

# Environment plays role in complex heart defect

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A congenital heart disease that often leads to death in newborns is significantly more common during the summer, leading researchers to believe that the environment, and not just genes that affect the heart, may play a role in causing "mini-epidemics" of this disease.

A cardiac surgeon from Cincinnati Children's Hospital Medical Center presents this research today at the annual American College of Cardiology Meeting in Orlando, FL. The study is a finalist in the ACC's Best Poster Awards Competition.

Hypoplastic Left Heart Syndrome is one of the most complex cardiac defects seen in newborns and remains probably the most challenging to manage of all congenital heart defects. In a child with HLHS, all of the structures on the left side of the heart (the side which receives oxygen-rich blood from the lungs and pumps it out to the body) are severely underdeveloped. This results in the left side of the heart being completely unable to support the circulation needed by the body's organs.

The most common treatment for HLHS is "staged reconstruction," in which a series of operations, usually three, are performed to reconfigure the child's cardiovascular system to be as efficient as possible despite the lack of an adequate left ventricle. Current management at major pediatric heart centers has resulted in [survival rates](#) of 75 percent or better.

Pirooz Eghtesady, MD, PhD, a cardiothoracic surgeon at Cincinnati Children's, led a study of nearly 1,500 newborns from 38 children's hospitals in the United States who had left-sided congenital heart diseases. Dr. Eghtesady and his colleagues found a seasonal occurrence of HLHS, but not other left-sided diseases, over a 10-year period, 1996 to 2006. Seasonal differences in HLHS occurred each year, with peaks between April and July and low points in January.

"Strong seasonality is a clue that environmental factors may play an important role in this disease, as we see, for example, with such common childhood illnesses as asthma and croup," says Dr. Eghtesady. "The study augments some prior epidemiologic studies and points the finger at the possibility of additional factors. It also opens the window for genetic studies to consider candidate genes not directly related to cardiac maldevelopment, such as those involved in immune responses, which really have not been considered in the past."

One potential environmental factor being studied by Dr. Eghtesady and colleagues is recurrent maternal exposure to the common agent strep throat, which is also responsible for the devastating condition known as rheumatic [heart disease](#). Numerous studies have indicated that an immune reaction against strep in rheumatic heart disease can lead to injury on the left side of the heart, which is the side also affected in HLHS. Dr. Eghtesady's preliminary study suggests that many mothers whose newborns had left-sided heart injury had a significant history of problems related to strep throat.

Cincinnati Children's is involved in an ongoing clinical trial looking at maternal history of strep exposure compared to mothers with normal hearts and mothers affected by other cardiac defects. Researchers at Cincinnati Children's also are studying whether there are antibodies in the blood of mothers exposed to strep similar to ones found in patients with rheumatic heart disease

Source: Cincinnati Children's Hospital Medical Center

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