# Effects of Alcohol on a Fetus

WHAT YOU NEED TO KNOW

*"Of all the substances of abuse (including cocaine, heroin, and marijuana), alcohol produces by far the most serious neurobehavioral effects in the fetus."*

—Institute of Medicine Report to Congress, 1996[1]

Prenatal exposure to alcohol can damage a fetus at any time, causing problems that persist throughout the individual's life. There is no known safe level of alcohol use in pregnancy.

## What is the Scope of the Problem?

Alcohol is one of the most dangerous teratogens, which are substances that can damage a developing fetus.[1] Every time a pregnant woman has a drink, her unborn child has one, too. Alcohol, like carbon monoxide from cigarettes, passes easily through the placenta from the mother's bloodstream into her baby's blood (See Figure 1)—and puts her fetus at risk of having a fetal alcohol spectrum disorder (FASD). The blood alcohol level (BAC) of the fetus becomes equal to or greater than the blood alcohol level of the mother. Because the fetus cannot break down alcohol the way an adult can, its BAC remains high for a longer period of time.[2]

## What Are Fetal Alcohol Spectrum Disorders?

"FASD" is an umbrella term describing the range of effects that can occur in an individual whose mother drank alcohol during pregnancy. These effects may include physical, mental, behavioral, and/or learning disabilities with possible lifelong implications. The term FASD is not used as a clinical diagnosis. It refers to conditions such as fetal alcohol syndrome, alcohol-related neurodevelopmental disorder, and alcohol-related birth defects. In the United States, about 130,000 pregnant women each year drink at levels shown to increase the risk of having a child with an FASD.[3] Each year, as many as 40,000 babies are born with an FASD, costing the Nation up to $6 billion annually in institutional and medical costs.[4]

## How Does Alcohol Damage a Fetus?

Defects caused by prenatal exposure to alcohol have been identified in virtually every part of the body, including the brain, face, eyes, ears, heart, kidneys, and bones. No single mechanism can account for all the problems that alcohol causes. Rather, alcohol sets in motion many processes at different sites in the developing fetus:

- Alcohol can trigger cell death in a number of ways, causing different parts of the fetus to develop abnormally.
- Alcohol can disrupt the way nerve cells develop, travel to form different parts of the brain, and function.
- By constricting the blood vessels, alcohol interferes with blood flow in the placenta, which hinders the delivery of nutrients and oxygen to the fetus.[5]
- Toxic byproducts of alcohol metabolism may become concentrated in the brain and contribute to the development of an FASD.[6]

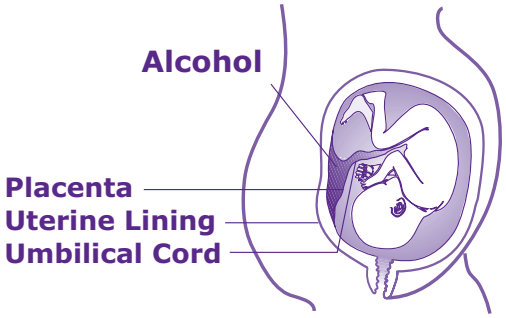


*Figure 1: Transmission of alcohol to the fetus*

Drinking at any time during pregnancy can harm the fetus. Figure 2 depicts developing parts and systems in the body of a fetus. These body parts and systems represent some of the sites that may be affected by alcohol.

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Drinking alcohol while pregnant can result in cognitive, social, and motor deficiencies and other lifelong problems.

Prenatal exposure to alcohol can cause permanent brain damage. The fetal brain can be harmed at any time, because the brain develops throughout pregnancy. Magnetic resonance imaging (MRI) reveals that some individuals who were prenatally exposed to alcohol have smaller brains. Some parts of the brain may also be damaged or missing, such as the basal ganglia, cerebellum, corpus callosum, and others. Resulting impairments may include, but are not limited to, the following:

- Mental retardation
- Learning disabilities
- Attention deficits
- Hyperactivity
- Problems with impulse control, language, memory, and social skills

Research is under way to learn more about the complex effects of alcohol on a fetus. Increased understanding may lead to improvements in prevention, diagnosis, and treatment of FASD.

Although many questions remain unanswered, this much is clear: **When a pregnant woman uses alcohol, her baby does, too.** That's why abstaining from drinking throughout pregnancy and during breastfeeding is the best gift a mother can give her child—it's a gift that lasts a lifetime.

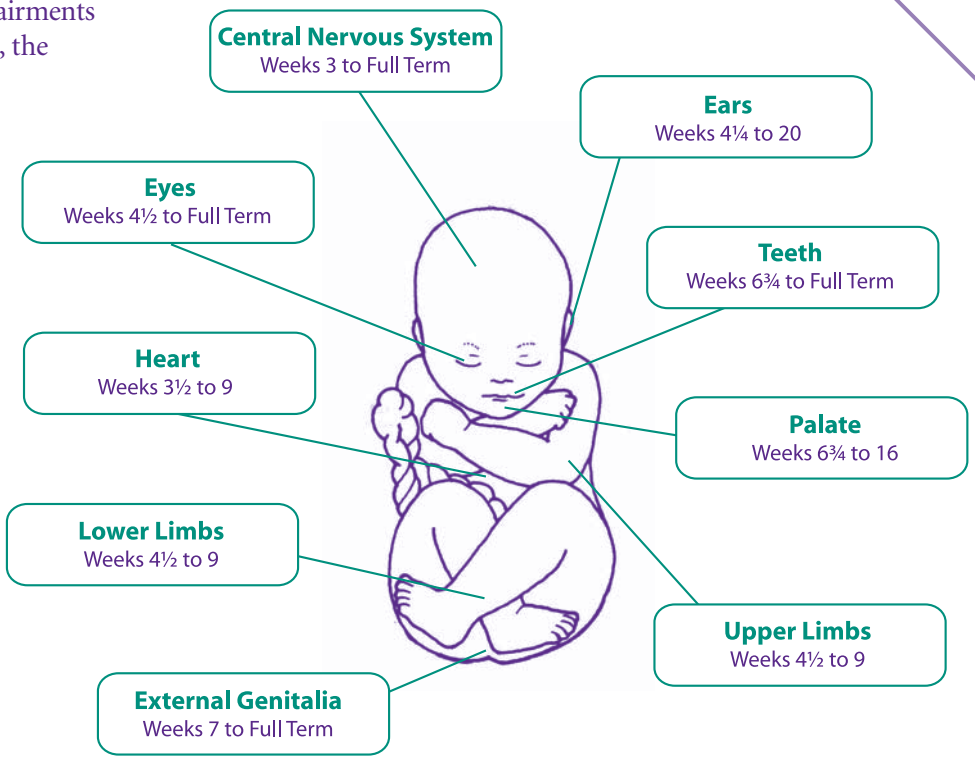


*Figure 2: Periods of fetal development*[7]

## References


1. Stratton, K.; Howe, C.; and Battaglia, F. 1996. *Fetal Alcohol Syndrome: Diagnosis, Epidemiology, Prevention, and Treatment.* Washington, DC: Institute of Medicine, National Academy Press. http://books.nap.edu/html/fetal
2. Gillen, P. No date. Fetal Alcohol Syndrome Prevention presentation. Denver: Colorado Area Health Education Center.
3. Centers for Disease Control and Prevention. National Center on Birth Defects and Developmental Disabilities. August 2004. *Preventing Alcohol-Exposed Pregnancies*. www.cdc.gov/ncbddd/fas/fasprev.htm
4. Lupton, C.; Burd, L.; and Harwood R. 2004. Cost of fetal alcohol spectrum disorders. *American Journal of Medical Genetics* 127C(676):42-50.
5. University of Wisconsin. 2003. "Alcohol as a Teratogen—Fetal Alcohol Syndrome." www.uwec.edu/piercech/FAS/FAS...htm
6. Goodlett, C.R., and Horn, K.H. 2001. Mechanisms of alcohol-induced damage to the developing nervous system. *Alcohol Research & Health* 25(3):175-184.
7. Adapted from Moore, K.L., and Persaud, T.V.N. 1993. *The Developing Human: Clinically Oriented Embryology.* Philadelphia: W.B. Saunders, p. 156.


Stop and think. If you're pregnant, don't drink.

For more information, visit **fasdcenter.samhsa.gov** or call 866-STOPFAS.

www.stopalcoholabuse.gov

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