is a set of birth defects caused by maternal consumption of alcohol during pregnancy. At birth, children with FAS can be recognized by growth deficiency and a characteristic set of minor facial traits that tend to become more normal as the child matures. Less evident at birth—but far more devastating to FAS children and their families—are the lifelong effects of alcohol-induced damage to the developing brain.*

*FAS is considered the most common nonhereditary cause of mental retardation. In addition to deficits in general intellectual functioning, individuals with FAS often demonstrate difficulties with learning, memory, attention, and problem solving as well as problems with mental health and social interactions. Thus these individuals and their families face persistent hardships in virtually every aspect of life.*

*Estimates of FAS prevalence vary from 0.5 to 3 per 1,000 live births in most populations, with much higher rates in some communities (Stratton et al. 1996). However, the diagnosis of FAS identifies only a relatively small proportion of children affected by alcohol exposure before birth. Children with significant prenatal alcohol exposure can lack the characteristic facial defects and growth deficiency of FAS but still have alcohol-induced mental impairments that are just as serious, if not more so, than in children with FAS. The term “alcohol-related neurodevelopmental disorder” (ARND) has been developed to describe this condition. In addition, prenatally exposed children without FAS facial features can have other alcohol-related physical abnormalities of the skeleton and certain organ systems; these are known as alcohol-related birth defects (ARBD).*

*Because the effects of prenatal alcohol exposure on the developing brain appear to be especially long lasting and debilitating, a significant proportion of research has concentrated on brain malformations as well as cognitive and behavioral abnormalities. In this chapter, the section on “Prenatal Alcohol Exposure: Effects on Brain Structure and Function” describes research using neuroimaging techniques to provide precise pictures of brain abnormalities found in persons exposed to alcohol before birth. The studies strongly support the notion that alcohol has specific, rather than global, effects on the developing brain. The section also describes current research on the many behavioral manifestations of this structural brain damage, including problems with cognitive and motor functions as well as mental health and psychosocial behavior.*

*It is unlikely that a single mechanism can explain all of the deleterious effects that result from alcohol exposure during pregnancy. As described in the section “Underlying*

*Mechanisms of Alcohol-Induced Damage to the Fetus,” alcohol exerts its effects on the developing fetus through multiple actions at different sites. In the developing brain, for example, alcohol has been shown to interfere with the development, function, migration, and survival of nerve cells. Also, in the embryonic cell layer that develops into the bones and cartilage of the head and face, alcohol exposure at critical stages of development induces premature cell death that is thought to be linked to the FAS facial defects. These actions of alcohol have provided scientists with numerous paths for pursuing possible biochemical mechanisms for these actions. Better understanding of the mechanisms may point to pharmacologic approaches for intervening or for preventing alcohol-related fetal injury.*

*Although research in animals and humans is continuing to provide details about alcohol-induced deficits, efforts to prevent these problems are not nearly so advanced. The section “Issues in Fetal Alcohol Syndrome Prevention” notes that numerous strategies to prevent FAS have been implemented in recent years, but that rigorous analysis of the effectiveness of these approaches is in its infancy. The section summarizes major reviews of FAS prevention efforts, presents issues related to research methods and evaluations, and describes research on prevention approaches targeted to women at different levels of risk.*

*Recent research underscores an intensifying need for effective prevention strategies. One study found that*

*although alcohol use among pregnant women decreased between 1988 and 1992 (from 22.5 to 9.5 percent), by 1995 it had increased to 15.3 percent (Ebrahim et al. 1998). Moreover, binge drinking (defined in the study as five or more drinks per occasion) among pregnant women, a particularly hazardous drinking pattern in terms of FAS risk, increased significantly between 1991 and 1995 (from 0.7 to 2.9 percent of pregnant women) (Ebrahim et al. 1999). In light of these unsettling findings, and because FAS and other adverse effects of drinking during pregnancy are completely preventable, the need for a solid research base to guide prevention program developers is critical.*

## References

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