Screening programs unlikely to prevent sudden cardiac arrest in competitive athletes

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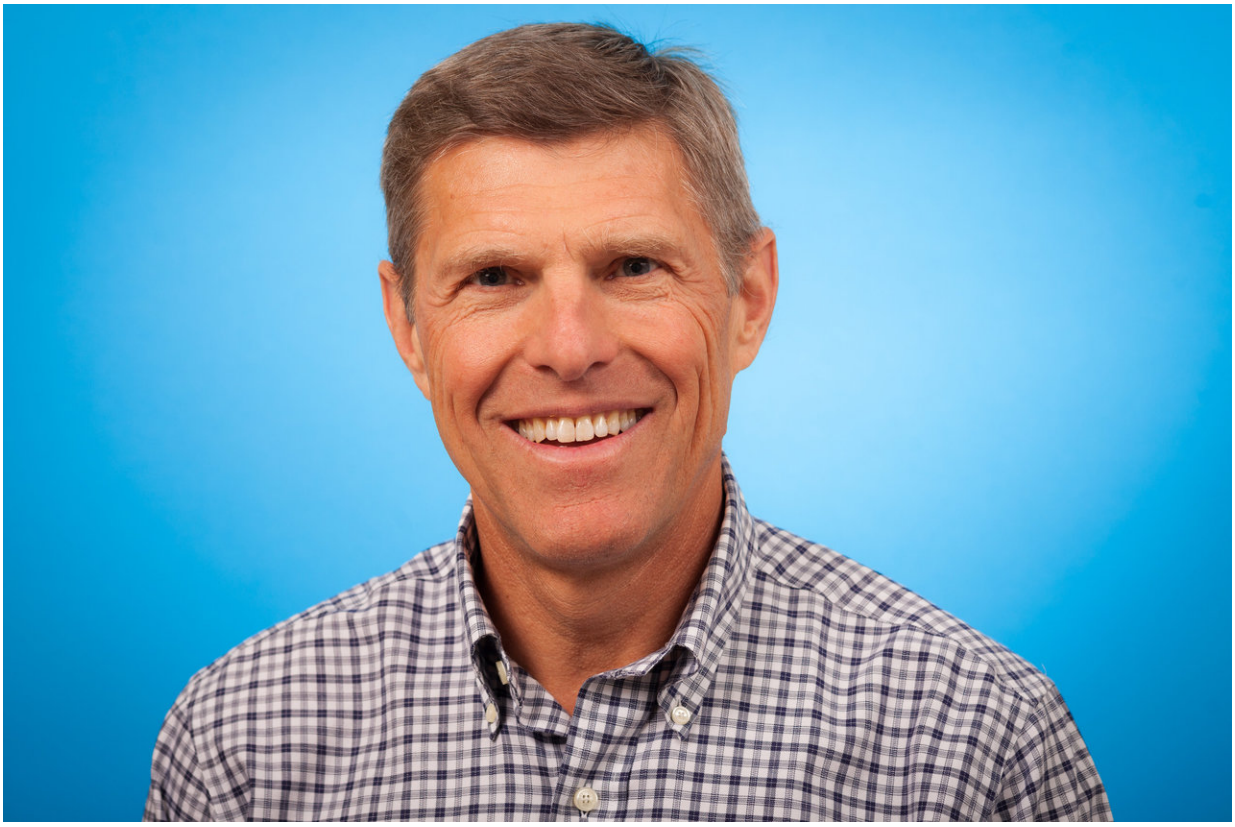

Dr. Paul Dorian, cardiologist at St. Michael's Hospital and lead author of the study. Credit: St. Michael's Hospital

Screening programs for cardiac conditions are not an effective way to prevent sudden cardiac arrest in competitive sport, and may prevent

healthy athletes from participating, a new study suggests.

More than 80 per cent sudden cardiac arrests in competitive sports could not have been predicted by screening programs, according to the study published online today in the *New England Journal of Medicine*.

Researchers at St. Michael's Hospital identified a total of 3825 out-of-hospital cardiac arrests among persons aged 12-45 during the six-year study period.

They identified 58 and 16 cases of sudden cardiac arrest in non-competitive sport and competitive sport, respectively. The researchers examined sudden cardiac arrest in a variety of sports including amateur and college or university level hockey, soccer, track and field, baseball, basketball and marathons.

Of the 16 cases of sudden cardiac arrest during competitive sport, only three were caused by conditions that could have been identified through a pre-participation screening program, according to the authors.

Previous research suggested hypertrophic cardiomyopathy, a hereditary condition in which the heart muscle is abnormally thick, is the leading cause of sudden cardiac arrest among competitive athletes.

However, only two of 16 cases of sudden cardiac arrest in competitive sport were caused by hypertrophic cardiomyopathy, the authors said.

Previous research has also identified arrythmogenic right ventricular cardiomyopathy, a hereditary condition in which parts of heart muscle turns to fat, as a potential cause of sudden cardiac arrest in competitive sports. The researchers found no cases of sudden cardiac arrest in competitive sport caused by this condition during the study period.

Dr. Paul Dorian, a cardiologist at St. Michael's and lead author of the study, said while there are a small number of cases in which these underlying conditions may be the cause of sudden cardiac arrest among competitive athletes, the findings demonstrate that more often than not, screening programs are likely to be ineffective.

"In Europe and in the United States, screening programs have been implemented on the assumption that most cases of sudden cardiac arrest during sport can be predicted and prevented by identifying people who are at risk because of a pre-existing condition, and withdrawing them from competitive sports," he said. "Our study shows these events are too rare, and the causes are not likely enough to be identified , to warrant screening every athlete who wants to play competitive sports."

Among the athletes who experienced sudden cardiac arrest during competitive sport, 44 per cent were resuscitated and survived, the study found.

Dr. Dorian said the results of the study indicate a need for defibrillators in every arena or field where competitive sports are played, rather than screening for pre-existing cardiac conditions.

"Sudden cardiac arrest in young athletes is a rare but tragic event," he said. "We need to find a way to prevent these events while keeping as many kids as we can in the game. The evidence suggests one of the best ways to do that is by installing defibrillators at every sporting arena and field at which competitive sports are played, and training bystanders to respond effectively."

The study is believed to be the first to examine all cases of sudden cardiac arrest in competitive sport in a highly-populated metropolitan area with a large number of registered competitive athletes, according to the authors.

The researchers used the Toronto Regional RescuNET cardiac arrest database, which contains records of every cardiac arrest attended by paramedics in Southern Ontario, to identify all out-of-hospital cardiac arrests in individuals aged 12-45 that occurred during sport in Toronto from 2009-2014.

Sudden cardiac arrest occurred at a rate of 0.76 cases for every 100,000 athletes per year, the authors said. During the study period, registered competitive athletes aged 12-45 in Toronto represented 11.4 per cent of the total population, according to the study.

The authors estimate that if screening programs including an electrocardiogram, or ECG, were implemented, 1 in 300 Canadians aged 12-45 who registered for competitive sports—about 1,200 athletes in the Toronto area in a year—would be prevented from participating due to an abnormality, despite the low risk of sudden cardiac arrest reported in the study.

"These conditions are common enough that the number of kids who would be removed from competitive sports because of a pre-existing condition greatly exceeds the number who are truly at risk of ever experiencing sudden cardiac arrest," said Dr. Dorian. "For the majority of people, the benefits of participating in competitive sports far outweigh any risk of sudden cardiac arrest."

Provided by St. Michael's Hospital