



SportsCardiologyBC

Young and Masters Athlete Screening Project Updates

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The first reported SCD



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The death of an athlete



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- Regardless of age, is a tragic event
- The death of an athlete is often difficult to comprehend
- How can some of the 'healthiest' and most physically fit members of society succumb to sudden cardiac death?
- Are there ways to identify these athletes who may be at an increased risk of SCD?



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Pre-participation Screening

- The primary objective is the detection of intrinsic underlying cardiovascular abnormalities that predispose an athlete to sudden cardiac death
- To find the:
 ‘fatally flawed among the fabulously fit’

Young vs. Old (Masters)



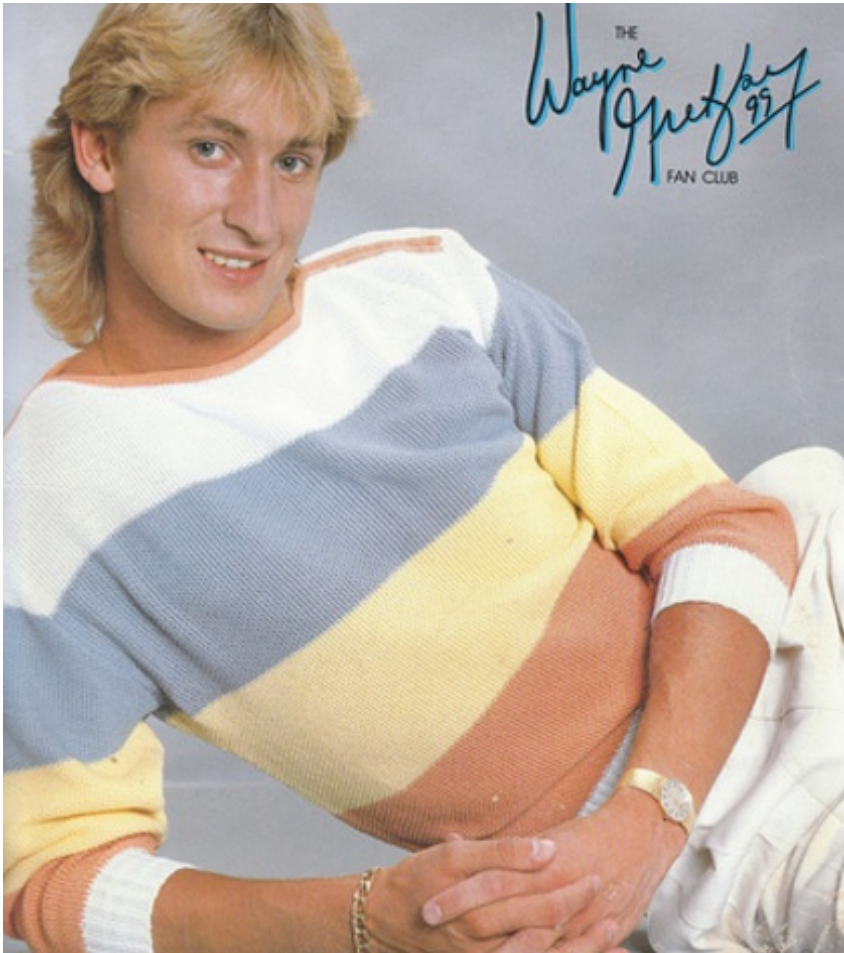
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Young vs. Old (Masters)



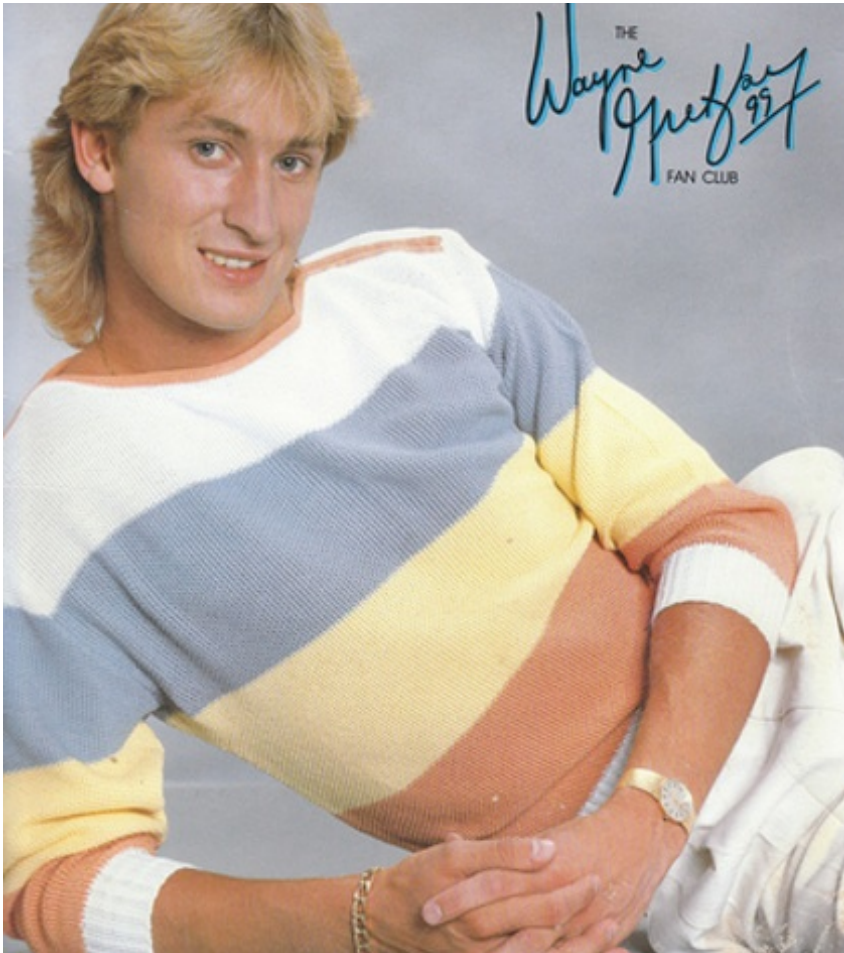
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Young vs. Old (Masters)



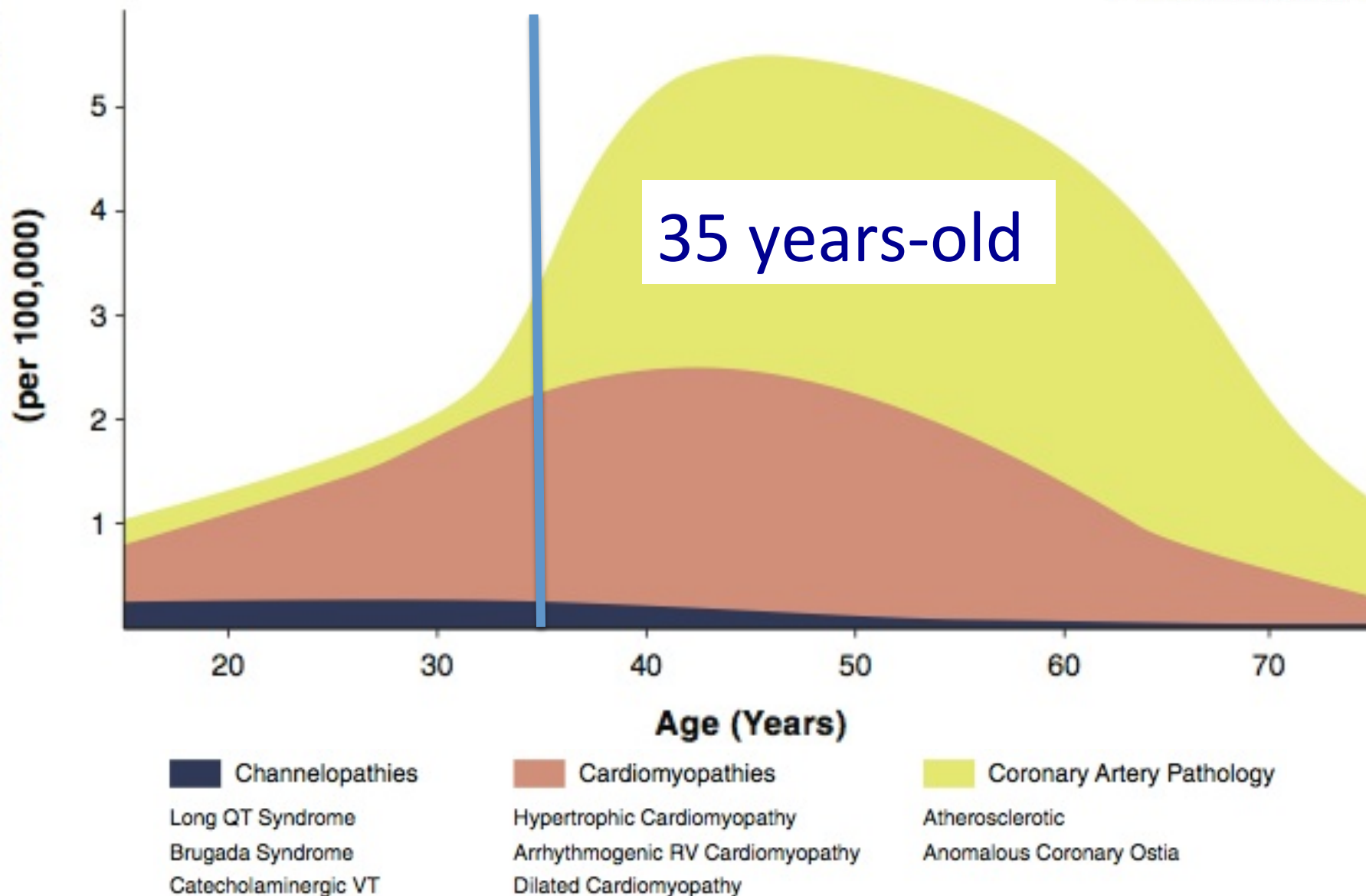
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Causes of SCD by age





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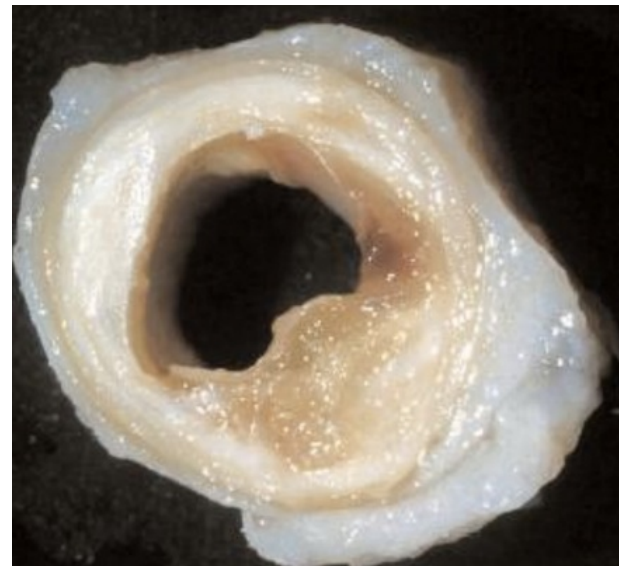
Causes of SCD by age

Young Athlete < 35 years

- >80% of SCD due to:
- Cardiomyopathies
 - Hypertrophic Cardiomyopathy
 - ARVC
 - Dilated Cardiomyopathy
- Electrical abnormalities
 - Long QT Syndrome
 - WPW
 - Brugada
- Coronary Anomalies
- Myocarditis / Drugs / Aortopathy

Masters Athlete > 35 years

- >80% of SCD due to:
- Coronary Artery Disease



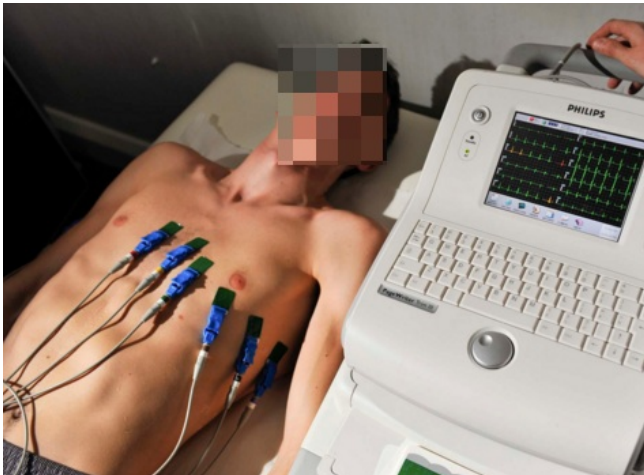


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Tools used in screening

Young Athlete

- History
- Physical
 - Symptoms
 - Family History
- 12-lead ECG



Masters Athlete

- History
- Physical
- 12-lead ECG
- Framingham Risk Score
- Exercise Stress Test



SCBC Young Athlete Study



- Purpose(s):
 - Ascertain the prevalence of subclinical potentially lethal CVD amongst a sample of young competitive athletes in the province of British Columbia
 - Assess the effectiveness of the ECG in screening
 - Development of a novel SCBC protocol

SCBC Young Athlete Study

Phase 1

Phase 2

681 Young Competitive Athletes

681 Young Competitive Athletes

AHA 12-item questionnaire
Physical Examination
12-lead ECG**

Novel SCBC questionnaire *
12-lead ECG**

Athletes aged 12 to 35

ECG interpreted as per Seattle Criteria

SCBC Young Athlete Study

Phase 1

Phase 2

681 Young Competitive Athletes

AHA 12-item questionnaire
Physical Examination
12-lead ECG**



681 Young Competitive Athletes

Novel SCBC questionnaire *
12-lead ECG**

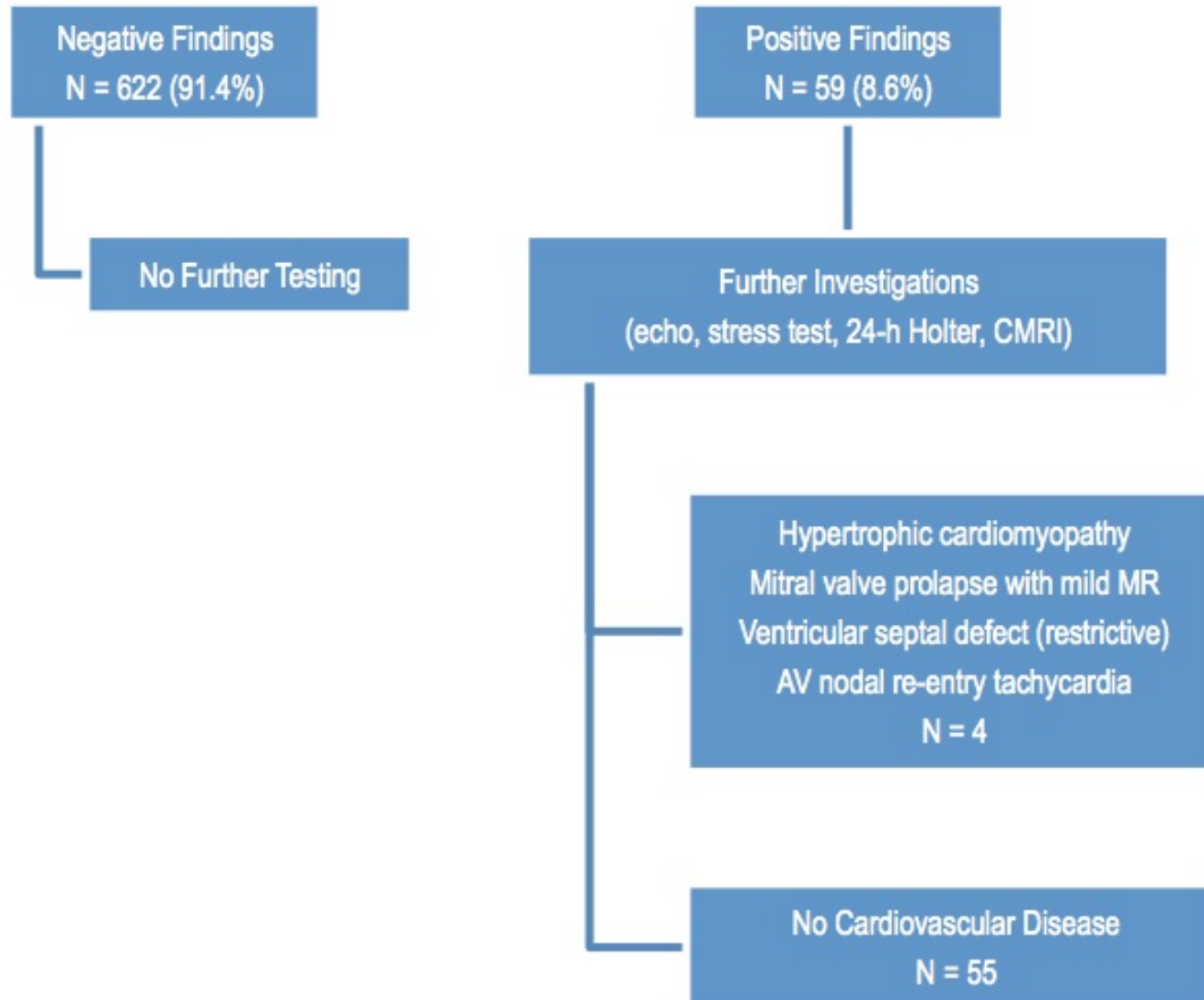
NO



Phase 1 (AHA + Physical + ECG)



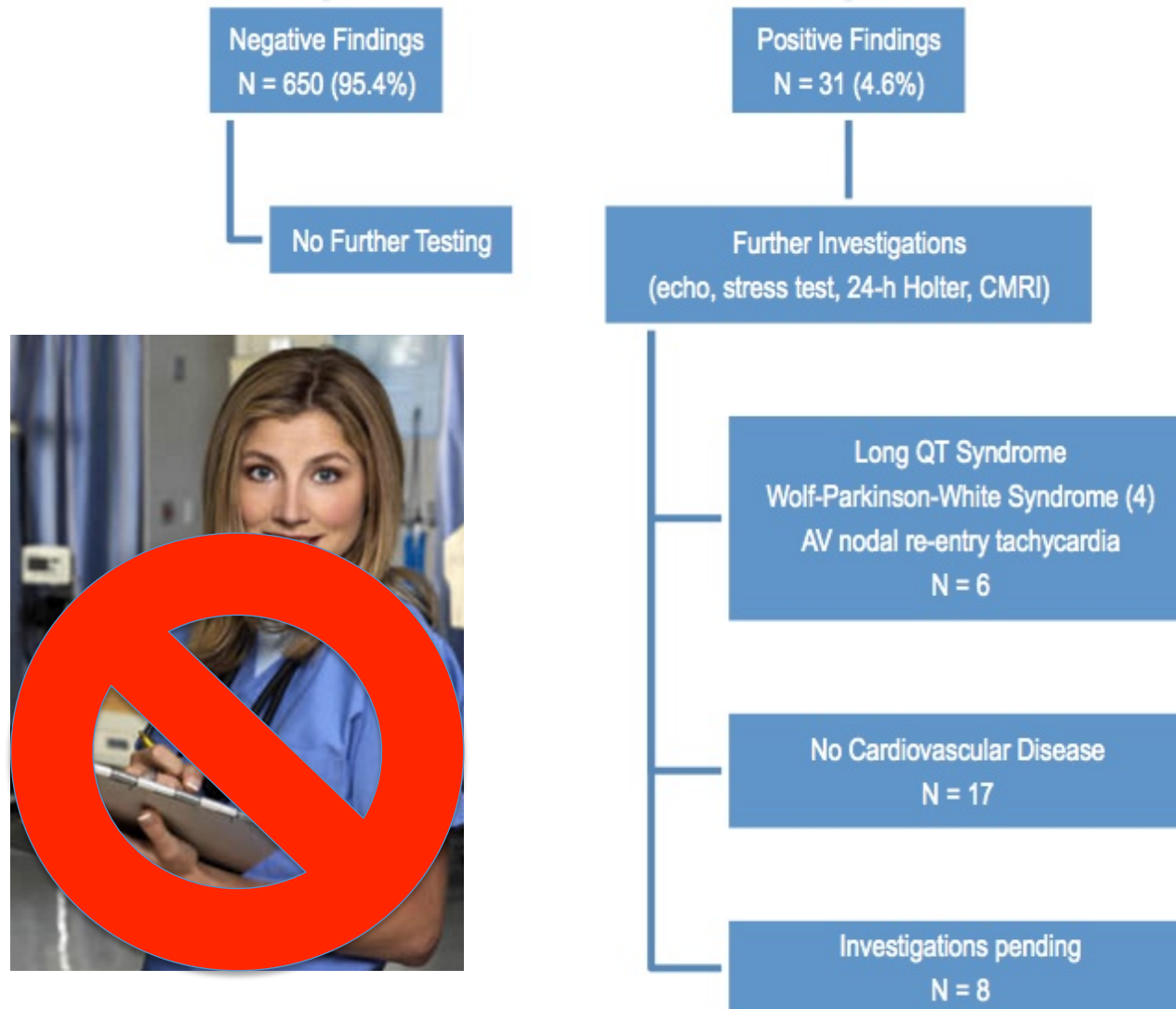
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Phase 2 (SCBC questionnaire + ECG)



Young Athlete Study

CONCLUSIONS



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- We found significant subclinical CV disease amongst BC's young competitive athletes
- The 12-lead ECG is an effective tool at identifying significant disease
- Our novel SCBC questionnaire increased the positive predictive value 8.9% to 19.4% and reduced false positives

SCBC Masters Athlete Screening Study

- **Primary Objective:**
 - Prevent adverse cardiac events and sudden cardiac death in Masters athletes
- **Outcomes:**
 - Prevalence of cardiovascular disease (i.e. CAD)
 - Prevalence of risk factors (i.e. hypertension, dyslipidemia)
 - Prevalence of atrial fibrillation in the masters athlete and its association with intensity of sport and volume of physical activity



N = 800+ Recreationally Competitive and High Performance Masters Athletes

Initial Screen:

History and Personal Symptoms Questionnaire, Physical Exam,
Framingham Risk Score, Resting 12-lead ECG

Negative

No Further Testing →
Follow-up (5 Years):
ECG, FRS,
Questionnaire

Positive

Exercise Treadmill Test

Positive

Further Examinations (i.e. echo, 24 h
holter, CMR, CCT/CACS)

No Cardiovascular
Disease

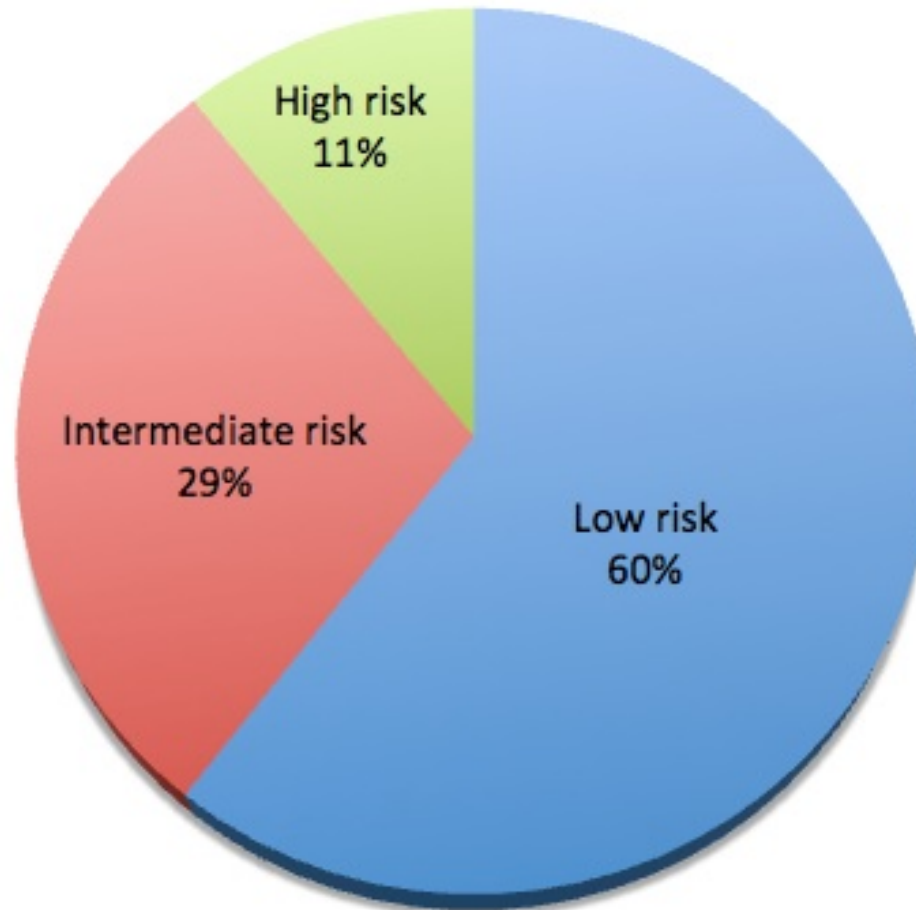
Follow-up (5 years):
ECG, FRS,
Questionnaire

CVD → q1yr Follow-up

Other →
Clinical Care

Masters Study – Interim Results

Framingham Risk Score

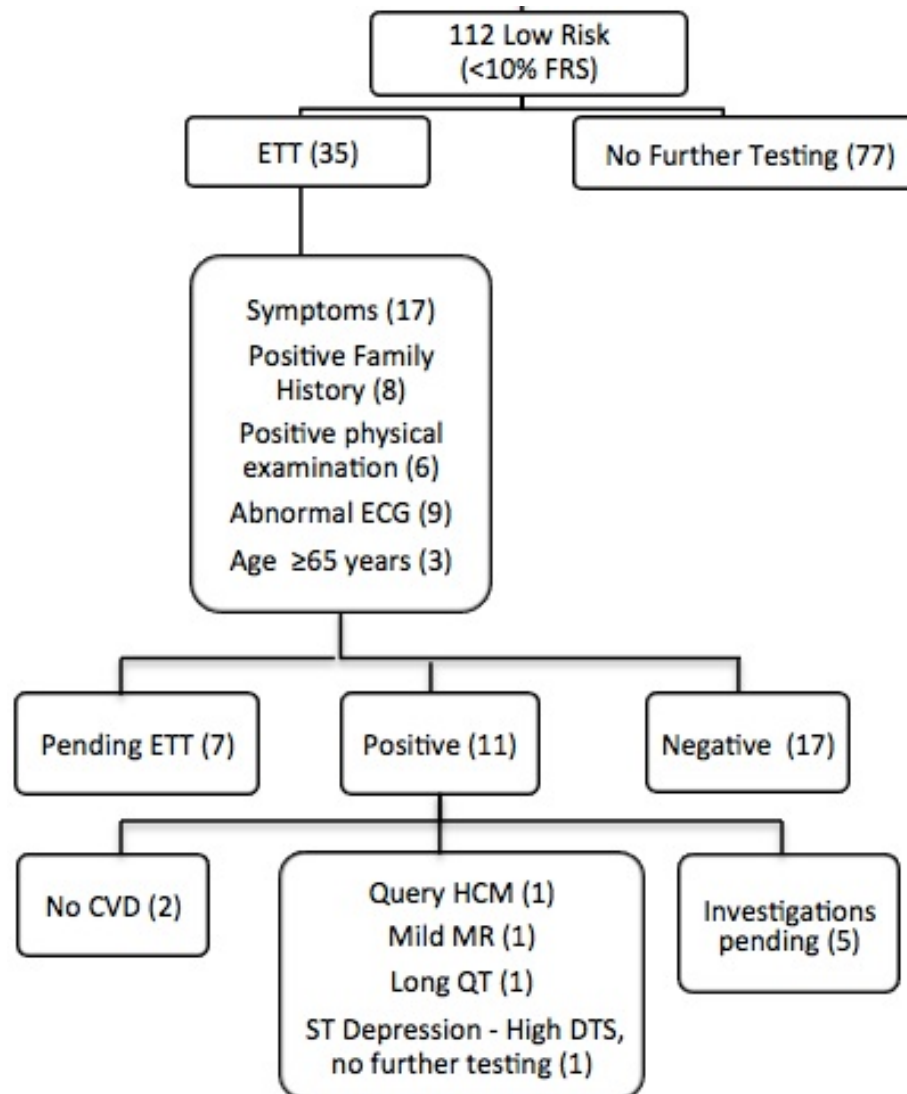


185 Patients

Masters Study – Interim Results



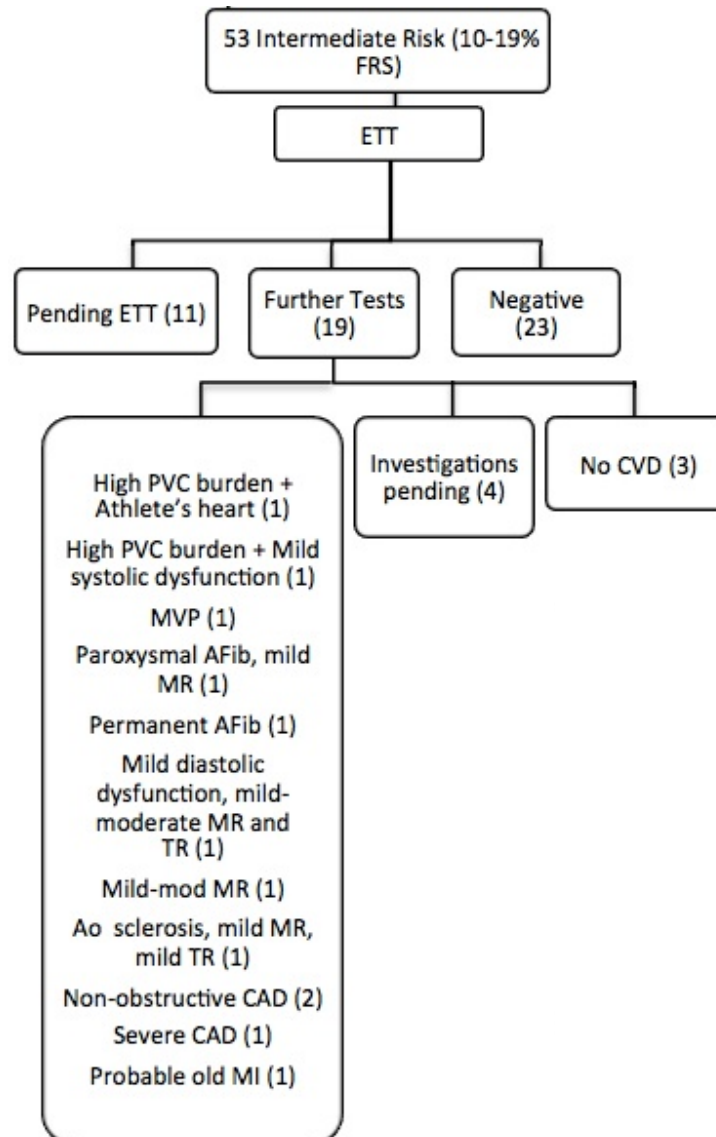
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Masters Study – Interim Results



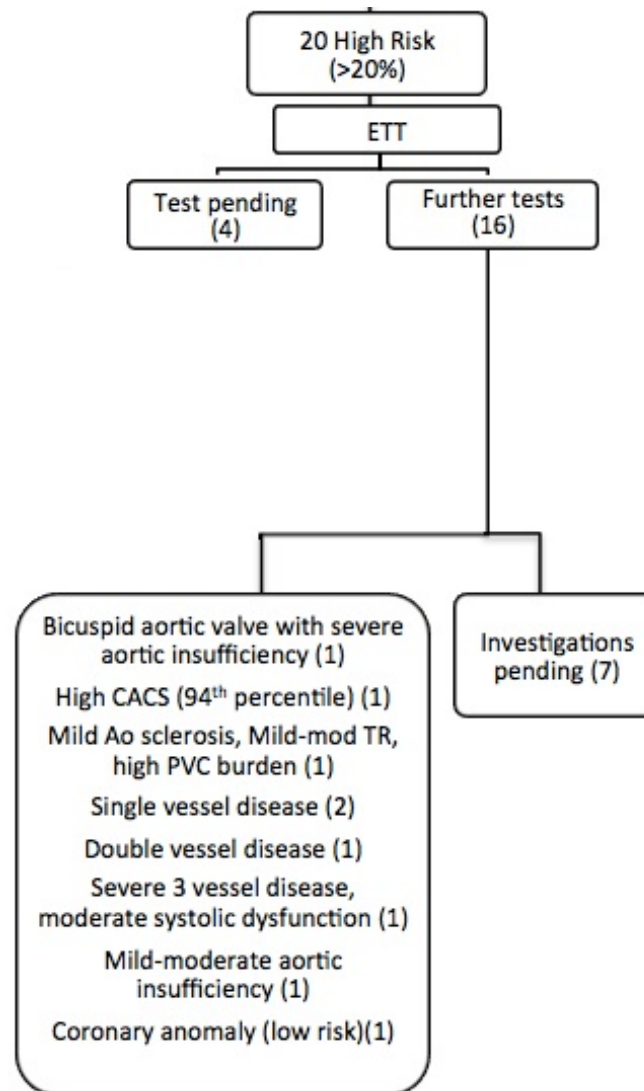
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Masters Study – Interim Results



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Masters Study – Interim Conclusions



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- Masters athletes are not immune to elevated cardiovascular risk
- Significant CV disease exists amongst asymptomatic physically fit Masters athletes
- Systematic screening amongst Masters athletes may worthwhile in select cases

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Stay active, stay fit, stay safe

<http://www.sportscardiologybc.org/>

OUR MISSION

Clinical Assessment

With the overwhelming existing evidence of the beneficial and preventive effects of exercise, our society is becoming more and more physically active. Our goal is to assess and evaluate athletes to ensure safe participation in athletics.



Research

With an aging population and an overall increase in the participation of regular athletics and exercise in the general population, research in risk factors and warning signs for cardiovascular events must be investigated.



Advocacy

In order to educate the public on the importance of cardiovascular health and help prevent tragic cardiovascular events, Sports Cardiology B.C. will collaborate with local, national and international organizations.



Education

Through the dissemination of results from research investigation and the interpretation of clinical case studies, public education on safe participation in athletics needs to be provided.



SportsCardiologyBC Team



- Please feel free to contact us:
 - Collaboration in research
 - Current and NEW projects
 - Participation in advocacy events
 - Clinical assessment of an athlete
 - Create partnerships



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SCBC Team

- Dr. Saul Isserow
- Dr. Brett Heilbron
- Barb Morrison MSc.
- Daniel Lithwick MSc.
- Dr. James McKinney
- Dr. Andrew Krahm
- Dr. Jack Taunton
- Dr. Darren Warburton
- Dr. Kam Shojania
- Dr. Teresa Tsang
- Dr. Anthony Della Siega
- Dr. Rick Leather
- Dr. Kevin Pistawka
- Dr. Mike Wilkinson
- Dr. Janet McKeown
- Dr. Shu Sanatani
- Dr. Rich Vandegriend
- Dr. Michael Luong
- Dr. Christopher Fordyce
- Faisal Aziz

Questions?

www.sportscardiologybc.org



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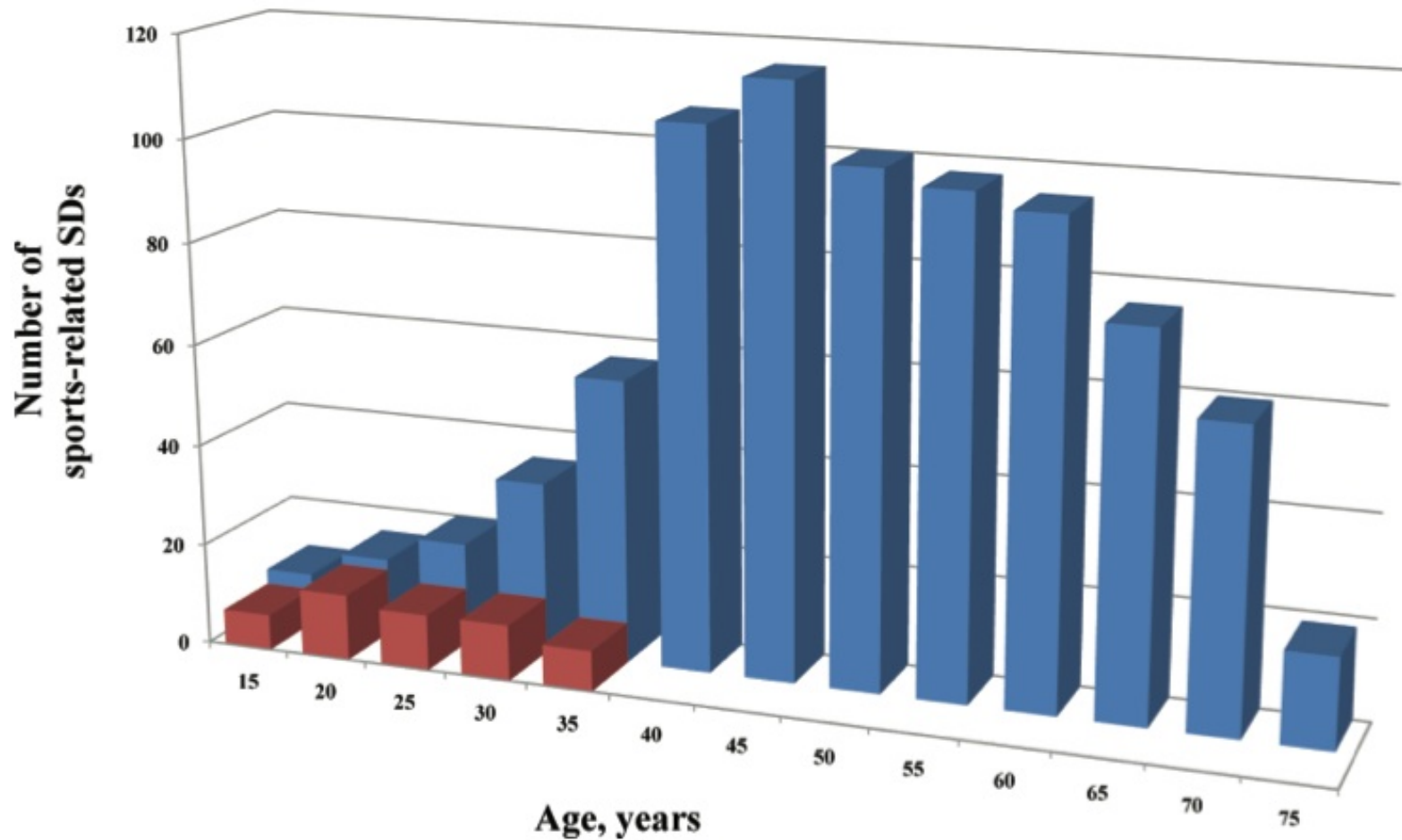
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- Multidisciplinary medical team approach
- Goals of the program are outlined by the 4 pillars:
 - **Research, Clinical Assessment, Education and Advocacy**
- Clinical focus: Risk assessment and guidance in athletes with cardiac abnormalities, with a focus on Master's athletes with CHD
- Resource for medical community to educate and provide local perspective on controversial topics
- Research: Detection, prevention and treatment of cardiovascular disease, registry formation, risk factor and disease prevalence

SCD in General Population



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Marijon, Circulation, 2011

Disclosures



- We will only be discussing our screening study results

Exercise can be a trigger for a heart attack?

TABLE 3. Physical Stress as a Trigger of Acute Cardiovascular Events During Vigorous Exertion*

Study	Effect Period	End Point	RR (95% CI)
Seattle study ⁵ (1984)	<1 h	Primary cardiac arrest	56 (23–131)†
Onset study ³² (1993)	1 h	Nonfatal MI	5.9 (4.6–7.7)
TRIMM study ³¹ (1993)	1 h	Nonfatal MI	2.1 (1.1–3.6)
Hartford Hospital AMI study ⁶ (1999)	1 h	Nonfatal MI	10.1 (1.6–55.6)
SHEEP study ⁴⁰ (2000)	<15 min	Nonfatal MI	6.1 (4.2–9.0)
Physician's Health Study ⁷ (2000)	30 min	SCD	16.9 (10.5–27)



The paradox of exercise

- **Undisputed** health benefits of physical activity
- Vigorous exertion may **transiently** increase the risk of acute cardiac events
- The risk of sudden cardiac death (SCD) approximately doubles during physical activity



Physiological alterations accompanying acute exercise and recovery

