

New research could improve cardiac care for children

April 11 2023



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A first-of-its-kind study has established pediatric reference intervals for two common tests for cardiovascular disease. Published in *The Journal of Applied Laboratory Medicine*, these findings are crucial to advancing

diagnosis and treatment of heart conditions in children.

Many pediatric hospitals have started to use two cardiac tests known as high-sensitivity cardiac troponin (hs-cTn) and N-terminal pro B-type natriuretic peptide (NT-proBNP). These tests detect levels of the proteins cTn I or T and NT-proBNP, respectively, and recent studies have shown that their use could improve care for children with conditions ranging from [congenital heart disease](#) and [heart failure](#) to multi-system organ failure caused by sepsis.

A major limitation of these tests in children, however, is that precise pediatric reference intervals for hs-cTn and NT-proBNP have not been determined yet. Pediatric reference intervals are the range of normal test values appropriate for the age, stage of development, ethnicity, and gender of a child. They are essential for interpreting test results accurately, and without them, children are at risk for misdiagnosis and inappropriate or even harmful medical care.

With this in mind, Khosrow Adeli, Ph.D., and Ph.D. candidate Mary Kathryn Bohn of The Hospital for Sick Children in Toronto, set out to determine pediatric reference intervals for both hs-cTnI and NT-proBNP. To do this, they analyzed approximately 200 [blood samples](#) collected from healthy pediatric patients (ranging in age from newborns to 18 years old) using an hs-cTnI test and an NT-proBNP test made by the same major diagnostic manufacturer. Based on the results of this analysis, the researchers then followed the Clinical and Laboratory Standards Institute EP-28A3c guidelines to determine reference limits at the 2.5, 97.5, and 99th percentiles.

Significantly, Adeli and Bohn found that blood concentrations of both hs-cTnI and NT-proBNP are substantially elevated in newborns, with 99th percentiles of 55.8 ng/L and 1,785 ng/L, respectively. This means that test results for hs-cTnI and NT-proBNP that don't surpass these levels

are normal in newborns, even though results this high in adults would indicate [cardiovascular disease](#). This finding could prevent the misdiagnosis of heart issues in newborns, and it also underscores why pediatric reference intervals are so critical for these tests.

"Lack of evidence-based pediatric reference standards for cardiac biomarker interpretation complicates test interpretation," said Adeli and Bohn. "The current study establishes comprehensive pediatric reference limits for high sensitivity cardiac troponin I and NT-proBNP in the CALIPER cohort and demonstrates the importance of considering age in interpretation. These data valuably contribute to the limited literature on expected health-associated values for cardiac biomarkers in children and will be helpful to clinical laboratories in interpreting these [increasingly] utilized assays in neonates, children, and adolescents."

More information: Mary Kathryn Bohn et al, Comprehensive Pediatric Reference Limits for High-Sensitivity Cardiac Troponin I and NT-proBNP in the CALIPER Cohort, *The Journal of Applied Laboratory Medicine* (2023). [DOI: 10.1093/jalm/jfad012](https://doi.org/10.1093/jalm/jfad012)

Provided by American Association for Clinical Chemistry (AACC)

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