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In pilot study, screening detects potentially serious heart conditions in healthy children

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A pilot study in healthy children and adolescents shows that it is feasible to screen for undiagnosed heart conditions that increase the risk of sudden cardiac arrest (SCA). Adding a 10-minute electrocardiogram (EKG or ECG) to a history and physical examination identified unsuspected cases of potentially serious heart conditions.

Although more research is needed, the preliminary results suggest that a relatively low-cost screening might help identify children who are at risk for sudden cardiac arrest, possibly preventing childhood death.

"In the United States, the current American Heart Association guidelines recommend screening only competitive athletes, not all children, using history and physical examination alone," said the study leader, Victoria L. Vetter, M.D., M.P.H., a pediatric cardiologist at The Children's Hospital of Philadelphia. She noted that in Italy and Japan, which have compulsory screening of all athletes or schoolchildren, researchers have found that adding an ECG to the history and physical increases the likelihood of detecting children at risk for SCA.

"Our pilot study evaluated the feasibility of adding an ECG to cardiac screening of healthy school-aged children," Vetter added. The Children's Hospital research team published their study on March 15 in the *American Heart Journal*.

In children, sudden cardiac arrest is caused by structural or electrical abnormalities in the heart that frequently cause no symptoms and may go

undiagnosed. It results in an estimated 100 to 1,000 or more annual deaths in childhood in the U.S. The current study evaluated 400 healthy subjects, 5 to 19 years old, recruited from Children's Hospital's Care Network. The researchers screened the subjects using a medical family history questionnaire, a physical examination, an ECG and an echocardiogram.

The study team identified previously undiagnosed cardiac abnormalities in 23 subjects, and hypertension in an additional 20. Ten of the 400 subjects (about 2.5 percent) had potentially serious cardiac conditions. Of those 10 subjects, only one had experienced symptoms, and those had previously been dismissed. None of the 10 subjects had a family history of SCA. "In our study, using ECG outperformed the history and physical examination and found previously unidentified potentially serious abnormalities that would not have been identified by history and physical examination alone," the study authors wrote. The authors added that the children in the screening were not all high school athletes, and most would not have undergone athletic cardiac screening. Regular physical examinations by primary care physicians had not detected the cardiac conditions found in the current study

"Performing the ECG and its interpretation added less than 10 minutes to each subject's total evaluation," said Vetter, added that the ECG machines are portable and relatively inexpensive.

"Our pilot study showed that adding ECG to the currently recommended guideline of history and physical examination is feasible for screening children and adolescents, and offers the potential to identify serious cardiovascular abnormalities," said Vetter. "However, our study was not designed to be generalized to a larger population of children at risk for SCA. Larger, more representative studies must be done, as well as cost-effectiveness research." She added that larger pediatric studies may establish better standards for ECG measurements, and determine how

broad ECG-screening of school-aged children could best be implemented.

More information: Vetter et al, "A pilot study of the feasibility of heart screening for sudden cardiac arrest in healthy children," American Heart Journal, published online March 15, 2011; doi: 10.1016/j.ahj.2011.01.022

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