

Sudden Cardiac Death in Athletes and Preparticipation CV screening

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Global Debate or Common Ground ?

- SCD is a catastrophic event
- Athletes are at increased risk
- Prevention is critical
- Screening for occult disease is efficient



**Sudden Cardiac Death
in Athletes:
incidence**

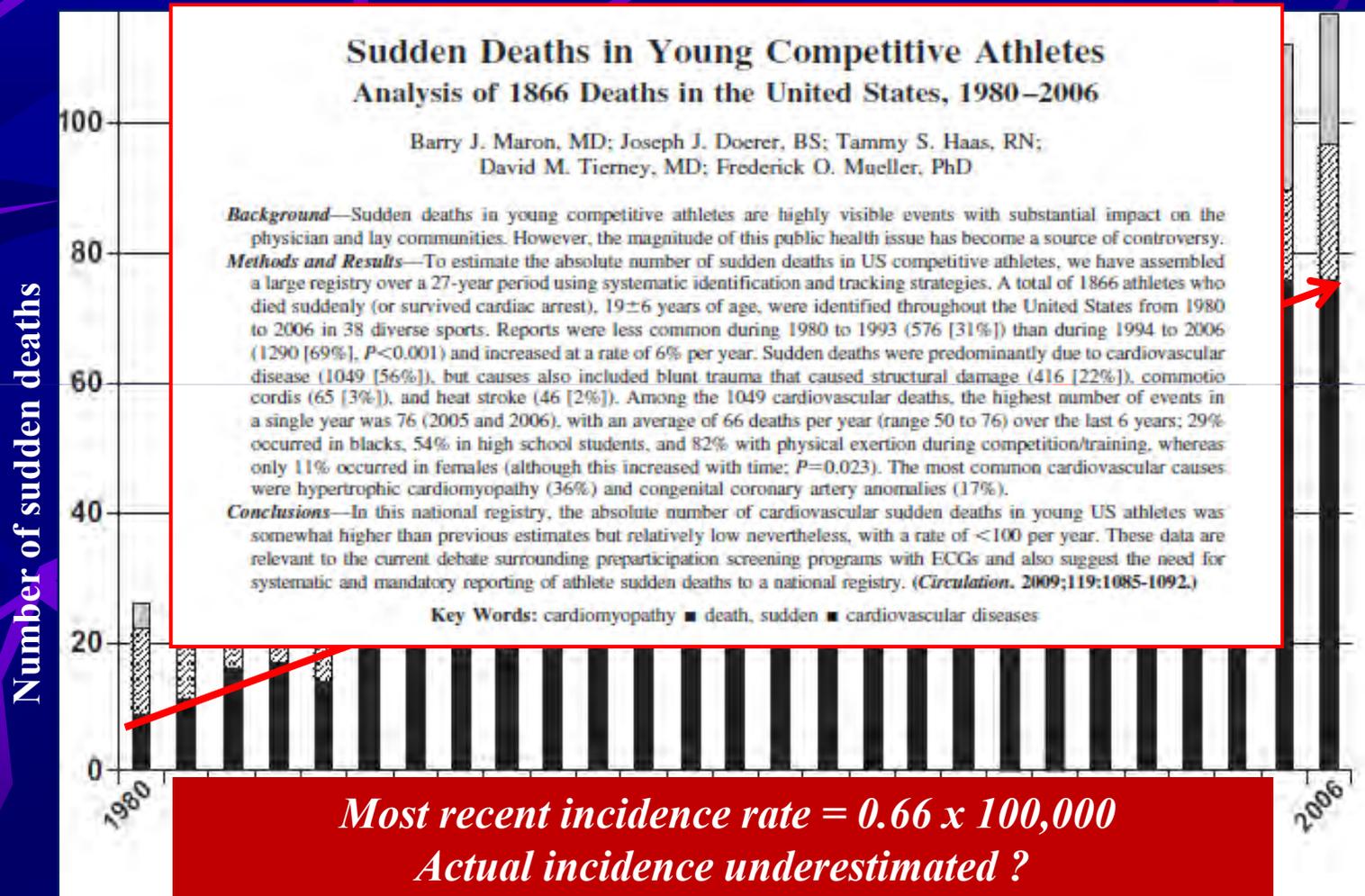
SCD Incidence

- **Traditional Estimates in the U.S.**
 - **1 in 200,000 (i.e., 0.5 x 100,000) High School Athletes/yr^{1,2}**
 - **1 in 160,000 (i.e., 0.62 x 100,000) in young of 12-35 age³**

1. Van Camp; *MSSE* 1995
2. Maron; *JACC* 1998
3. Maron; *Circulation* 2009

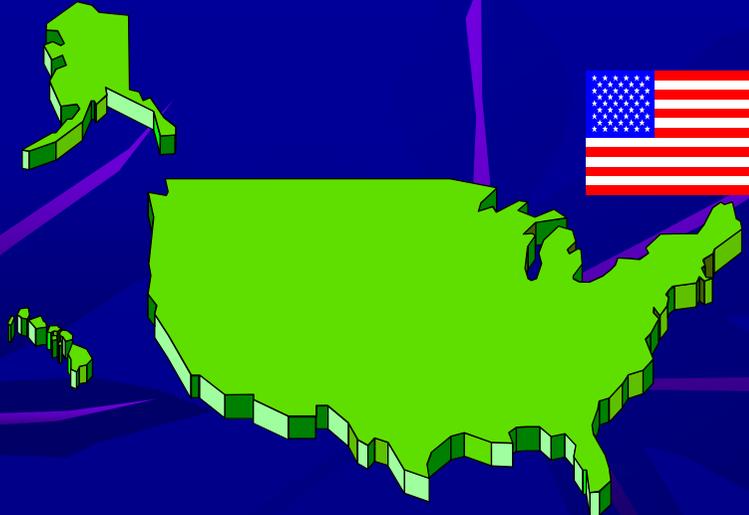
Sudden Deaths in US Young Competitive Athletes: 1980-2006

Number of cardiovascular sudden deaths (black bars) in 1,866 young US athletes



Maron et al. *Circulation*. 2009;119:1085-1092

Incidence of SCD in young athletes



Sudden Unexpected Nontraumatic Death in 54 Young Adults: A 30-Year Population-Based Study

Win-Kuang Shen, MD, William D. Edwards, MD, Stephen C. Hammill, MD, Kent R. Bailey, PhD, David J. Ballard, MD, PhD, and Bernard J. Gersh, MB,ChB, DPhil

The objective of this study was to evaluate the incidence and correlates of sudden unexpected nontraumatic death among young adults in a well-surveyed population. The incidence and pathogenesis of sudden unexpected nontraumatic death in a young adult population (aged 20 to 40 years old) have not been well defined. All residents 20 to 40 years old from Olmsted County, Minnesota, who had nontraumatic sudden death between 1960 and 1989 were included. Histologic and gross cardiac specimens were examined. The incidence of sudden death was estimated based on the ratio of number of observed events to relative census data for the Olmsted County population from the last 3 decades

were men (8.7/10⁵ population annually). An increase in incidence of sudden death was evident in men. Causes of death included coronary artery disease, noncardiovascular disease, suspected primary arrhythmia, vascular disease, myocarditis, hypertrophic cardiomyopathy, and unknown causes. Gross and histologic features suggestive of right ventricular dysplasia were found in 9 subjects (17%), but 6 of these 9 had other established causes of death. Of the 27 sudden deaths between 1980 and 1989, 9 (33%) had a history of cocaine abuse. A trend in increasing incidence of sudden death in young men is noted. A high prevalence of cocaine abuse was observed in young adults who died

3,55 x100,000 was the incidence of sudden cardiac death in residents of Olmsted County, Minnesota, aged 20 to 40 years, in the period 1960 to 1989.

3.6x100,000

Cases were collected by a prospective registry of Juvenile SD, in a relatively limited geographical area, with causes identified by experienced pathologist

Pediatric Cardiology

Epidemiology and Outcomes From Out-of-Hospital Cardiac Arrest in Children

The Resuscitation Outcomes Consortium Epistry–Cardiac Arrest

Prospective population-based study on OHCA

- **11 US/Canadian sites; >260 EMS agencies**
- **All OHCA with EMS response; Dec 2005 – March 2007**
- **Incidence of OHCA in adolescents (age 12-19)**
 - **CV cause: 3.75/100,000 (1 in 27,000)**

(from Atkins et al. Circulation 2009)

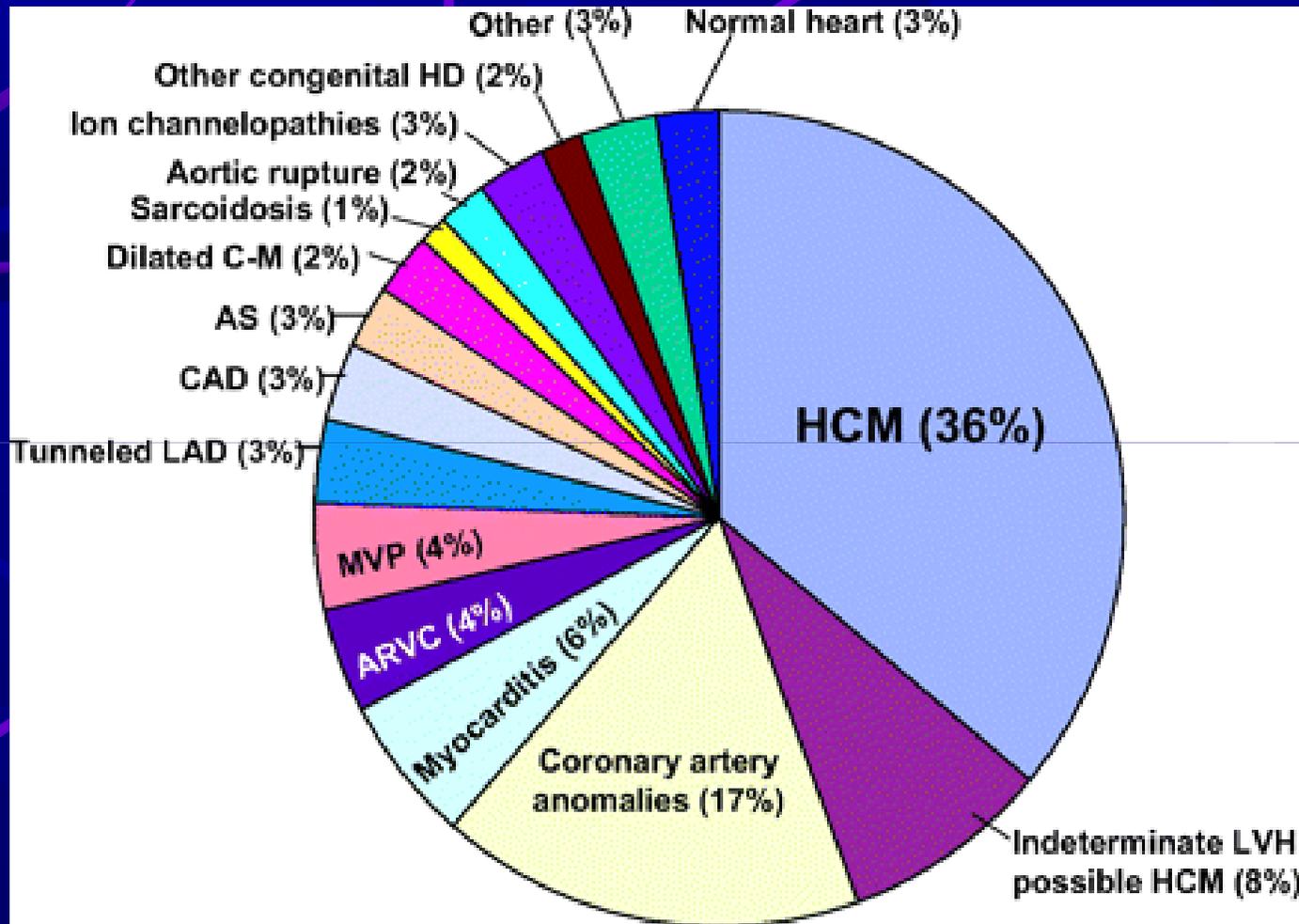
SCD Incidence: Challenges and Limitations

- **Difficult to compare incidence studies with profoundly different methodology**
- **No mandatory reporting system in U.S.**
- **U.S. estimates reliant on media and other electronic sources**
- **What [Numerator] / What [Denominator] grossly estimated**



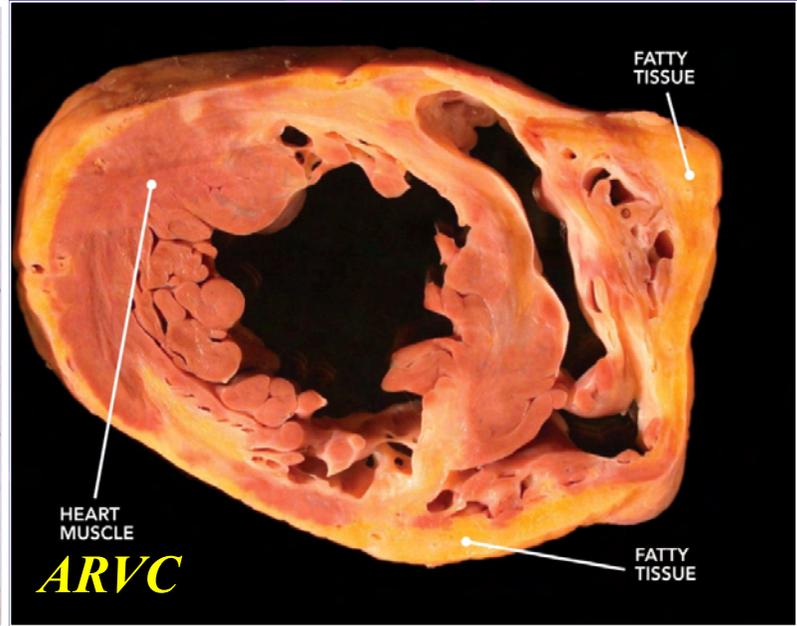
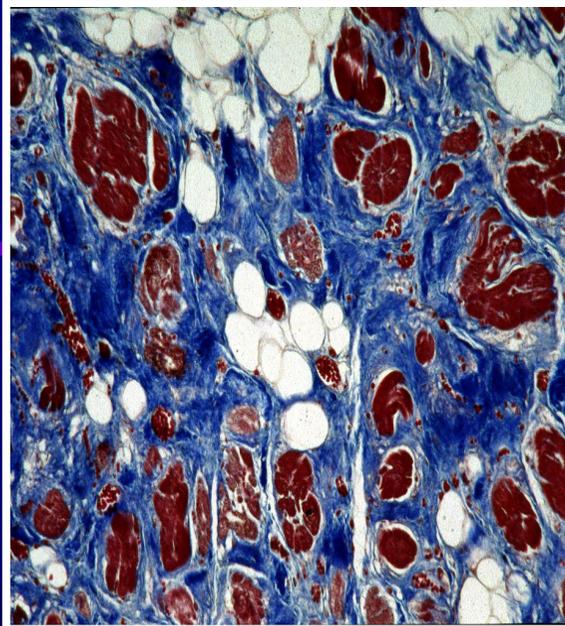
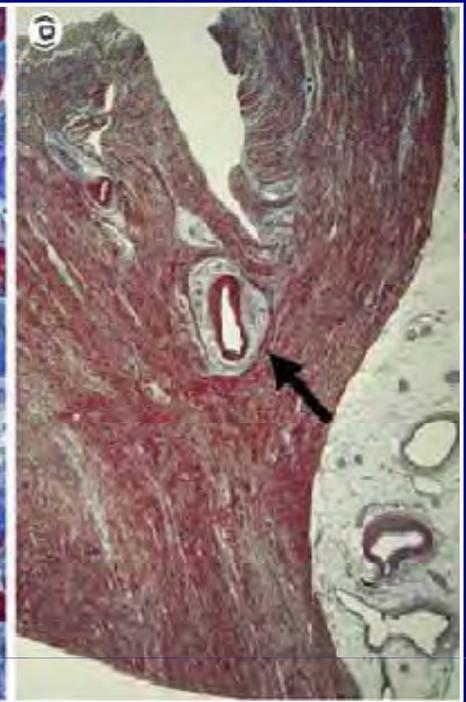
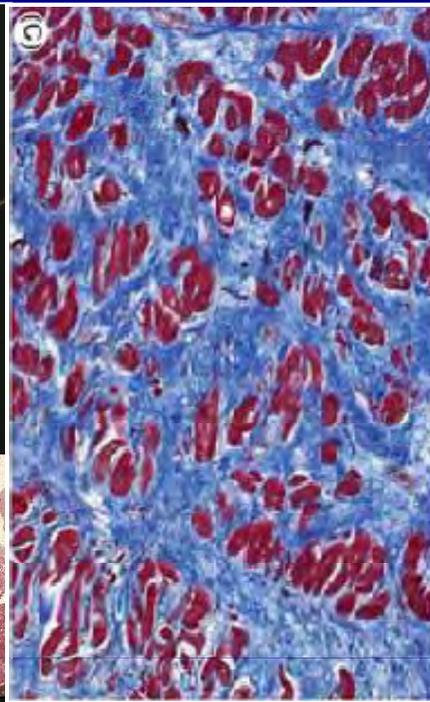
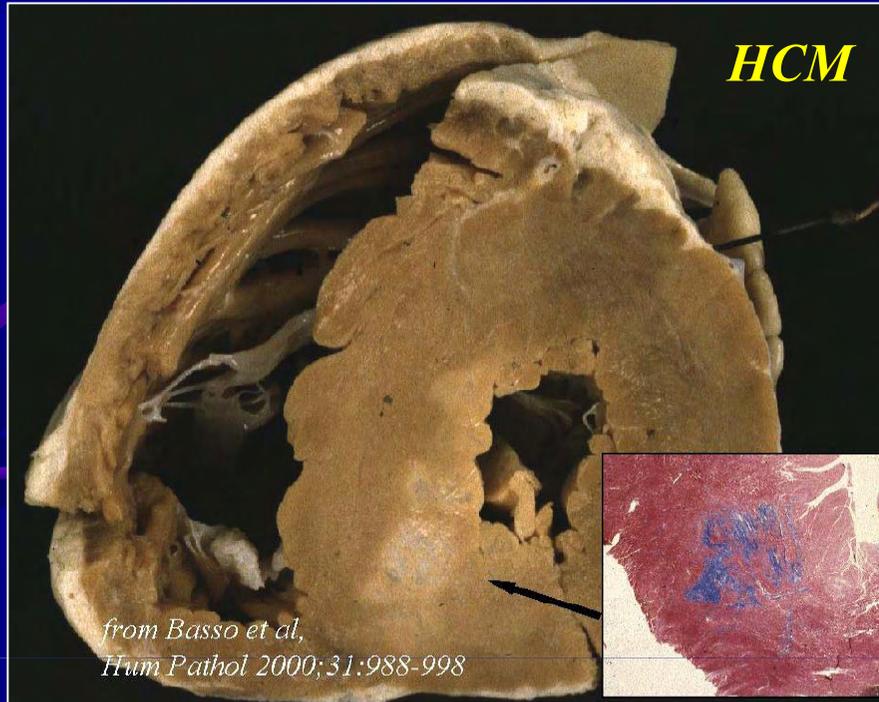
**Sudden Cardiac Death
in Athletes:
pathologic findings**

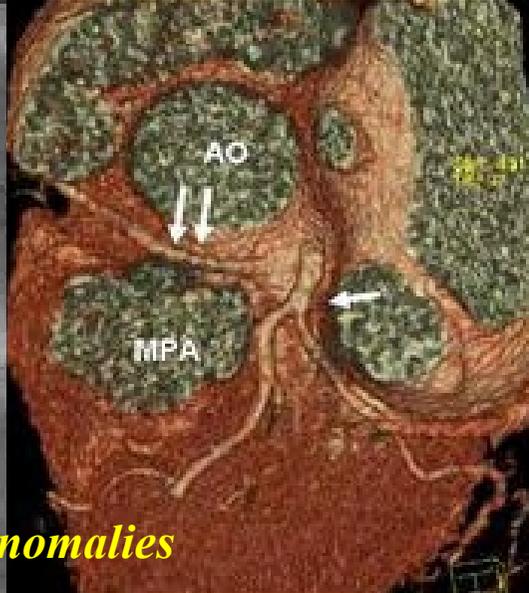
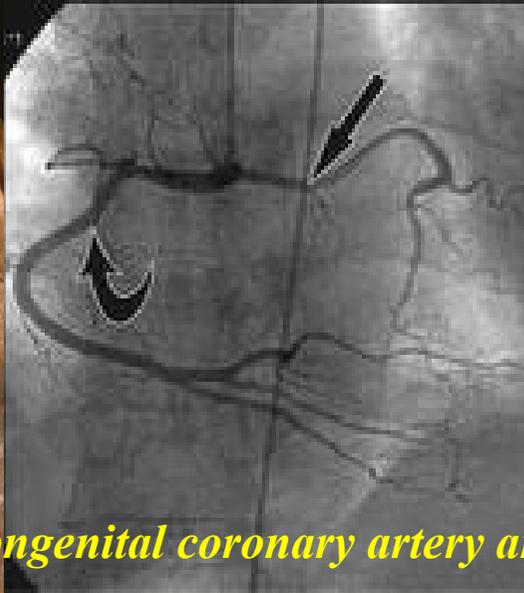
Cardiovascular Causes of Sudden Death



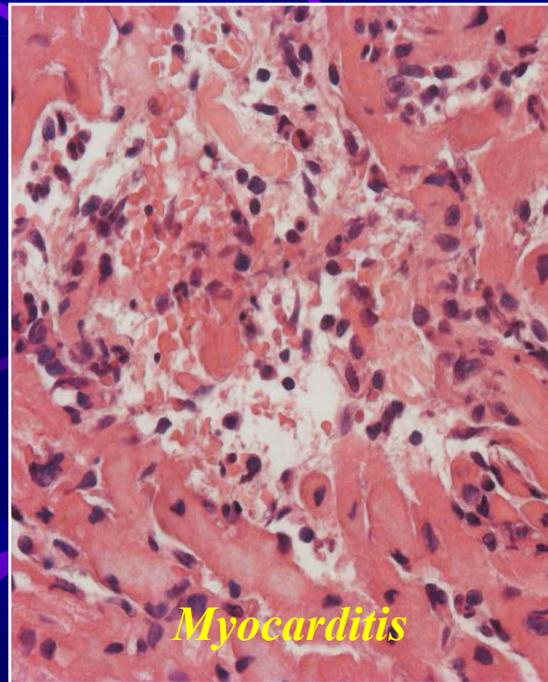
Combined prevalence of these cardiac diseases in the general athletic population is 0.3% (or 3 in 1,000)

From the Minneapolis Heart Foundation Registry





Congenital coronary artery anomalies



Myocarditis

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