

# ECG testing of young athletes cost-effective in preventing deaths, study shows

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Routine testing of the hearts of young American athletes using electrocardiograms to screen for sudden death is "reasonable in cost and effective at saving lives," according to a new study by cardiologists at the Stanford University School of Medicine.

The findings challenge the conventional wisdom in the United States that conducting routine electrocardiograms, known as ECGs, is too expensive to be required of young American athletes prior to engaging in competitive exercise, despite saving lives. The study will be published in the March 2 issue of the [Annals of Internal Medicine](#).

"According to our model, ECG together with a history and physical exam is the preferred strategy for screening athletes for underlying heart disease. This would save the most lives at a cost that is generally agreed to be acceptable for the U.S. health-care system," said Matthew Wheeler, MD, PhD, a fellow in [cardiovascular medicine](#) and first author of the study.

The goal of the Stanford study was to scientifically examine the costs, and determine whether the expense of the screenings should be the reason for not doing routine ECG-based screenings of young athletes, the study's authors said. "All we've had to go on so far was a rough estimate of what the cost would be, without a long term view as to the potential life-saving effects," Wheeler said.

"We wanted to do a scientific analysis of cost-effectiveness," said senior

author Euan Ashley, MD, PhD, assistant professor of cardiovascular medicine and director of the Stanford Hypertrophic Cardiomyopathy Center.

Currently, using ECGs for routine screening to uncover such diseases as hypertrophic cardiomyopathy, is required for many professional athletes but not for those in college or high school. Participation requirements for these younger athletes are usually limited to physicals and medical history. In general, the thinking goes, heart testing is a good idea but it's just too expensive, especially when the prevalence of death is so low.

But a study out of Italy, where routine ECG heart screenings of young athletes has been mandatory since 1982, has fueled the debate about feasibility of such testing in America. The study showed that sudden death during competition has decreased nearly 90 percent since testing began.

"In the study that came out of Italy, they kept very good records of their screening over a period of 25 years," Wheeler said. "That gave us the data to show that screening can work."

The authors based their model on results from the Italian study, while adjusting for U.S. variations in disease prevalence and differences in screening modalities. They also collected data from numerous smaller studies written on the topic.

Results showed that adding the ECG to screening at a total cost of \$88 per athlete saves 2.1 life-years per 1,000 athletes screened. The total cost included both initial testing, follow-up and treatment costs resulting from screening. "Our study looked at all of the costs of care, which is critical in determining how a screening test will affect the health-care system," said co-author Paul Heidenreich, MD, associate professor of medicine and of health research and policy. From a health economics standpoint,

the cost-effectiveness ratio was \$42,900 per life-year saved, the study said.

"The cost-effectiveness ratio means you spend more money screening, but you also get benefits by reducing deaths," explained co-author Mark Hlatky, MD, professor of health research and policy and of cardiovascular medicine. "Procedures under \$50,000 per life-year added are generally accepted in the United States as cost effective. Procedures over \$100,000 are often not."

Sudden death in athletes is rare. What researchers are looking for, when they examine the athletes' ECG results, is signs of hypertrophic cardiomyopathy, long QT syndrome and other causes of [sudden death in young athletes](#). In the United States, hypertrophic cardiomyopathy is the most common cause of athlete death.

Nationally, it's estimated that one out of every 500 people has HCM, in which a genetic defect causes thickening of the heart muscle and leads to dangerous heart rhythms that can stop the heart. The first symptom of HCM can be death. If an athlete is found to have HCM, it's recommended that he or she quit competitive exercise.

Provided by Stanford University Medical Center

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