Cardiac Assessment of the Competitive Athlete

October 10, 2015

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School of Medicine

Objectives

- Definition of sports – define the athlete, the activity and the risk
- CV adaptation – recognizing normal physiology and pathology
- The Grey Zone – reference ranges, registries and specialized centers for care of athletes.

Disclosures

- Astra Zeneca (DSMB)
- Biomedical Systems (Consultant)
- Biotie (DSMB)
- Co-Chair Participation Recommendations for Competitive Athletes (AHA/ACC)
- Cook MED Institute (CEC)
- Eli Lilly (DSMB, Consultant)
- NFL Cardiovascular Committee
- TEVA (DSMB)

JOURNAL OF THE AMERICAN COLLEGE OF CARDIOLOGY
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PUBLISHED BY ELSEVIER INC.

VOL. ■, NO. ■, 2014
ISSN 0735-1097/$36.00
http://dx.doi.org/10.1016/j.jacc.2014.08.027

CONFERENCE REPORT

Protecting the Heart of the American Athlete

Proceedings of the American College of Cardiology Sports and Exercise Cardiology Think Tank
October 18, 2012, Washington, DC

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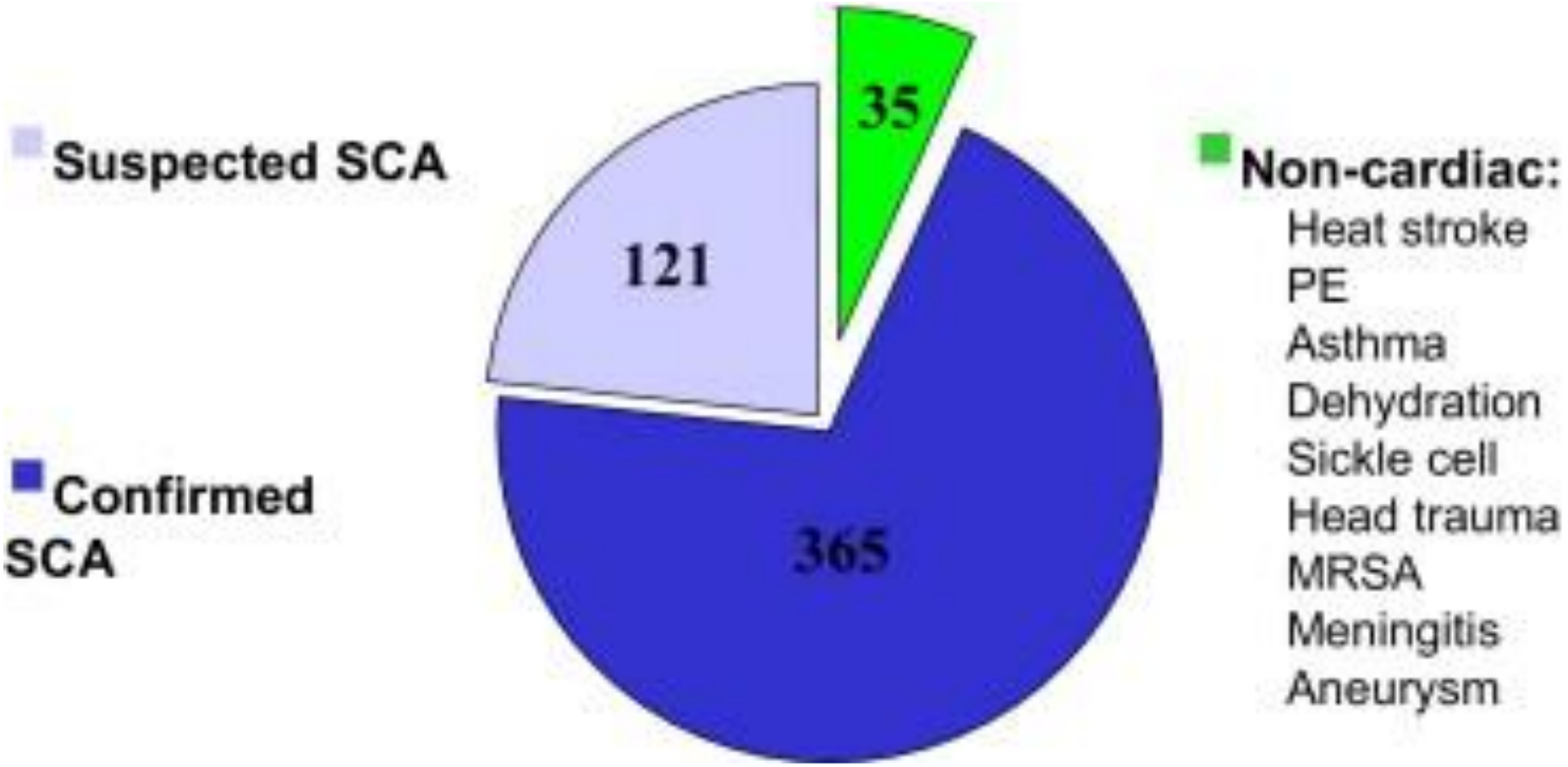
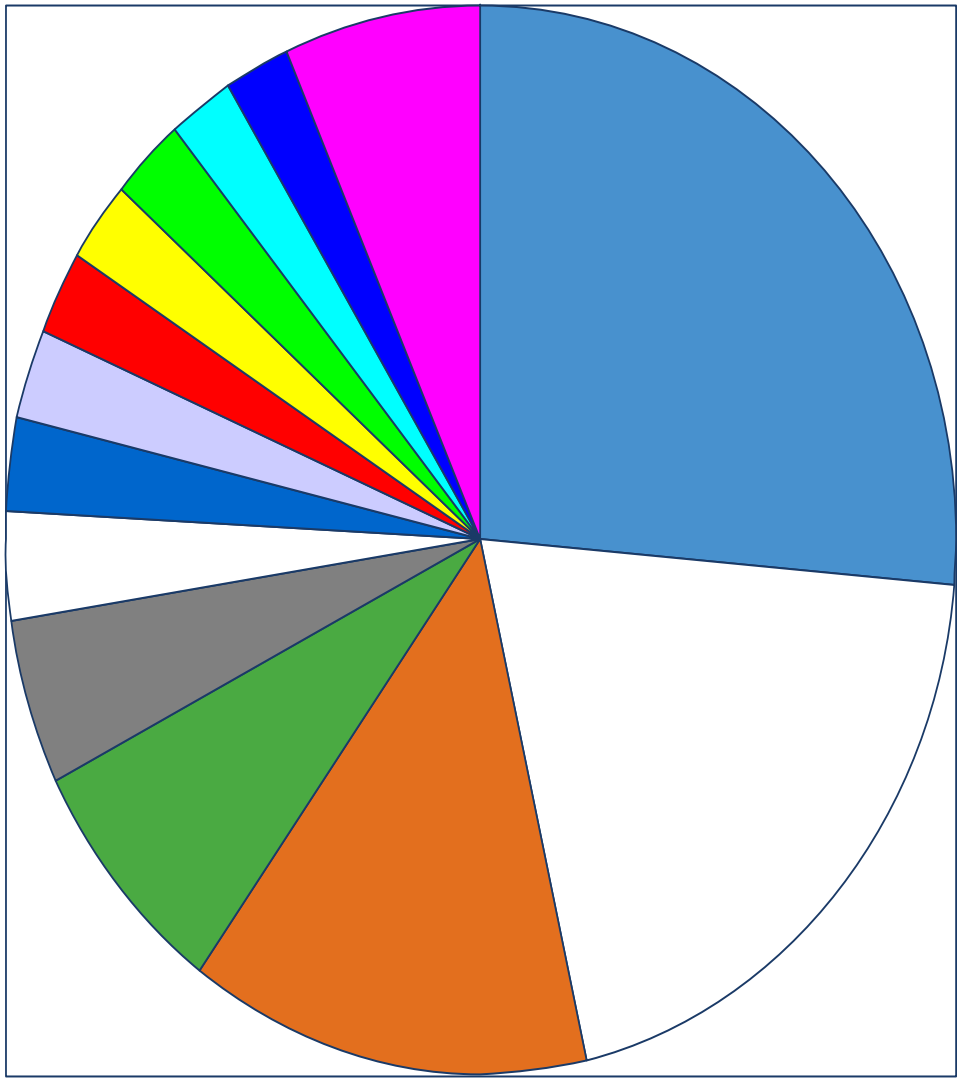
Death in Young Athletes



Drezner JA. Heart Rhythm. 2008

Tufts Medical Center

Causes of SCD in US Athletes



- HCM
- Commotio
- Cor Anomalies
- LVH
- Myocarditis
- Marfans
- ARVD
- Tunnelled CAD
- AS
- CAD
- IDCM
- MVP
- Asthma
- Others

Maron, NEJM, 2003

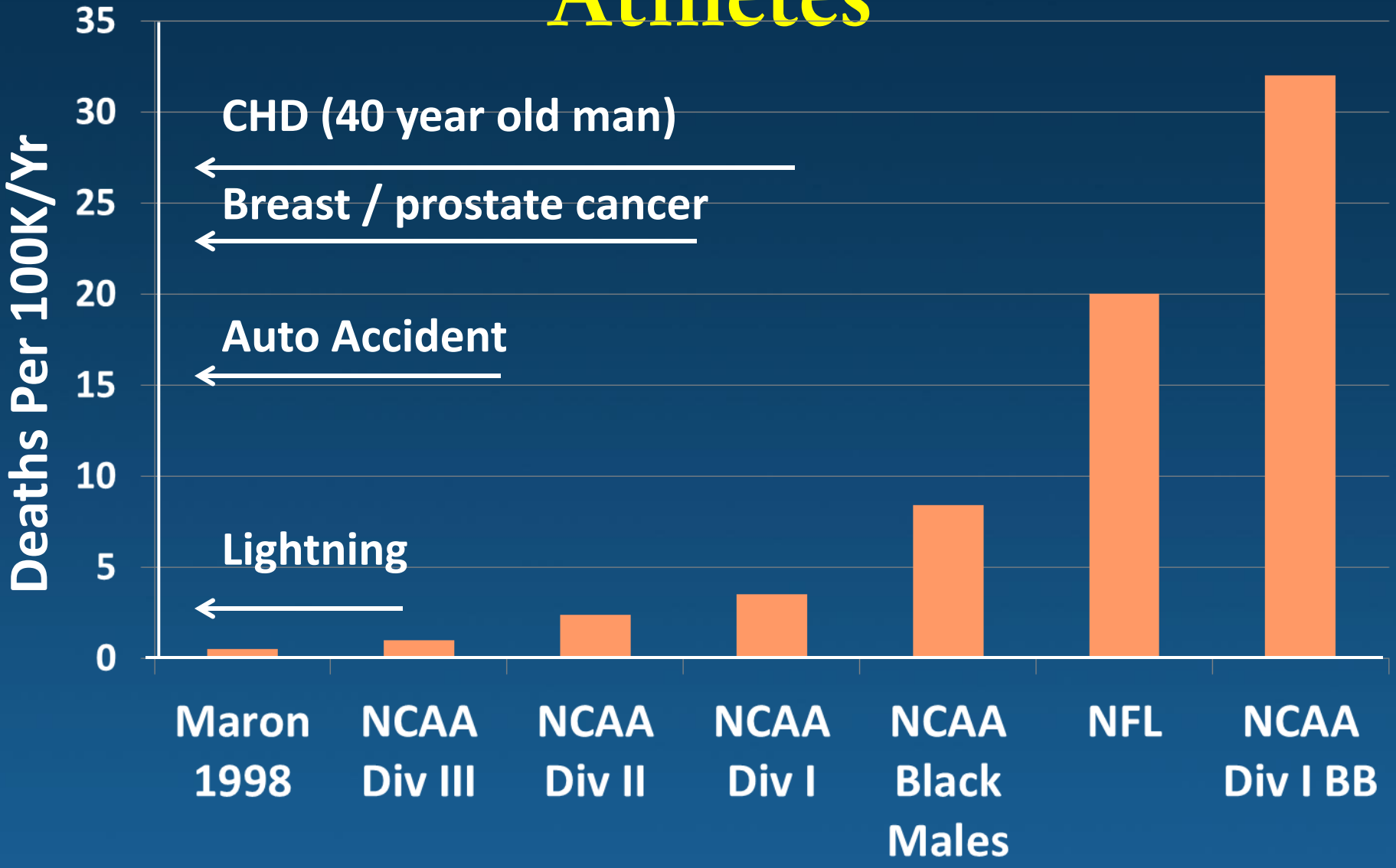
Top Causes of Sudden Cardiac Death in Young Athletes

- Hypertrophic Cardiomyopathy
- Commotio Cordis
- Coronary Artery Anomalies
- Arrhythmogenic Right Ventricular Cardiomyopathy
- Myocarditis
- Long QT Syndrome

Facts and Figures (U.S.)

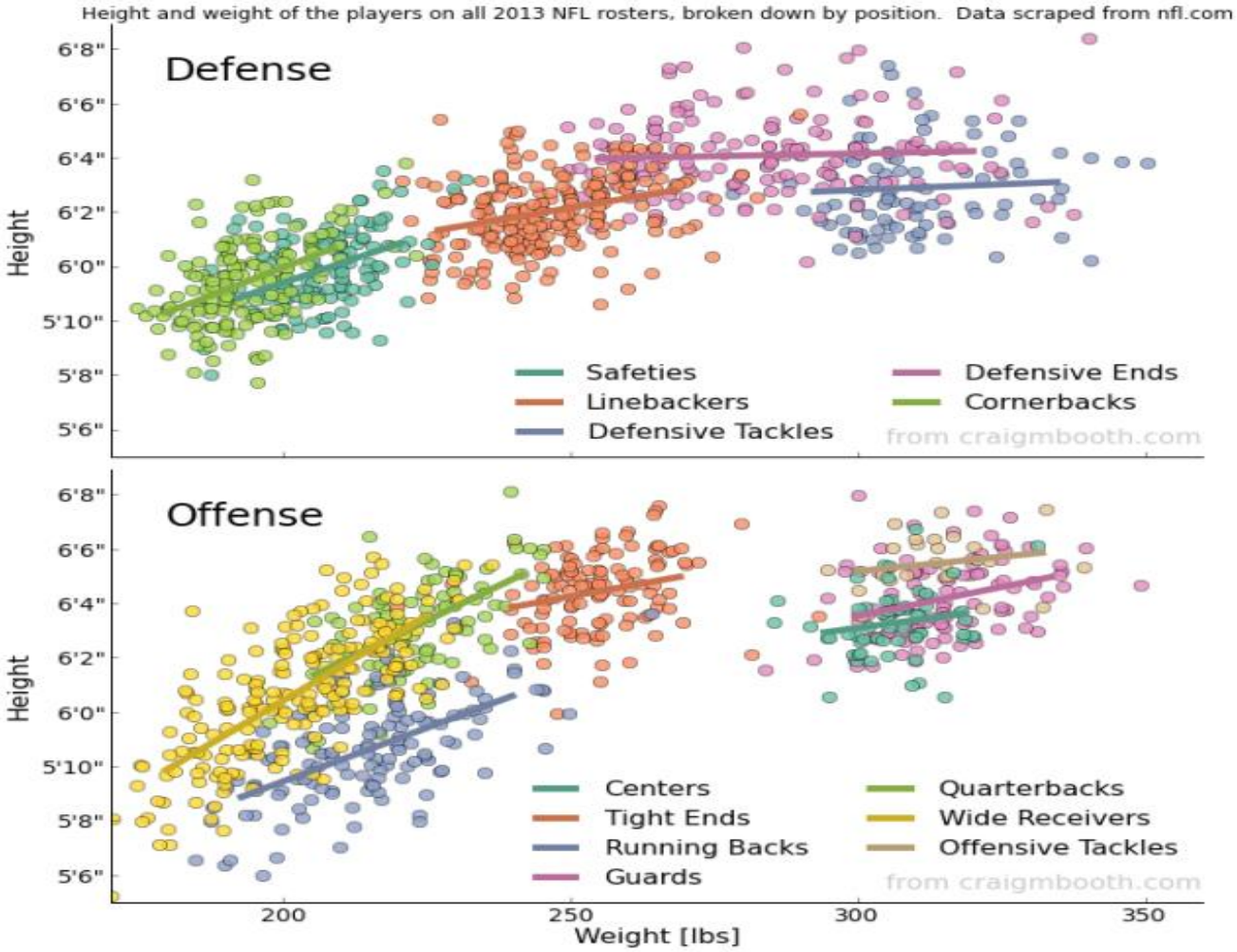
- 44 Million Youth Sports Participants
- 10 Million High School Athletes
- 500,000 Collegiate Athletes
- 541,000 Marathon Runners
- 1,000,000 Adult Congenital Survivors
- Countless “Weekend Warriors”

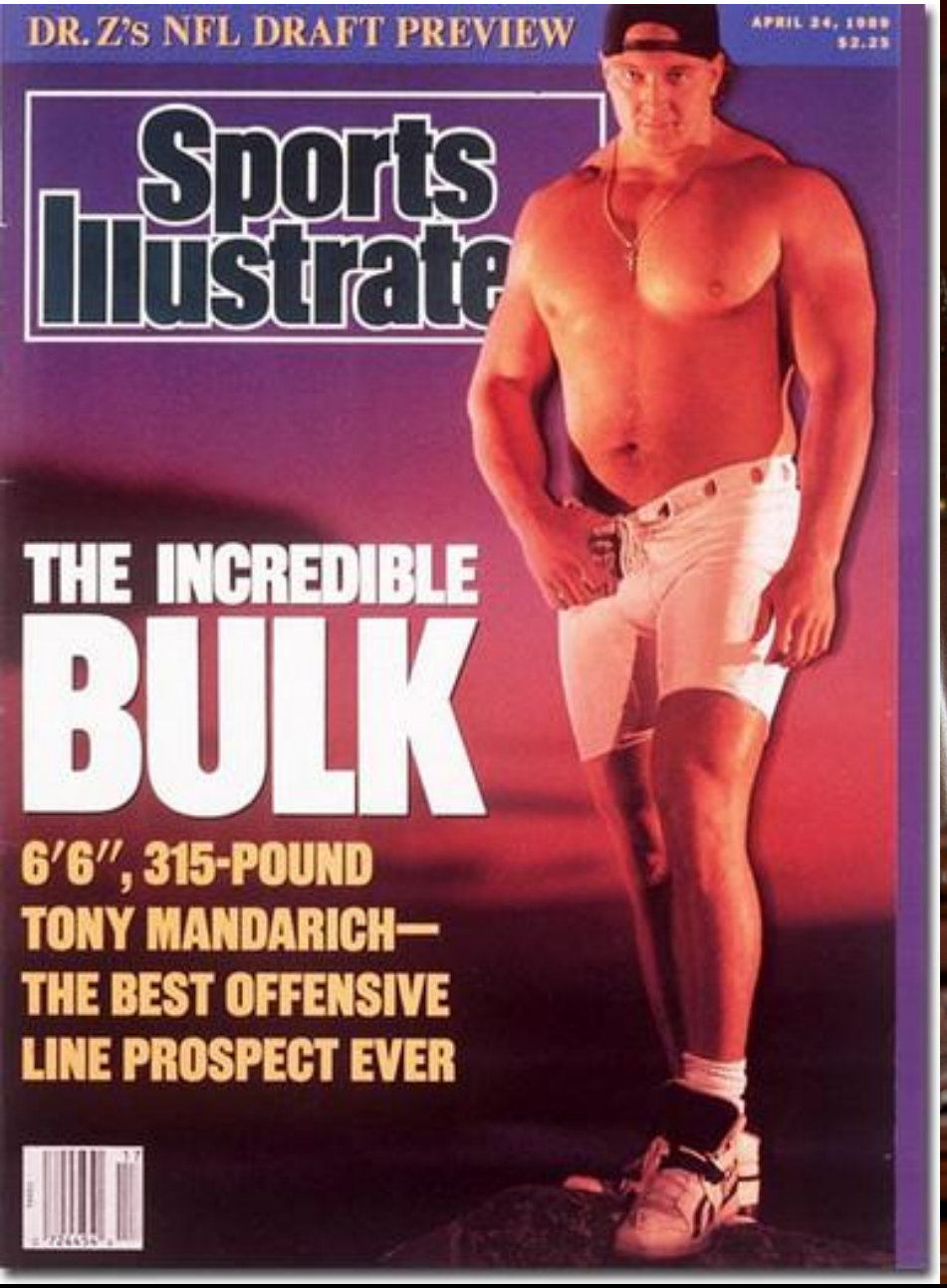
Annual Incidence of SCD in Athletes

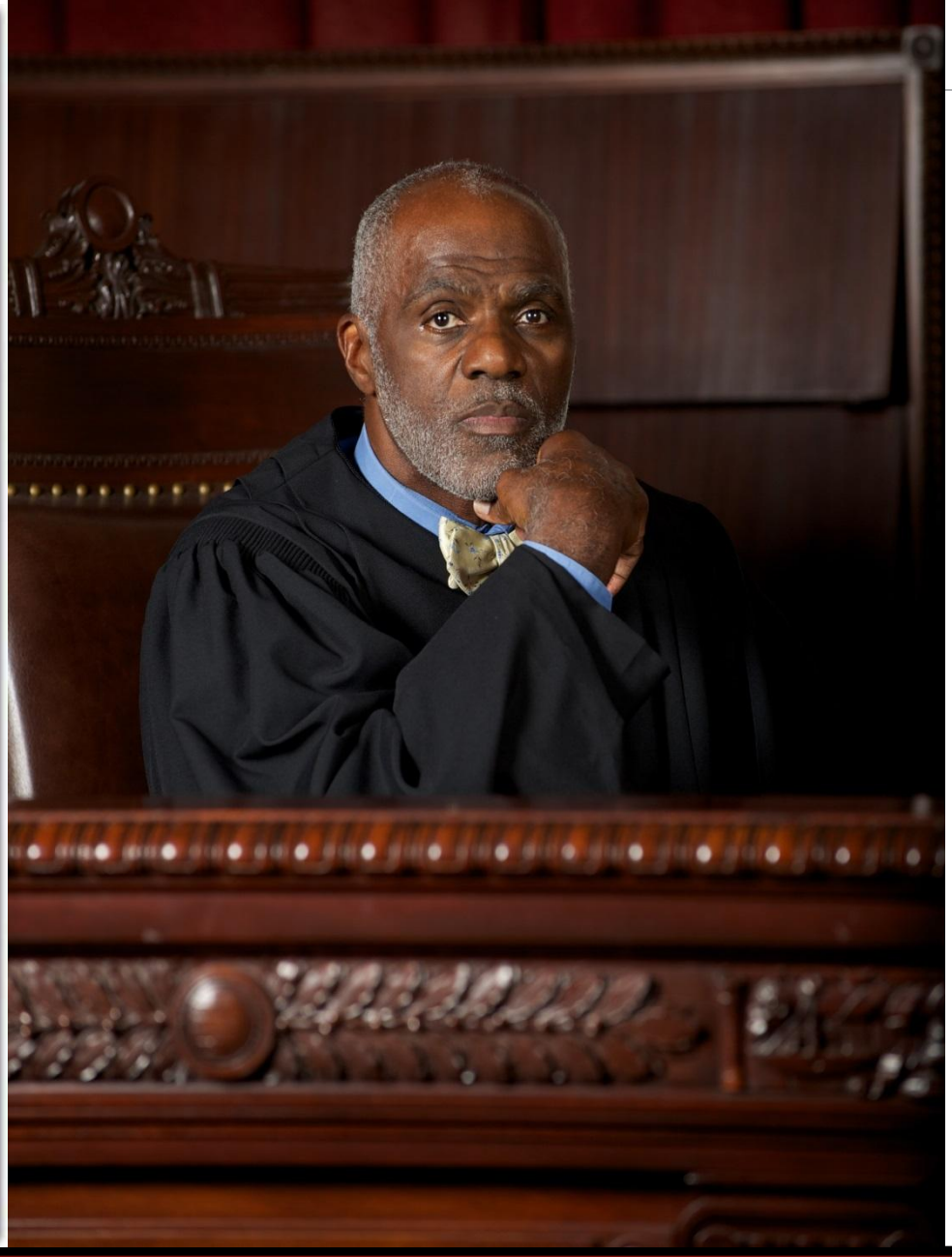


Harmon KG et al, Circ 2011;123:1594; Maron BJ et al, Ann Intern Med 1998;129:379; Vogel R (personal data)

Within the Sport there is Significant Heterogeneity




DR. Z's NFL DRAFT PREVIEW
APRIL 24, 1989
$2.25
Sports Illustrated
THE INCREDIBLE
BULK
6'6", 315-POUND
TONY MANDARICH—
THE BEST OFFENSIVE
LINE PROSPECT EVER



Available online at www.sciencedirect.com

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Cardiovascular adaptation in athletes

Richard Kovacs, MD[a,*], *and Aaron L. Baggish, MD*[b]

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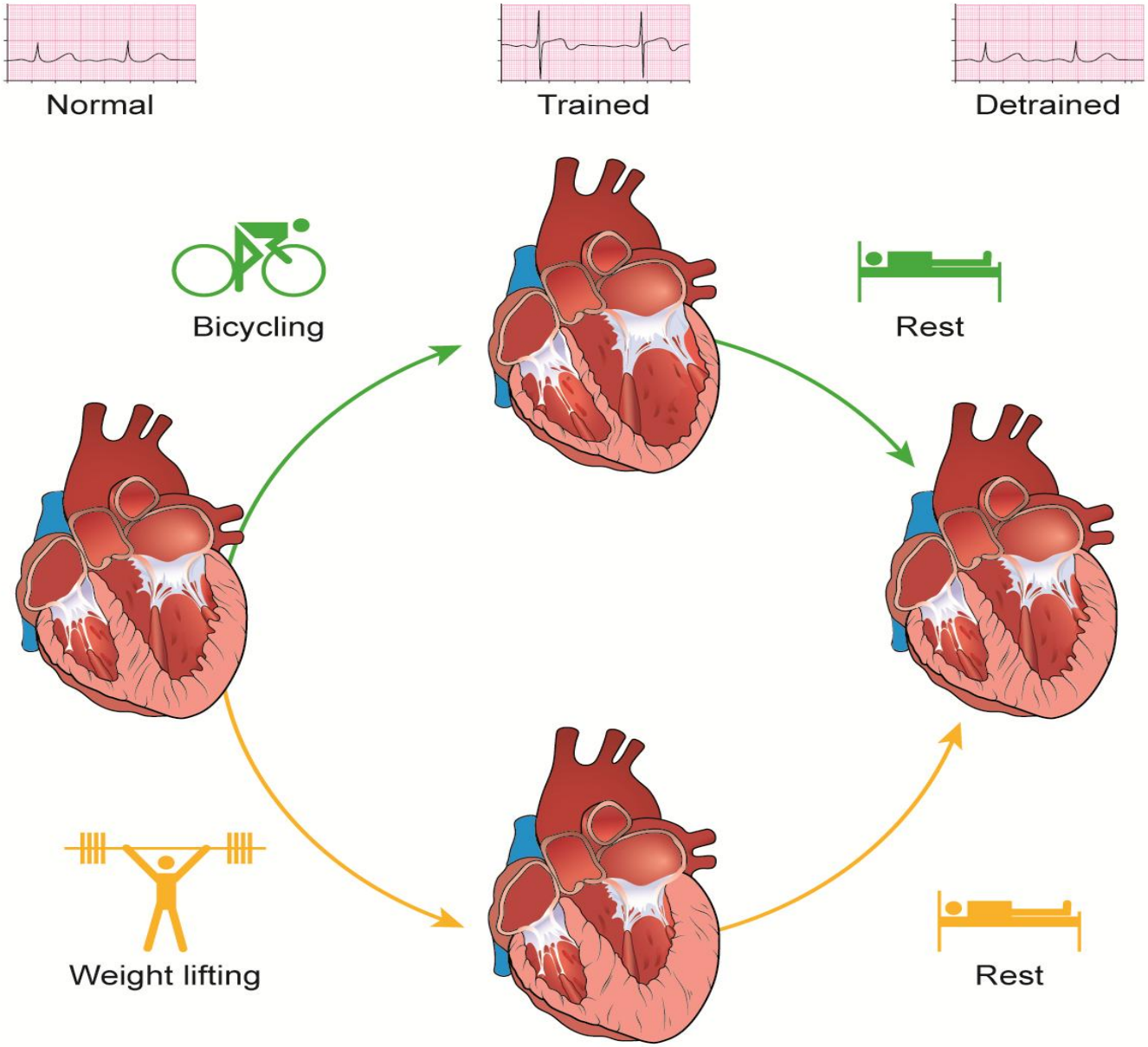
A B S T R A C T

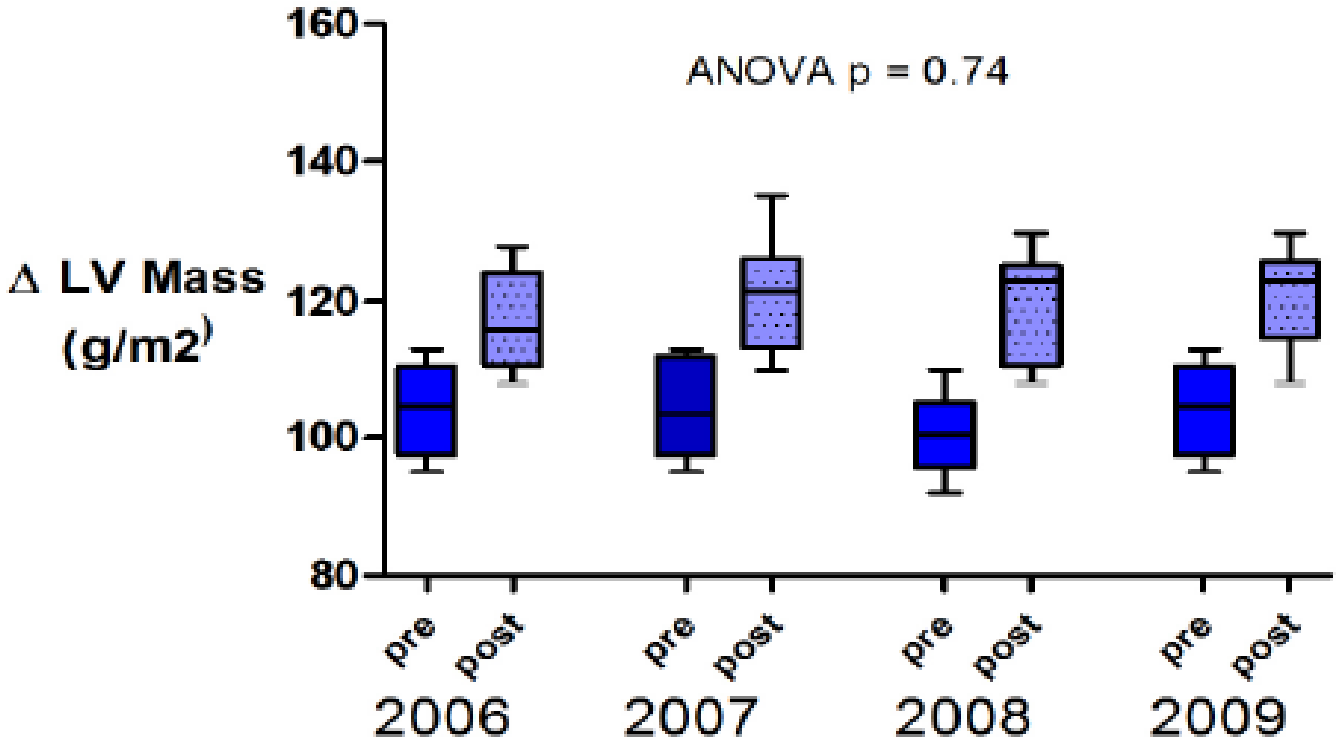
Millions of athletes train for and participate in competitive athletics each year. Many of these athletes will present to a cardiovascular specialist with signs or symptoms that might indicate heart disease and these athletes/patients will ask for advice on their ability to continue to train and compete safely. By virtue of their training, athletes' hearts may undergo significant structural and electrical change, presenting a special challenge for the cardiovascular specialist. It is important to understand normal adaptive changes in order to separate normal physiology from pathology.

Keywords: Athlete's heart, Sports cardiology, Exercise, Athlete, Cardiomyopathy, Hypertrophy.


Normal
Trained
Detrained
Bicycling
Rest
Weight lifting
Rest

The Harvard Athlete Initiative

Freshmen Rowers



Baggish Unpublished

Grey Zone Considerations

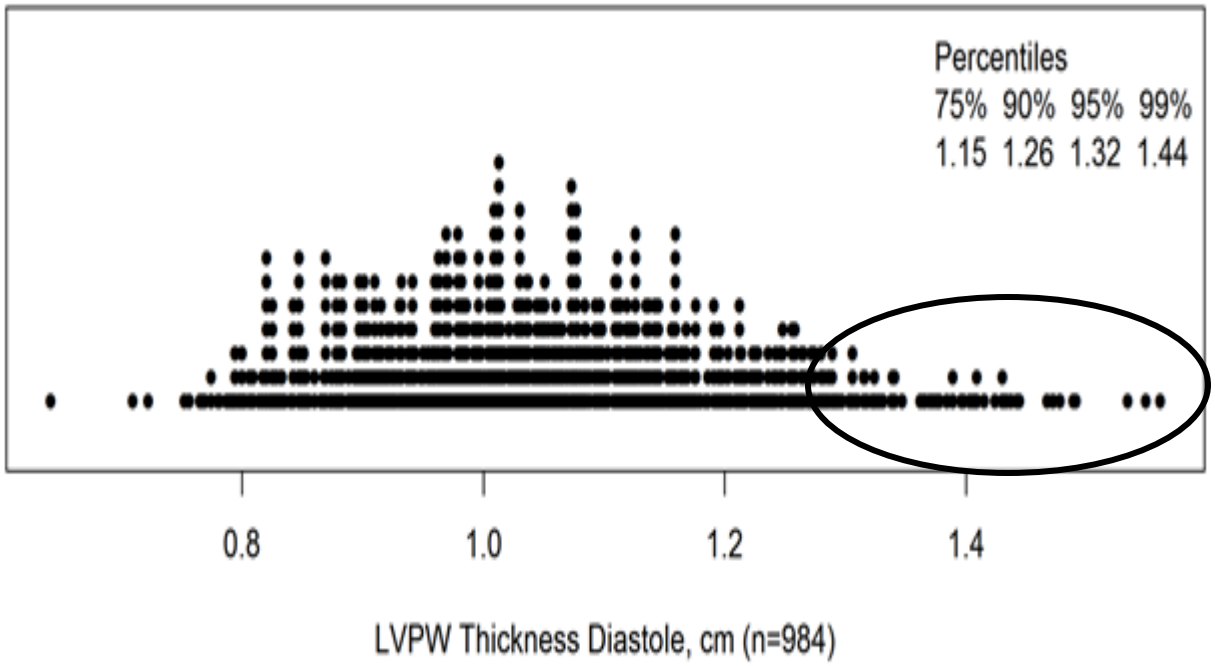
- Physiologic Left Ventricular Hypertrophy or Hypertrophic Cardiomyopathy?
- Congenital Long QT syndrome or Physiologic Response to Bradycardia?
- Congenital Aortopathy or Effect of Large Body Size?
- Physiologic Right Ventricular Dilation or Arrhythmogenic RV Cardiomyopathy?

NFL Scouting Combine Facts and Figures

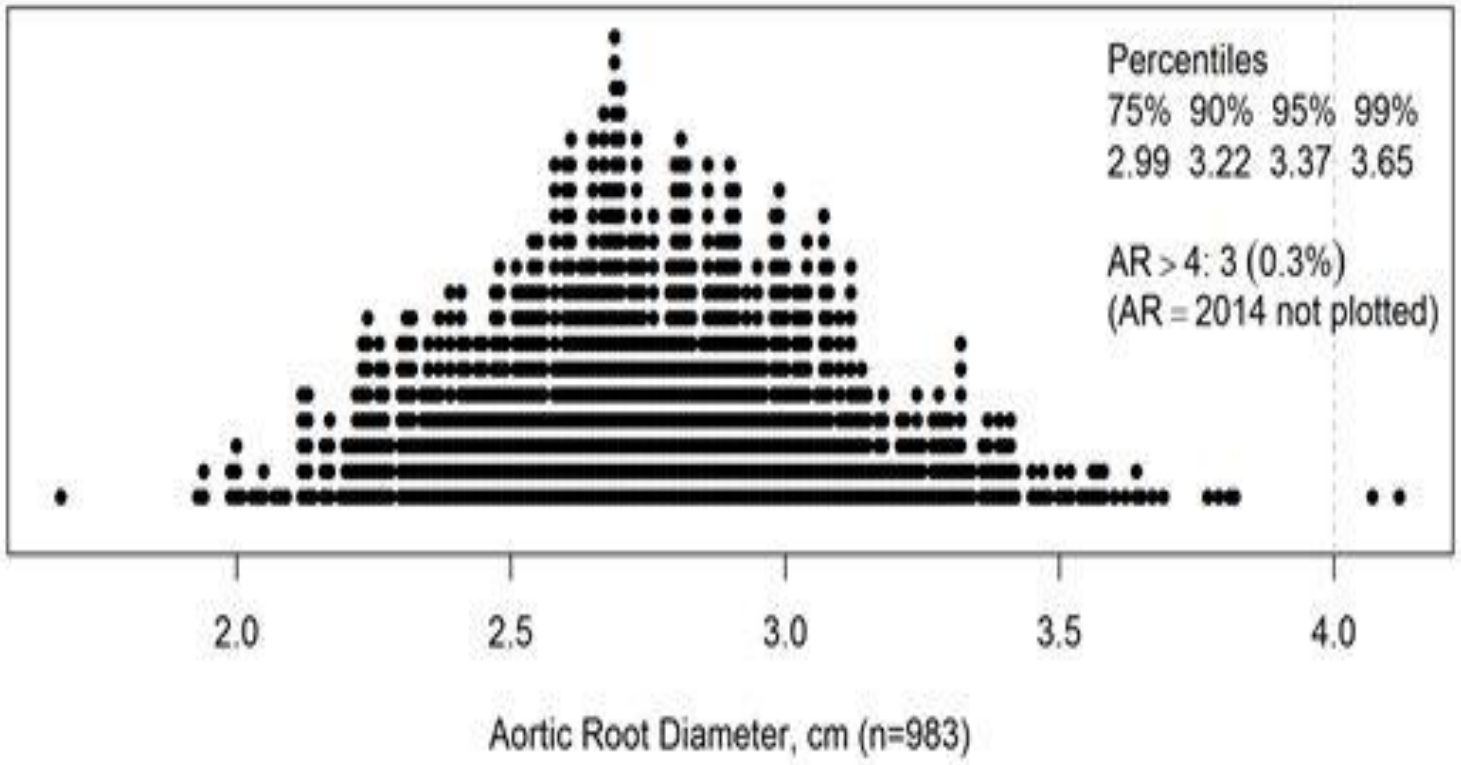
- 1500 participants 2011-2015
- Age: 21-24 years
- Height: 5’5” – 6’9”
- Weight: 150 – 400+ lbs.

NFL 2011-2013

~ 10% ≥ 1.3 cm.



Aortic Size in NFL Scouting Combine Participants



AHA Abstract Nov. 2013

» by Disorder (A-Z)
» by Medical Specialty (A-Z)
» by Gene (A-Z)
» by Test (A-Z)

Medical Specialties for which GeneDx offers tests

A B C D E F G H I J K L M N O P Q R S T U V W X Y Z

C

Back To Top

Cardiac Disorders

- Arrhythmogenic Right Ventricular Cardiomyopathy (ARVC)
- Brugada Syndrome (BrS)
- Cardio-Facio-Cutaneous Syndrome
- Catecholaminergic Polymorphic Ventricular Tachycardia (CPVT)
- CHARGE Syndrome
- Congenital Heart Disorder due to Micro Del/Dup Syndrome
- DiGeorge syndrome
- Dilated Cardiomyopathy (DCM)
- Hereditary Hemorrhagic Telangiectasia (HHT)
- Heterotaxy
- Holt-Oram syndrome
- Hypertrophic Cardiomyopathy (HCM)
- Left Ventricular Noncompaction (LVNC)
- LEOPARD Syndrome
- Loeys-Dietz syndrome (LDS)
- Long QT Syndrome (LQTS)
- Lujan syndrome (LS) (Lujan-Fyns syndrome)
- Marfan Syndrome/LDS/Related Disorders
- Noonan Syndrome
- Oculo Facio Cardio Dental Syndrome
- Pulmonary Arterial Hypertension
- Short QT Syndrome (SQTS)
- Shprintzen-Goldberg syndrome
- Simpson-Golabi-Behmel Syndrome (SGBS)
- Sotos Syndrome
- Sudden Cardiac Arrest
- Sudden Unexplained Death
- Supravalvular Aortic Stenosis
- Thoracic Aortic Aneurysm and Dissection (TAAD) and Related Disorders
- Transthyretin Amyloidosis
- Velocardiofacial syndrome
- Williams-Beuren syndrome
- Wolff-Parkinson-White Syndrome

Making Decisions in the Gray Zone

- Understand the athlete and the training.
- Consider complimentary imaging techniques.
- Advocate for registration of large data sets
- There will still be a gray zone where decisions are complex.

Should NFL Teams Still Be Worried About Star Lotulelei's Heart?

BY DAVE SIEBERT (FEATURED COLUMNIST) ON APRIL 8, 2013

SPORTS

Worried About Heart Defects, Some NCAA Schools Take Action

Routine cardiac testing of athletes has been adopted by some teams even though the American Heart Association doesn't recommend it

Team physicians at some NCAA schools are increasingly taking actions that the American Heart Association doesn't recommend. WSJ's Sharon Terlep reports. Photo: Getty

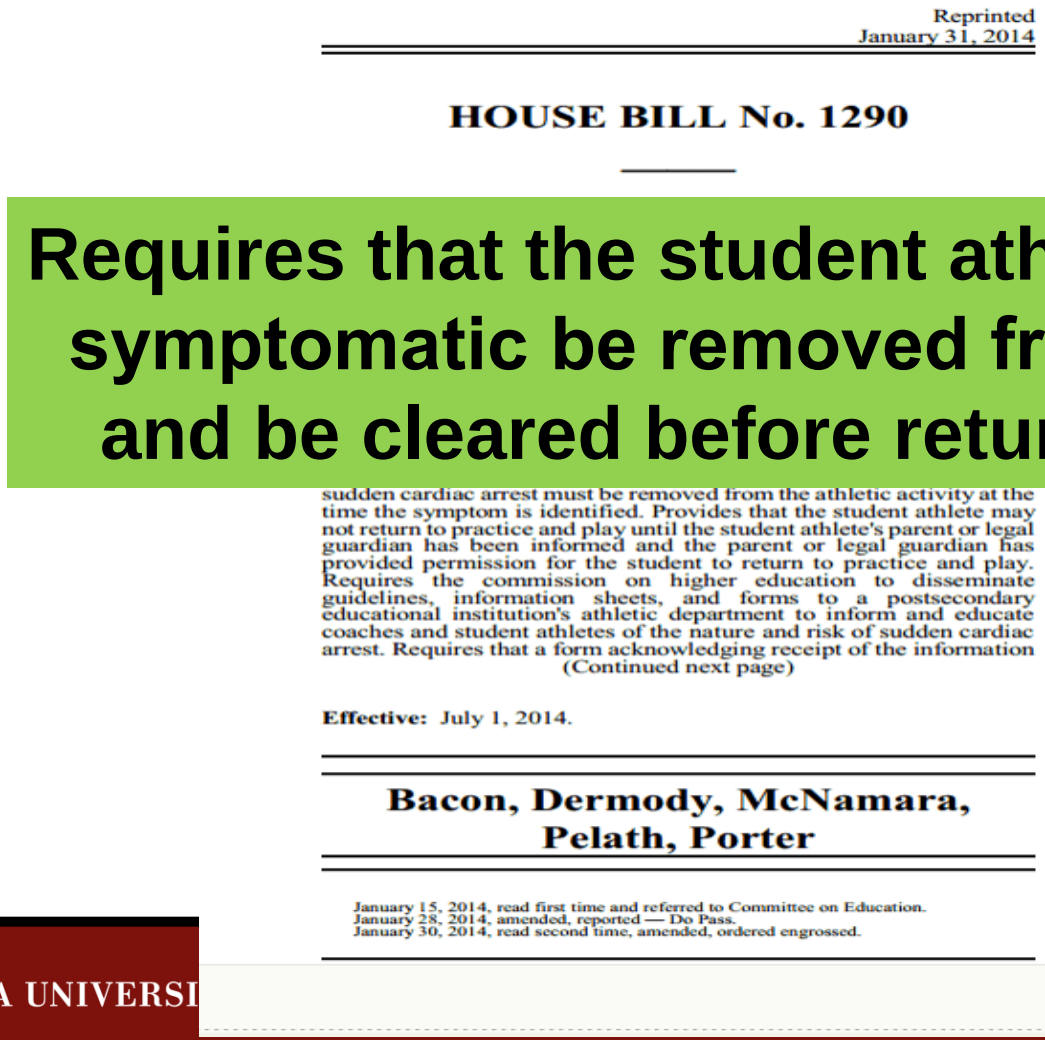
By SHARON TERLEP

9 COMMENTS

Updated March 5, 2015 2:59 p.m. ET

As a Kent State University football player, Jason Bitsko was seemingly healthy—until he died after practice on Aug. 20. The coroner determined that the cause of death was HCM, or

Return to Play Legislation in Indiana



Reprinted
January 31, 2014

HOUSE BILL No. 1290

Requires that the student athlete who is symptomatic be removed from play… and be cleared before return to play

sudden cardiac arrest must be removed from the athletic activity at the time the symptom is identified. Provides that the student athlete may not return to practice and play until the student athlete's parent or legal guardian has been informed and the parent or legal guardian has provided permission for the student to return to practice and play. Requires the commission on higher education to disseminate guidelines, information sheets, and forms to a postsecondary educational institution's athletic department to inform and educate coaches and student athletes of the nature and risk of sudden cardiac arrest. Requires that a form acknowledging receipt of the information

(Continued next page)

Effective: July 1, 2014.

Bacon, Dermody, McNamara, Pelath, Porter

January 15, 2014, read first time and referred to Committee on Education.
January 28, 2014, amended, reported — Do Pass.
January 30, 2014, read second time, amended, ordered engrossed.

Implementation of IC 20-34-8

SUDDEN CARDIAC ARREST

A Fact Sheet for Parents

FACTS

Sudden cardiac arrest is a rare, but tragic event that claims the lives of approximately 500 athletes each year in the United States. Sudden cardiac arrest can affect all levels of athletes, in all sports, and in all age levels. The majority of cardiac arrests are due to congenital (inherited) heart defects. However, sudden cardiac arrest can also occur after a person experiences an illness which has caused an inflammation to the heart or after a direct blow to the chest.

WARNING SIGNS

There may not be any noticeable symptoms before a person experiences loss of consciousness and a full cardiac arrest (no pulse and no breathing).

Warning signs can include a complaint of:

- Chest Discomfort
- Unusual Shortness of Breath
- Racing or Irregular Heart Beat
- Fainting or Passing Out

How can I help my child prevent a sudden cardiac arrest?

Daily physical activity, proper nutrition, and adequate sleep are all important aspects of life-long health. Additionally, parents can assist student athletes prevent a sudden cardiac arrest by:

- Ensuring your child knows about any family history of sudden cardiac arrest (onset of heart disease in a family member before the age of 50 or a sudden, unexplained death at an early age)
- Ensuring your child has a thorough pre-season screening exam prior to participation in an organized athletic activity
- Asking if your school and the site of competition has an automatic defibrillator (AED) that is close by and properly maintained
- Learning CPR yourself
- Ensuring your child is not using any non-prescribed stimulants or performance enhancing drugs
- Being aware that the inappropriate use of prescription medications or energy

Implementation of IC 20-34-8

SUDDEN CARDIAC ARREST

A Fact Sheet for Coaches

FACTS

Sudden cardiac arrest is a rare, but tragic event that claims the lives of approximately 500 athletes each year in the United States. Sudden cardiac arrest can affect all levels of athletes, in all sports, and in all age levels. The majority of cardiac arrests are due to congenital (inherited) heart defects. However, sudden cardiac arrest can also occur after a person experiences an illness which has caused an inflammation to the heart or after a direct blow to the chest. Once a cardiac arrest occurs, there is very little time to save the athlete, so identifying those at risk before the arrest occurs is a key factor in prevention.

WARNING SIGNS

There may not be any noticeable symptoms before a person experiences loss of consciousness and a full cardiac arrest (no pulse and no breathing).

How can I help prevent a sudden cardiac arrest from occurring?

Daily physical activity, proper nutrition, and adequate sleep are all important aspects of life-long health. Additionally, coaches can:

- Ensure that all student athletes and parents have been given the fact sheet and returned the acknowledgement form
- Make a list of athletes who have informed you about a family history of sudden cardiac arrest (onset of heart disease in a family member before the age of 50 or a sudden, unexplained death at an early age)
- Ask if your school and the site of competition has an automatic defibrillator (AED) that is close by and properly maintained
- Learn CPR yourself
- Be aware that the inappropriate use of prescription medications or energy

IC 20-34-8 Implementation

- Fact sheets drafted in collaboration with Indiana Chapter of the American College of Cardiology, Riley Hospital for Children and Peyton Manning Children's Hospital
- Fact sheets and parent letters posted on the Indiana Department of Education website http://www.doe.in.gov/
- Implementation in 2015

INDIANA DEPARTMENT OF EDUCATION
Glenda Ritz, Indiana Superintendent of Public Instruction

Imagining the possibilities.
Making them happen.

HOME | PARENT PORTAL | ADMINISTRATORS | EDUCATORS | COMMUNITY | DATA

Site Map | Search

Student Services

- Attendance
- HEA 1423 Bullying Prevention Website
- Homeless Program (McKinney–Vento)
- Homeschool Information
- School Crisis Planning, Intervention, and Response
- School Counseling & Guidance
- School Health
- School Psychology
- School Social Work
- Child Abuse Response

Home > Student Services > Health > Sudden Cardiac Arrest

Sudden Cardiac Arrest

Posted: Tue, 02/17/2015 – 9:54am *Updated: Thu, 02/26/2015 – 2:07pm*

Sudden Cardiac Arrest Law

- Law – Link to a copy of the law from the Indiana Legislature (IC 20–34–8)

Forms to Implement the Sudden Cardiac Arrest Law

- Fact Sheet for Coaches
- Fact Sheet for Parents
- Fact Sheet for Student Athletes
- Concussion and SCA Acknowledgement and Signature Form for Parents and Student Athletes
- Sudden Cardiac Arrest Flow Chart
- Sudden Cardiac Arrest FAQ Document
- Suspected SCA Symptoms – Documentation for Schools – Sample form for schools to use for documenting SCA symptoms in student athletes
- SCA Release to Play Form – Sample form for schools to use to obtain written permission from parents in order for a student athlete to return to play

http://www.doe.in.gov/student-services/health/sudden-cardiac-arrest

Take Home Lessons

- Know the athlete and the sport in detail.
- Understand what is usual and unusual for the competitive athletes that you care for.
- Familiarize yourself with the regulatory landscape.
- Leverage networks of experts