



2025 Heart Disease & Stroke Statistics Update Fact Sheet Congenital Cardiovascular Defects

Congenital cardiovascular defects (CCD), which arise from abnormal or incomplete formation of the heart, valves, and blood vessels, are one of the most common birth defects worldwide. CCDs range in severity from minor abnormalities that spontaneously resolve or are hemodynamically insignificant to complex malformations, including absent, hypoplastic, or atretic portions of the heart. There is significant variability in the presentation of CCDs, resulting in heterogeneous morbidity, mortality, and health care costs across the life span. Some types of CCDs are associated with diminished quality of life on par with what is seen in other chronic pediatric health conditions, as well as deficits in cognitive functioning and neurodevelopmental outcomes. However, health outcomes generally continue to improve for CCDs, including survival.

The National Birth Defects Prevention Network showed the average birth prevalence of 29 selected major birth defects from 39 population-based birth defects surveillance programs in the United States from 2010 to 2014. These data indicated the following prevalence: atrioventricular septal defect (0.54 per 1000 births), coarctation of the aorta (0.56 per 1000 births), truncus arteriosus (0.067 per 1000 births), double-outlet right ventricle (0.17 per 1000 births), hypoplastic left heart syndrome (HLHS; 0.26 per 1000 births), other single ventricle (0.079 per 1000 births), interrupted aortic arch (0.062 per 1000 births), pulmonary valve atresia/stenosis (0.97 per 1000 births), tetralogy of Fallot (TOF; 0.46 per 1000 births), total anomalous pulmonary venous connection (0.14 per 1000 births), and transposition of the great arteries (TGA; 0.38 per 1000 births).

Prevalence

- In high-income North America, including the United States, the birth prevalence of CCDs was estimated to be 12.3 per 1000 according to 1990 to 2017 data.
- In 2017, the all-age prevalence of CCDs in the United States was estimated at 466 566 individuals, with 279 320 (60%) of these <20 years of age.

Mortality

- Mortality related to CCDs in 2022 was 3213 for all ages.
- In 2022, the age-adjusted US death rate attributable to CCDs was 1.0 deaths per 100 000 people, the same as it was in 2012.
- In 2022, CCDs were the most common causes of infant death resulting from birth defects; 23.0% of infants who died in 2021 of a birth defect had a heart defect.

Risk Factors

- Twins are at higher risk for congenital heart defects.
- Known maternal risks include maternal smoking during the first trimester of pregnancy.
- Exposure to secondhand smoke has been implicated as a risk factor.
- Maternal binge drinking is associated with an increased risk of CCDs, and the combination of binge drinking and smoking may be particularly dangerous.

Unless otherwise noted, all statistics in this Fact Sheet pertain to the United States. Please refer to the complete Statistics Update for references and additional information for reported statistics.

Risk Factors (continued)

- Maternal obesity is associated with CCDs.
- Maternal diabetes, including gestational and pregestational diabetes, has been associated with fetal CCDs.
- Folate deficiency has been a well-documented risk for CCDs, however a more recent systematic review did not identify a relationship between folate deficiency and CCDs.
- Maternal infections, including rubella, hepatitis B virus, coxsackievirus B, and human cytomegalovirus, have been associated with CCDs.
- Paternal exposures that increase risk for congenital heart defects include paternal anesthesia, sympathomimetic medication, pesticides, and solvents.
- Maternal exposure to teratogens.
- Maternal use of some antihypertensive agents (ACE inhibitors, antiadrenergic agents, β -blockers, calcium channel blockers, diuretics) during the first trimester.

Hospitalizations & Costs

- Among pediatric hospitalizations (0–20 years of age) in 2009 and 2012:
 - ◇ Pediatric hospitalizations with CCDs (4.4% of total pediatric hospitalizations) accounted for \$6.6 billion in hospitalization spending (23% of total pediatric hospitalization costs).
 - ◇ 26.7% of all CCD costs were attributed to critical CCDs, with the highest costs attributable to HLHS, coarctation of the aorta, and TOF.
 - ◇ Mean cost of CCDs was higher in infancy (\$36 601) than in older ages and in those with critical CCDs (\$52 899).

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[Heart and Stroke Association Statistics | American Heart Association.](#)

Many statistics in this fact sheet come from unpublished tabulations compiled for the Statistics Update document and can be cited using the document citation listed below. The data sources used for the tabulations are listed in the full document. Additionally, some statistics come from published studies. If you are citing any of the statistics in this fact sheet, please review the full Heart Disease and Stroke Statistics document to determine data sources and original citations.

The American Heart Association requests that the full document be cited as follows:

Martin SS, Aday AW, Allen NB, Almarzooq ZI, Anderson CAM, Arora P, Avery CL, Baker-Smith CM, Bansal N, Beaton AZ, Commodore-Mensah Y, Currie ME, Elkind MSV, Fan W, Generoso G, Gibbs BB, Heard DG, Hiremath S, Johansen MC, Kazi DS, Ko D, Leppert MH, Magnani JW, Michos ED, Mussolino ME, Parikh NI, Perman SM, Rezk-Hanna M, Roth GA, Shah NS, Springer MV, St-Onge M-P, Thacker EL, Urbut SM, Van Spall HGC, Voeks JH, Whelton SP, Wong ND, Wong SS, Yaffe K, Palaniappan LP; on behalf of the American Heart Association Council on Epidemiology and Prevention Statistics Committee and Stroke Statistics Committee. 2025 Heart disease and stroke statistics: a report of US and global data from the American Heart Association. *Circulation*. Published online January 27, 2025.

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