Congenital heart disease more deadly in low-income countries

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Even though mortality from congenital heart disease (CHD) has declined over the last three decades as diagnosis and treatments have advanced, the chances for a child to survive a CHD diagnosis significantly differs

based on the country where he or she is born.

This eye-opening finding is drawn from the first comprehensive study of congenital heart disease across 195 countries, prepared using data from the Global Burden of Diseases, Injuries and Risk Factors Study 2017 (GBD), and recently published in *The Lancet*.

"Previous congenital heart estimates came from few data sources, were geographically narrow and did not evaluate CHD throughout the life course," write the authors, known collectively as the 2017 GBD Congenital Heart Disease Collaborators. Co-lead author Meghan D. Zimmerman, M.D., worked on the study while completing her pediatric cardiology and American Heart Association Global Health Fellowships at Children's National Hospital, and two pediatric cardiologists from Children's National, Cardiology Associate Chief Craig Sable, M.D., and Gerard Martin, M.D., medical director of Global Services, provided leadership and oversight of this paper. The remaining collaborators are from more than 45 institutions around the world, spanning cardiology, public health and schools of medicine on every continent.

This is the first time the GBD study data was used along with all available data sources and previous publications—making it the most comprehensive study on congenital heart disease burden to date. Key differences between this study and prior estimates include:

- Anatomic groupings of CHD by type, rather than simply categorized as moderate, severe or critical.
- Inclusion of new data sources, including data from screening programs, congenital registries, administrative data and data sources in mortality and survival.
- A control mechanism to account for cases of CHD that remit on their own to reduce the risk of overestimating prevalence.
- Inclusion of all cases of congenital heart disease, including those

with chromosomal or genetic anomalies such as Trisomy 21 that often co-occur.

This more comprehensive data set led to findings that showed lower predicted long-term survival, higher remission, and lower prevalence than previous studies that extrapolated evidence from studies of high-income countries. However, it also means these new estimates are a more accurate representation of the current global state of affairs. Overall, the study found:

- A 34.5% decline in deaths from congenital disease between 1990 to 2017.
- Nearly 70% of deaths caused by CHD in 2017 (180,624) were in infants less than one year old.
- Most CHD deaths occurred in countries within the low and low-middle socio-demographic index (SDI) quintiles.
- Mortality rates get lower as a country's SDI rises.
- Birth prevalence of CHD was not related to a country's socio-demographic status, but overall prevalence was much lower in the poorest countries of the world. This is because children in these countries do not have access to life saving surgical services.
- Nearly 12 million people are currently living with CHD globally, 18.7% more than in 1990.
- The burden of CHD is not fully realized by just looking at prevalence and mortality. The measure "Years of Life Lost" provides deeper insight into the staggering burden of CHD, taking into account both absolute mortality and age at death.

"In high income countries like the United States, we diagnose some heart conditions prenatally during the 20-week ultrasound," says Dr. Martin, a pediatric cardiologist at Children's National Hospital who contributed to the study. "We catch others right after birth with a pulse oximetry screening for critical congenital heart disease. We can operate to correct

a critical issue within the first week of life. And now our CHD kids are growing and thriving through adulthood and having families of their own."

"For children born in middle- and low-income countries, these data draw stark attention to what we as cardiologists already knew from our own work in these countries—the lack of diagnostic and treatment tools leads to lower survival rates for children born with CHD," adds Dr. Sable. "This is one of the most significant publications I have been a part of as it highlights the substantial loss of life to CHD in infancy around the globe."

The authors write, "The UN has prioritized reduction of premature deaths from heart disease, but to meet the target of 'ending preventable deaths of newborns and children under 5 years of age,' health policy makers will need to develop specific accountability measures that address barriers and improve access to care and treatment."

The study also includes a 400-page appendix breaking down each area by type of congenital anomaly, world region and country.

More information: Meghan S Zimmerman et al, Global, regional, and national burden of congenital heart disease, 1990–2017: a systematic analysis for the Global Burden of Disease Study 2017, *The Lancet Child & Adolescent Health* (2020). DOI: 10.1016/S2352-4642(19)30402-X

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