
# L'ECG e la visita per l'idoneità sportiva non agonistica

**Presidente: Giovanni Semprini**

**Moderatore: Maria Catellani**

La legge, il pediatra ed il cardiologo

*Francesco De Luca, Alberto Ferrando*


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# Al mio segnale scatenate l'inferno...

*Alberto Ferrando*

# Pulse oximetry screening for congenital heart defects in newborn infants (PulseOx): a test accuracy study

**Background:** Screening for congenital heart defects relies on antenatal ultrasonography and postnatal clinical examination; however, life-threatening defects often are not detected. We prospectively assessed the accuracy of pulse oximetry as a screening test for congenital heart defects.

**Methods** In six maternity units in the UK, asymptomatic newborn babies (gestation >34 weeks) were screened with pulse oximetry before discharge. Infants who did not achieve predetermined oxygen saturation thresholds underwent echocardiography. All other infants were followed up to 12 months of age by use of regional and national registries and clinical follow-up. The main outcome was the sensitivity and specificity of pulse oximetry for detection of critical congenital heart defects (causing death or requiring invasive intervention before 28 days) or major congenital heart disease (causing death or requiring invasive intervention within 12 months of age).

**Lancet 5 August 2011**

| | Critical cases alone | All major cases |
|---|---|---|
| True positives | 18 | 26 |
| False negatives | 6 | 27 |
| False positives | 177 | 169 |
| True negatives | 19 854 | 19 833 |
| Sensitivity | 75·00% (53·29–90·23) | 49·06% (35·06–63·16) |
| Specificity | 99·12% (98·98–99·24) | 99·16% (99·02–99·28) |
| Positive predictive value | 9·23% (5·56–14·20) | 13·33% (8·90–18·92) |
| Negative predictive value | 99·97% (99·93–99·99) | 99·86% (99·80–99·91) |

Data are number or percentage (95% CIs).

*Table 3*: **Accuracy of pulse oximetry in full cohort (n=20 055)**

**Conclusions:** Pulse oximetry is a safe, non-invasive, feasible, and accurate test, which has a sensitivity **that is better than that of antenatal screening and clinical examination.** The use of both, preductal and postductal saturations, compared with postductal saturation alone seems to be advantageous and in practice does not take much longer to do. It adds value to existing screening procedures and is likely to be useful for identification of cases of CCHD that would otherwise go undetected. **The results of this study enhance the strong evidence that indicates the potential benefits of the introduction of predischarge pulse oximetry screening as a routine procedure.**

# Vantaggi dello screening della saturazione:

- Costo molto basso
- Nessun rischio
- Ottima specificità (0,03% di falsi positivi)
- Buona sensibilità

**Ma in Italia, sebbene sia raccomandato dalla AAP, sono ancora centinaia i punti nascita in cui non viene eseguita, come i PDF ben sanno…**


Bimba di 11 anni muore a scuola
Ipotesi: arresto cardiaco
Tragedia nel mondo dello sci
Muore un'azzurra di 17 anni
Lurano: milanese festeggia il 2011
poi muore di malore al ristorante
Marisa muore sul divano: aveva 34 anni
Gioca a volley e muore
Muore d'infarto durante la vacanza in Cile
Muore correndo, a 43 anni
tragedia in campo: muore il 21enne
PROFESSORESSA MUORE IN CLASSE STRONCATA DA UN INFARTO
La donna si è accasciata a terra appena entrata in aula. Panico tra gli studenti. All'arrivo del 118 era già deceduta

# Vigor Bovolenta

# Too Young to Die

## An Update on the Impact of Sudden Cardiac Death of the Young in Michigan 1999-2011

"...no important health problem will be solved by clinical care alone, or research alone, or by public health alone- but rather by all public and private sectors working together..."

- JS Marks. Managed Care 2005

***"Could this death have been prevented?"***

# Morte cardiaca improvvisa. Ogni anno muoiono mille giovani

- Sono giovani e apparentemente sani. Eppure muoiono per morte cardiaca improvvisa. Un evento drammatico che colpisce ogni anno oltre mille under 35. Una morte causata da difetti congeniti e malattie genetiche che potrebbero essere scoperti **con un semplice Ecg….** Per questo parte la campagna "Ascolta il battito.
- **Un ECG può salvare la vita" promossa dalla Società Italiana di Cardiologia (Sic) e dalla Fondazione Italiana Cuore e Circolazione-Onlus con il patrocinio del Miur. La campagna che ha ricevuto il via libera dal Segretariato sociale Rai nell'ambito di trasmissioni televisive e radiofoniche Rai, punta a raccogliere fondi con sms solidali.**
- **Obiettivo: realizzare il progetto "A scuola di cuore" che attraverso screening cardiovascolari ed Ecg agli studenti tra i 16 e i 18 anni delle scuole secondarie, punta a individuare i soggetti a rischio e a confermare la diagnosi anche con test genetici.**

# Comunicato stampa Roma, 8 aprile 2013

## *«Morte "improvvisa" giovanile: lo screening elettrocardiografico può salvare la vita»*

**Iniziativa nelle scuole del territorio dell'Ospedale Pediatrico Bambino Gesù di Palidoro**

Viene chiamata "morte improvvisa" in età pediatrica, perché colpisce bambini apparentemente sani: circa 5 pazienti all'anno su 100.000. Si manifesta nel 10-15% dei casi durante l'attività fisica, e nel 90% dei casi è riconducibile a cause cardiache che potrebbero essere individuate preventivamente attraverso un semplice elettrocardiogramma.

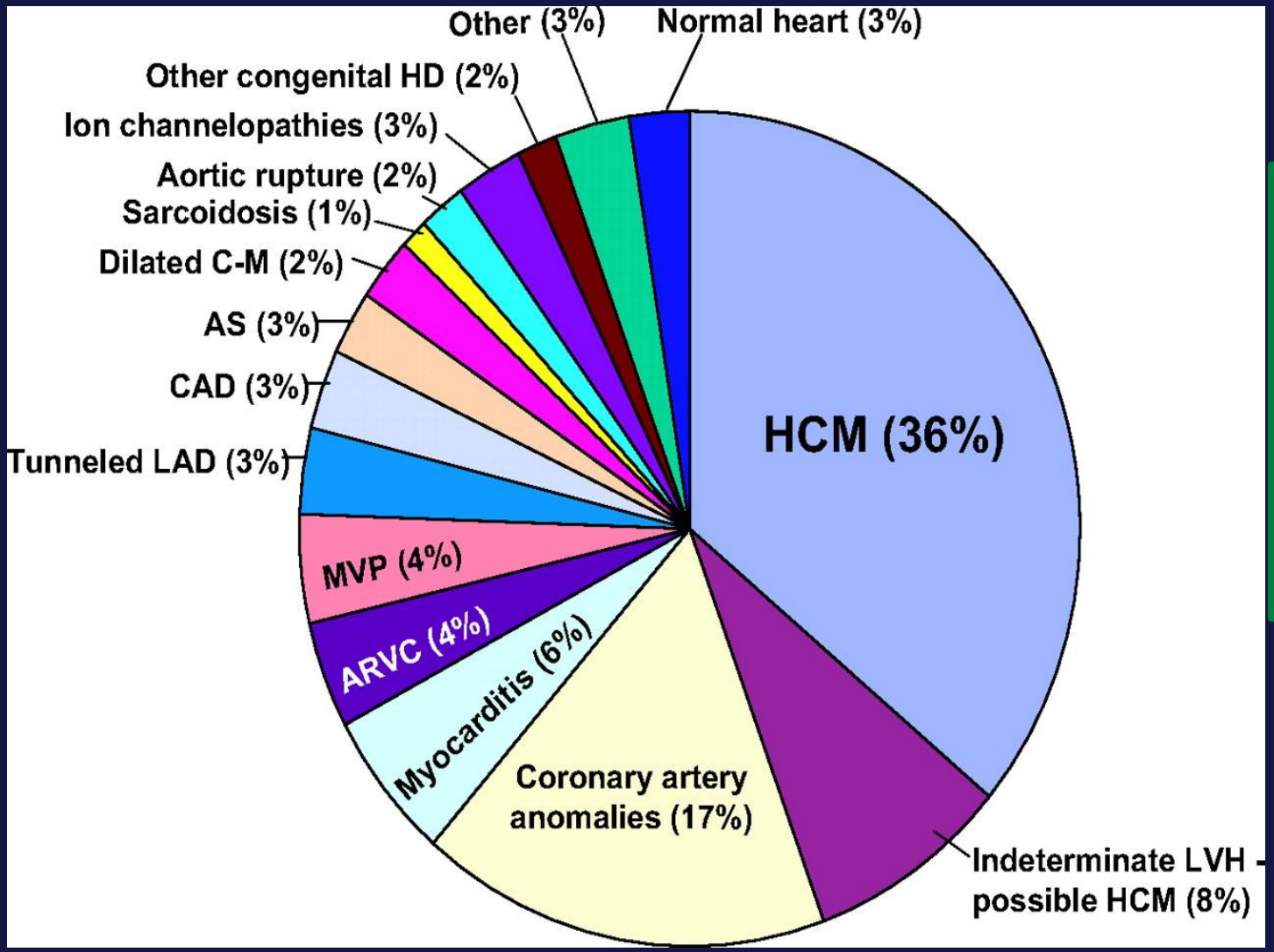
- Lunedì 22 Aprile 2013 - **Parte a Marsala il progetto contro la morte "improvvisa" giovanile**

# MA…… UNA MORTE IMPROVVISA CARDIACA (SCD) E' ANCHE SEMPRE INASPETTATA O, ALMENO IN ALCUNI CASI, PUO' ESSERE PREVISTA???

# Le dimensioni del fenomeno

| | |
|---|---|
| **SCD in bambini e adolescenti** | **0,6-6,2/100.000/anno (il 25° dei casi avviene durante lo sport. Nel giovane atleta il rischio é x 2,5 durante l'attività sportiva)** |
| **SCD in pazienti con cardiopatia congenita** | **100/100.000 pazienti** |
| **SCD in età adulta** | **135/100.000** |

# What causes SCD?




Distribution of cardiovascular causes of sudden death I in 1435 young competitive athletes

Maron BJ et al. *Circ*. 2007

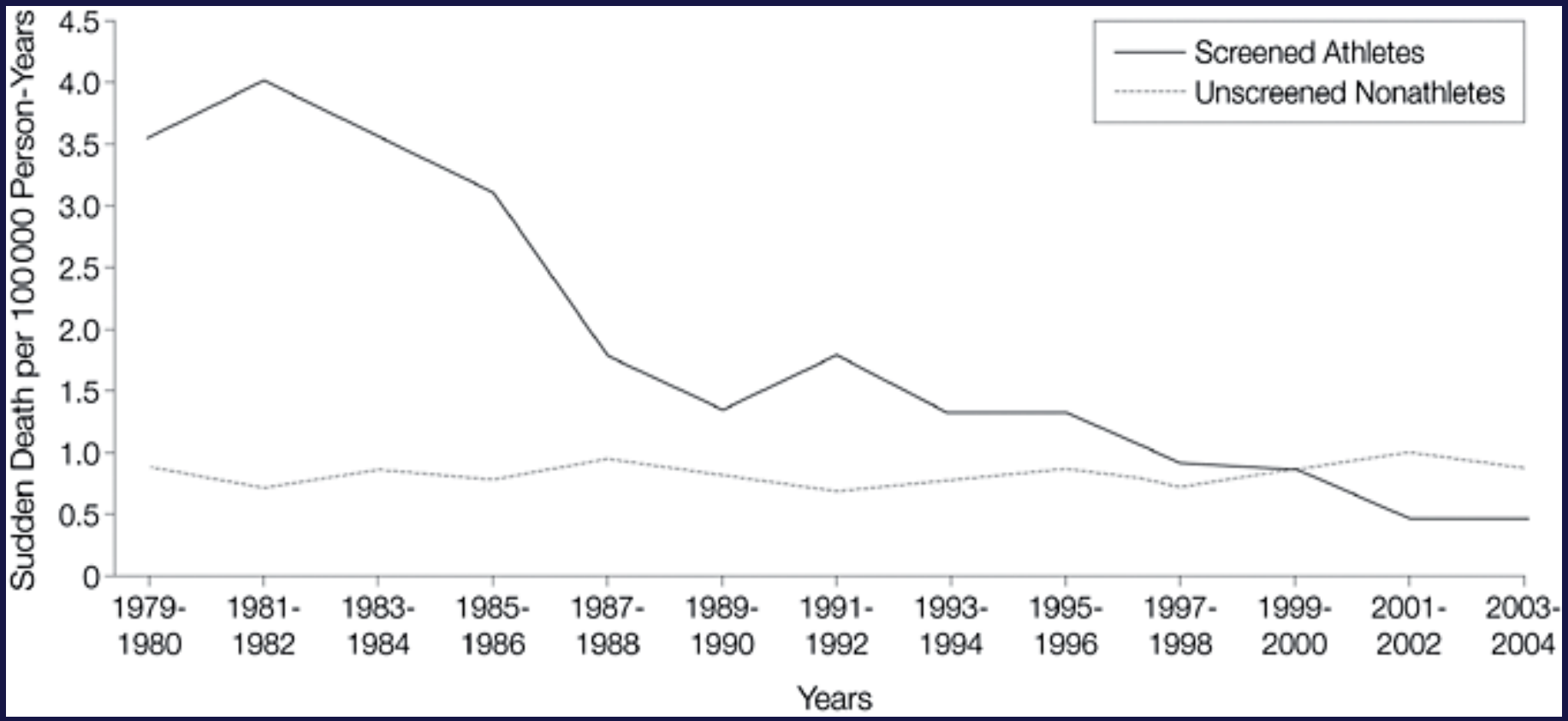
# Two approaches to screening

- Focused history and physical exam, further work-up only if risk-factors identified (U.S. approach)
- H&P, plus ECG, with further work-up if abnormalities on either (Italian approach)

# The Italian experience

- Pioneers of ECG screening for athletes
- They provide annual ECGs for all athletes ages 12-35
- They report dramatic reduction in SCD

# SCD rate in athletes and non-athletes, Veneto, Italy, 1979-2004

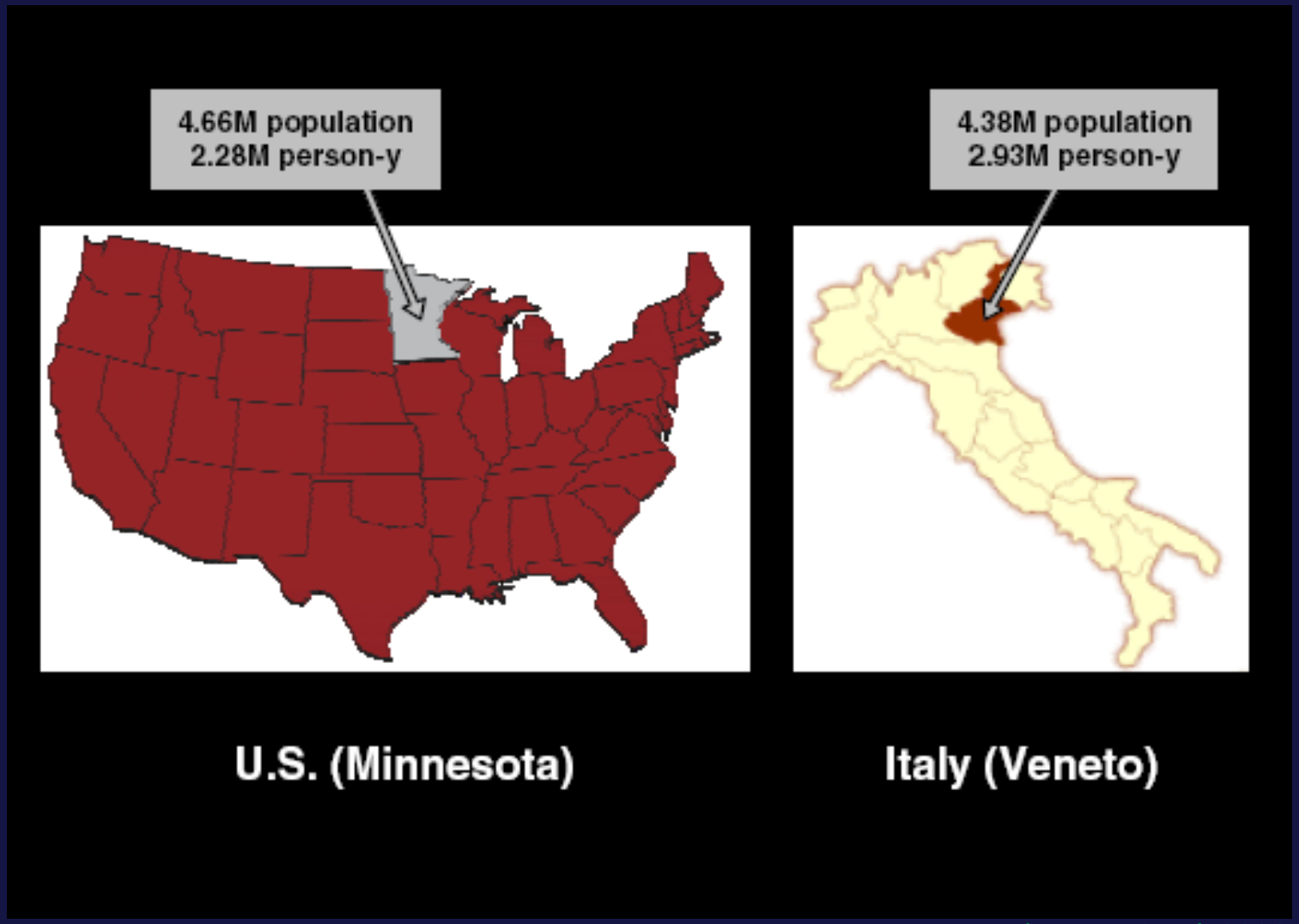



Corrado D. *JAMA.* 2006.

# What about the USA?

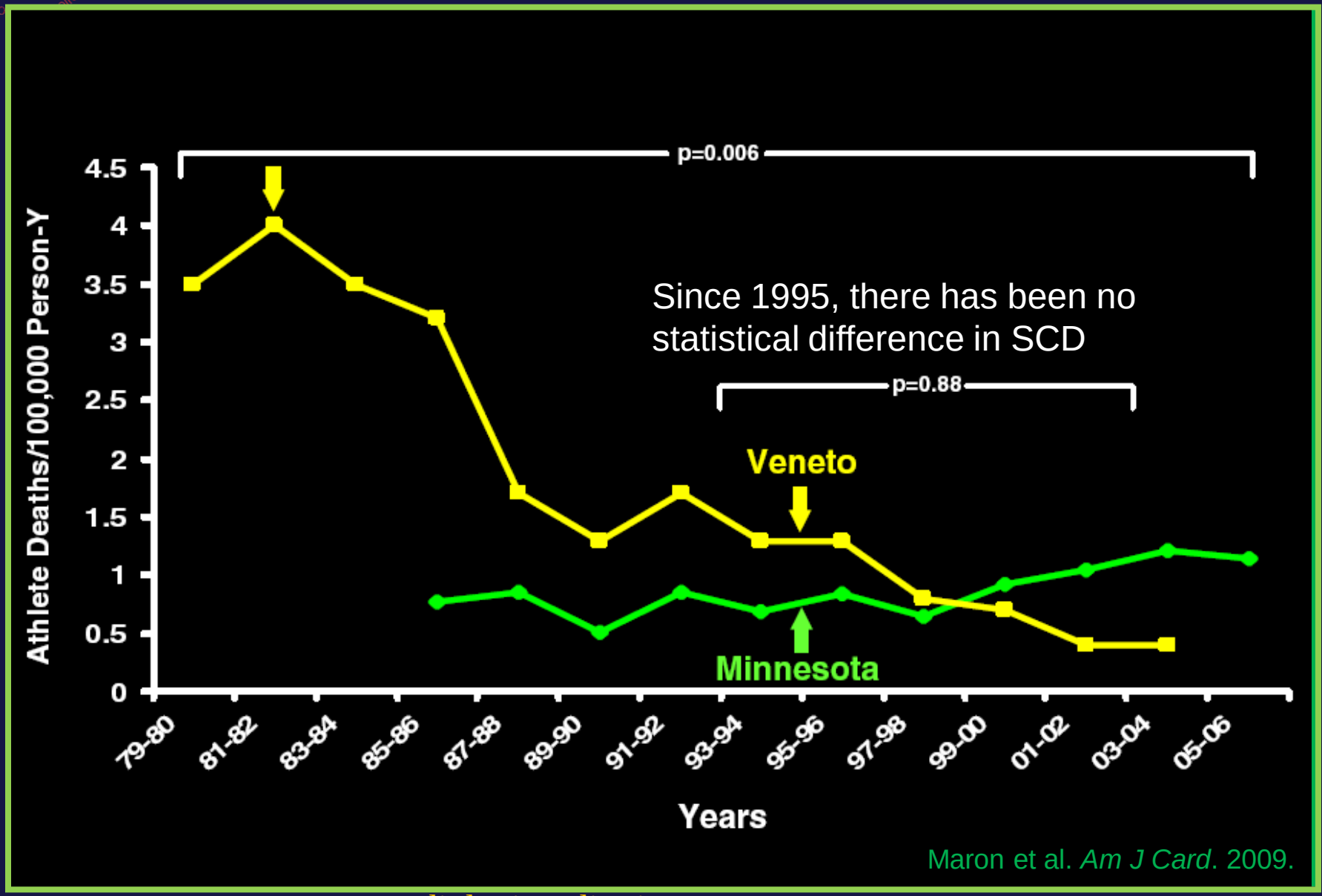
- Maron et al compared SCD death rates in Minnesota with those reported in Veneto
- They found that, without ECG screening, SCD rates in MN were comparable to those in Italy with ECG screening

# Veneto and Minnesota comparable in population and ethnicity




Maron et al. *Am J Card*. 2009

# Trends in rates of SCD in MN and Veneto, 1979-2004




Maron et al. *Am J Card*. 2009.

# To save one life…

- **About 1,700 athletes would have to be prohibited from sports, and their families warned that sudden cardiac death could kill their child**



Bessem et al. *Br J Sports Med*. 2009.

# Difficulties with screening

**Many false positives and false negatives**

- Cannot prevent all deaths
- Prevents sports participation in many people at low risk of SCD

- Anxiety for athletes with positive screen
- Cost
- Demands on medical personnel
- Freedom vs. paternalism

# So what is a pediatrician to do?

- AHA recommends H&P, without routine ECG
- Present parents the facts
- Acknowledge uncertainty
- Ultimately, must be a shared, well-informed, and individualized decision

# Is SCD preventable?

- The $2 billion question!
- Some conditions that predispose to SCD can be picked up on sports screening, others cannot
- Screening programs are expensive
- Experts advocate different approaches

CONTROVERSIES IN CARDIOVASCULAR MEDICINE

# *Electrocardiograms Should Be Included in Preparticipation Screening of Athletes*

*Robert J. Myerburg, MD; Victoria L. Vetter, MD*

**Circulation 2007, 116**

CONTROVERSIES IN CARDIOVASCULAR MEDICINE

# Should an electrocardiogram be included in routine preparticipation screening of young athletes?

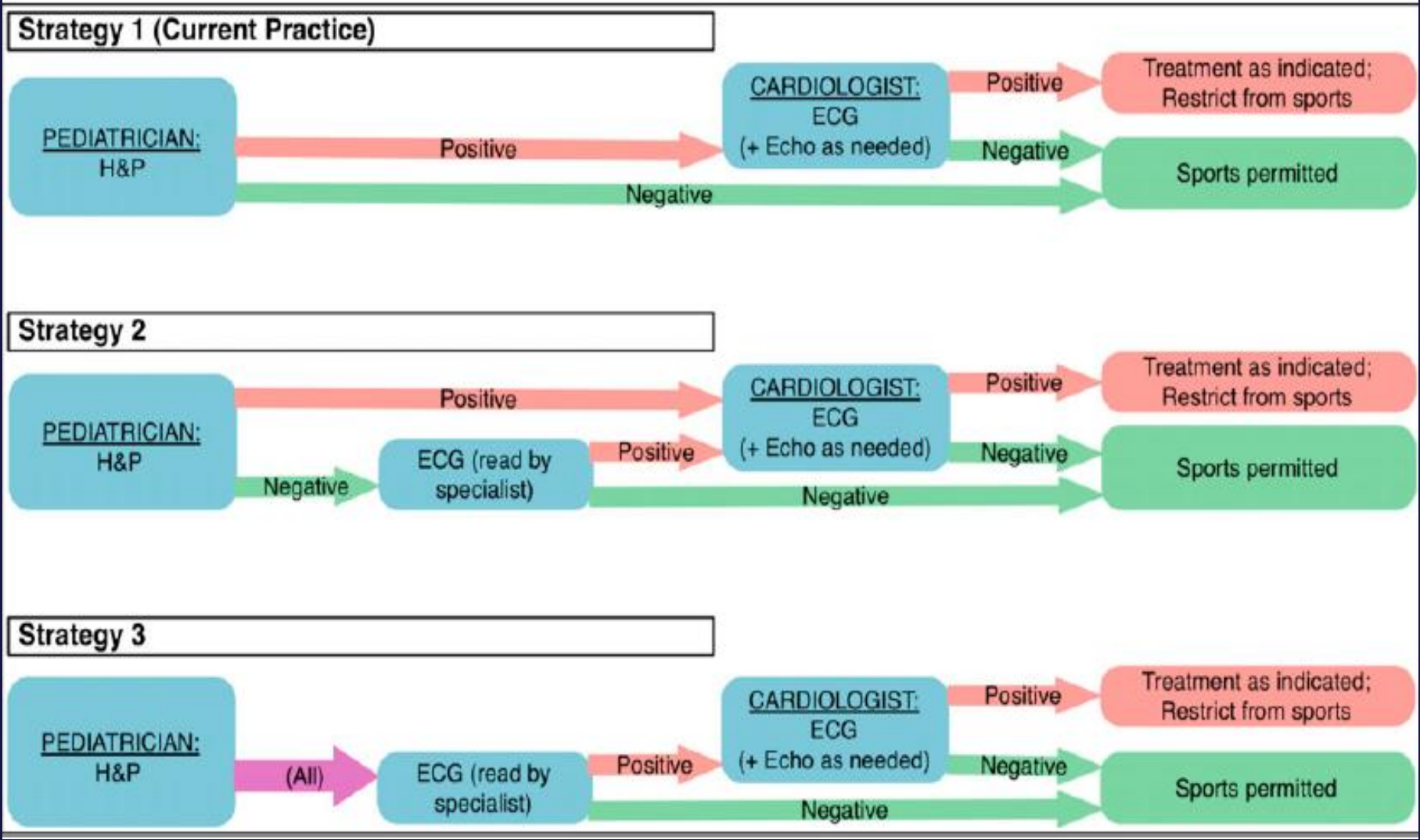
*An Electrocardiogram Should Not Be Included in Routine Preparticipation Screening of Young Athletes*

*Bernard R. Chaitman, MD, FACC*

**Circulation 2007, 116**

# Economic Evaluation of Strategies to Reduce Sudden Cardiac Death in Young Athletes

*Pediatrics* 2012;130:e380–e389



# Segni e sintomi di allarme

- Benché un SCD può essere il primo sintomo di presentazione, spesso i pazienti a rischio per alterazioni funzionali o strutturali o per disordini elettrici primitivi manifestano sintomi premonitori.
- La presenza **di famigliarità** per SCD e i **sintomi** sono utili per identificare i soggetti a rischio e impostare una prevenzione.

# Segni e sintomi di allarme

Scand Cardiovasc J 2005;39(3):143-149

Studio su 162 casi (15-34 anni) con SCA autopsia neg:

**IL 50% aveva storia di :**

- Sincope
- Pre-sincope
- Dolore precordiale
- Palpitazioni
- Dispnea
- Il 16% aveva una storia famigliare di SCD

# Questionario anamnestico per attività sportiva suggerito dalla AAP 2010

1. Sei mai svenuto o sei mai stato sul punto di svenire DURANTE o DOPO l'esercizio fisico?
2. Hai mai avuto disturbi (es dolori, o senso di costrizione) al torace durante sforzo fisico?
3. Hai mai avvertito battiti irregolari (tachicardia improvvisa o battiti extra o mancanza di battito) durante esercizio fisico?
4. In qualche visita precedente qualche dottore ti ha mai detto che potresti avere qualche problema al cuore? (Pressione alta, colesterolo alto, soffi al cuore, infezione al cuore, malattia di Kawasaki?)
5. Qualcuno ti ha mai prescritto esami per il cuore? (es ECG di base o sotto sforzo, eco etc?)
6. Ti sei mai sentito stordito o hai mai avvertito respiro inaspettatamente corto durante esercizio (più dell'atteso per lo sforzo)?
7. Hai mai avuto convulsioni non spiegate dai medici?
8. Durante esercizio fisico, ti senti più stanco e avverti respiro corto prima dei tuoi amici?
9. C'è qualche parente deceduto prima dei 50 anni per problemi cardiaci accertati oppure per morte improvvisa inspiegata (includendo annegamenti, incidenti d'auto "da sonno", SIDS)?
10. Qualcuno in famiglia è affetto da: Cardiomiopatia Ipertrofica? Sindrome di Marfan? Cardiomiopatia Aritmogena del Ventricolo Destro? Sindrome del QT lungo? Sindrome del QT corto? Sindrome di Brugada? Tachicardia Ventricolare Polimorfa Catecolaminergica?
11. Qualcuno nella tua famiglia ha avuto problemi di cuore, ha avuto necessità di ricorrere ad impianto di Pace Maker o Defibrillatore cardiaco?
12. Qualcuno in famiglia ha avuto svenimenti inspiegati, convulsioni di natura non definita, o è stato sul punto di annegare? www.cardiologiapediatricact.com

F. De Luca

Choosing Wisely®

An initiative of the ABIM Foundation

*Choosing Wisely* is focused on encouraging physicians, patients and other health care stakeholders to think and talk **about medical tests and procedures that may be unnecessary, and in some instances can cause harm.**

American Academy of Neurology

American Academy of Ophthalmology

American Academy of Orthopaedic Surgeons

American Academy of Otolaryngology–Head and Neck Surgery

American Academy of Pediatrics

American Academy of Pediatrics

DEDICATED TO THE HEALTH OF ALL CHILDREN™

The American Academy of Pediatrics (AAP) is a strong supporter of partnerships that improve the quality of care for patients. The *Choosing Wisely*® campaign helps to raise awareness of the need to evaluate tests and treatments thoughtfully. This is particularly important when treating children because they are still growing and developing. The AAP believes that health care for children, in addition to being delivered in a patient-centered medical home, should be evidence-based or informed, efficient and based on quality improvement measures relevant to the pediatric population. The AAP also encourages patient and family engagement in promoting their child's well-being. These hallmarks of the patient-centered medical home are integral to the *Choosing Wisely* campaign.

Eur J Pediatr
DOI 10.1007/s00431-013-2064-x

REVIEW

# Sports preparticipation cardiac screening: what about children?

**Daniel De Wolf · Dirk Matthys**

Received: 5 May 2013 / Accepted: 5 June 2013

*"Sufficient data are lacking to support general preparticipation screening with history, physical exam, and ECG in competitive children. Nevertheless, the impact of such a program, together with secondary preventive measures, should be evaluated in large prospective studies".*

Contents lists available at SciVerse ScienceDirect

European Journal of Internal Medicine

journal homepage: www.elsevier.com/locate/ejim

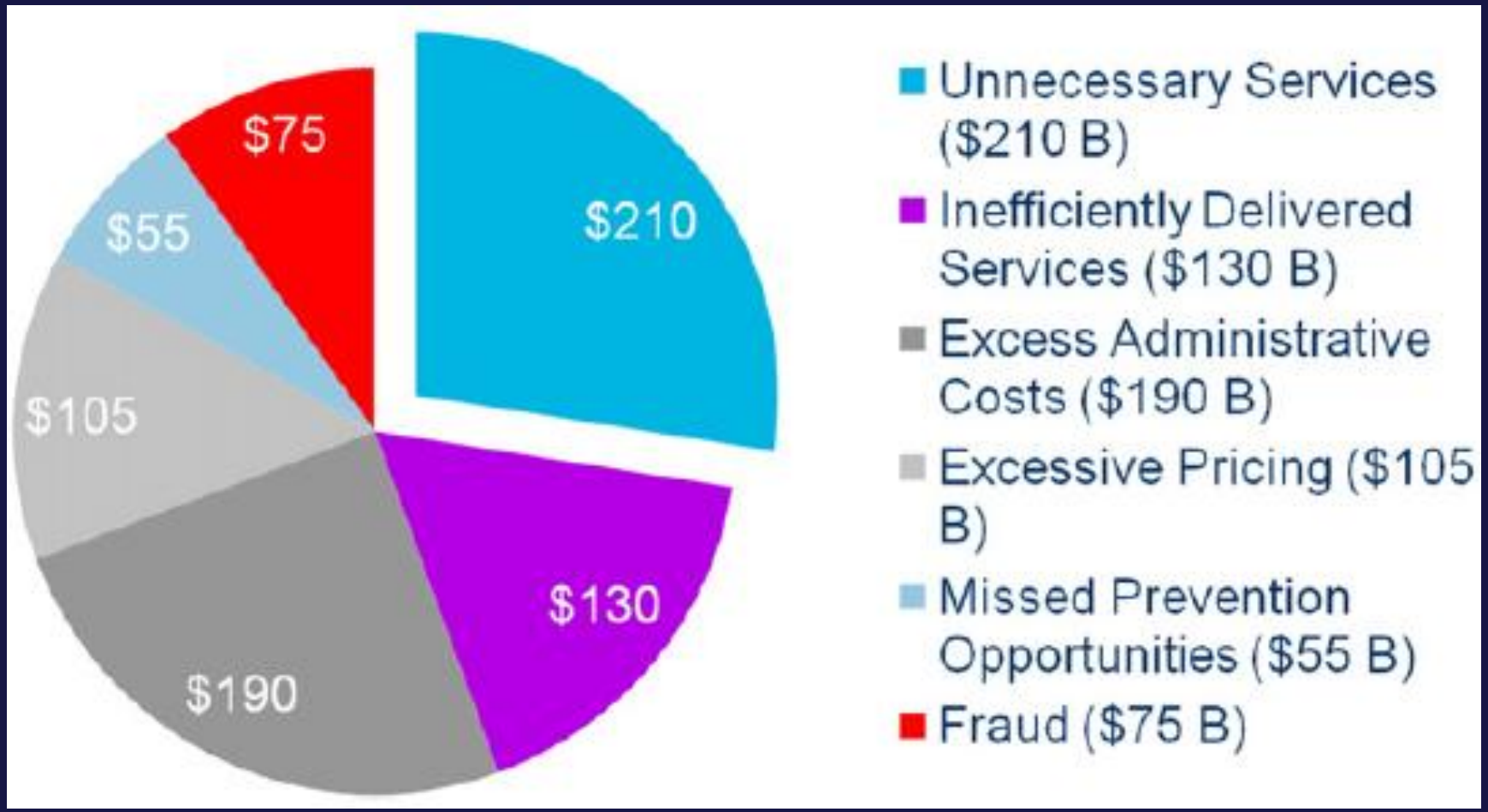
Review article

# High value, cost-conscious care: An international imperative

European Journal of Internal Medicine 23 (2012) 495–498

A B S T R A C T

Health care costs in the United States are the highest in the world, and are continuing to rise at a level that is unsustainable. However, although this problem is more acute in the United States than elsewhere in the world, it is a challenge for all nations to control the costs of health care. The high cost of health care in the U.S. is not accompanied by a higher quality of care, but rather is related in large measure to health system "waste" that does not benefit patients but adds to cost. Representing approximately 30% of dollars spent on health care, this waste includes a significant amount of money spent on overuse and misuse of diagnostic testing, including screening tests. The American College of Physicians, the largest specialty society for physicians in the U.S., representing internal medicine and all of its subspecialties, has embarked upon a High Value, Cost-Conscious Care initiative, aimed at identifying areas of overuse and misuse of care, and leading to development of guidelines, educational materials, and other resources targeted to health care providers, trainees, and the general public. It is incumbent upon physicians, non-physician health care professionals, patients, and other health care stakeholders to address the issue of reducing care that is not appropriate, both to improve the overall quality of care and to reduce the associated unsustainable financial burden to society.


$75
$210
$55
$105
$130
$190
Unnecessary Services ($210 B)
Inefficiently Delivered Services ($130 B)
Excess Administrative Costs ($190 B)
Excessive Pricing ($105 B)
Missed Prevention Opportunities ($55 B)
Fraud ($75 B)

## Learning points

- Health care costs in the United States, which already represent nearly 18% of GDP, are continuing to rise at an unsustainable rate.
- Approximately 30% of health care costs in the U.S. are thought to be "wasted," i.e. adding to costs without benefiting patients.
- The number of diagnostic tests per patient, including imaging studies, has risen by approximately 85% over the past decade, and the overuse of these studies must be addressed in order to provide optimal care and control costs.
- It is an ethical and professional responsibility of physicians and other health care professionals to avoid overuse and misuse of care that does not benefit patients.

# Sudden Cardiac Death in Young Athletes

**The Basic Facts on Sudden Cardiac Death in Young Athletes**

American Academy of Pediatrics
DEDICATED TO THE HEALTH OF ALL CHILDREN™

New Jersey Chapter

American Heart Association
*Learn and Live*

## SUDDEN CARDIAC DEATH IN YOUNG ATHLETES

Sudden death in young athletes between the ages of 10 and 19 is very rare. What, if anything, can be done to prevent this kind of tragedy?

**What is sudden cardiac death in the young athlete?**

Sudden cardiac death is the result of an unexpected failure of proper heart function, usually (about 60% of the time) during or immediately after exercise *without trauma*. Since the heart stops pumping adequately, the athlete quickly collapses, loses consciousness, and ultimately dies unless normal heart rhythm is restored using an automated external defibrillator (AED).

**How common is sudden death in young athletes?**

Sudden cardiac death in young athletes is very rare. About 100 such deaths are reported in the United States per year. The chance of sudden death occurring to any individual high school athlete is about one in 200,000 per year.

Sudden cardiac death is more common: in males than in females; in football and basketball than in other sports; and in African-Americans than in other races and ethnic groups.

**What are the most common causes?**

Research suggests that the main cause is a loss of proper heart rhythm, causing the heart to quiver instead of pumping blood to the brain and body. This is called *ventricular fibrillation* (*ven-TRICK-you-lar fib-roo-LAY-shun*). The problem is usually caused by one of several cardiovascular abnormalities and electrical diseases of the heart that go unnoticed in healthy-appearing athletes.

The most common cause of sudden death in an athlete is *hypertrophic cardiomyopathy* (*hi-per-TRO-fic CAR-dee-oh-my-OP-a-thee*) also called HCM. HCM is a disease of the heart, with abnormal thickening of the heart muscle, which can cause serious heart rhythm problems and blockages to blood flow. This genetic disease runs in families and usually develops gradually over many years.

The second most likely cause is *congenital* (*con-JEN-it-al*) (i.e., present from birth) *abnormalities of the coronary arteries*. This means that these blood vessels are connected to the main blood vessel of the heart in an abnormal way. This differs from blockages that may occur when people get older (commonly called "coronary artery disease," which may lead to a heart attack).

Other diseases of the heart that can lead to sudden death in young people include:

- *Myocarditis* (*my-oh-car-DIE-tis*), an acute inflammation of the heart muscle (usually due to a virus).

- *Dilated cardiomyopathy*, an enlargement of the heart for unknown reasons.
- *Long QT syndrome* and other electrical abnormalities of the heart which cause abnormal fast heart rhythms that can also run in families.

- *Marfan syndrome*, an inherited disorder that affects heart valves, walls of major arteries, eyes and the skeleton. It is generally seen in unusually tall athletes, especially if being tall is not common in other family members.

**Are there warning signs to watch for?**

In more than a third of these sudden cardiac deaths, there were warning signs that were not reported or taken seriously. Warning signs are:

- Fainting, a seizure or convulsions during physical activity
- Fainting or a seizure from emotional excitement, emotional distress or being startled
- Dizziness or lightheadedness, especially during exertion
- Chest pains, at rest or during exertion
- Palpitations - awareness of the heart beating unusually (skipping, irregular or extra beats) during athletics or during cool down periods after athletic participation
- Fatigue or tiring more quickly than peers
- Being unable to keep up with friends due to shortness of breath

**What are the current recommendations for screening young athletes?**

New Jersey requires all school athletes to be examined by their primary care physician ("medical home") or school physician at least once per year. The New Jersey Department of Education requires use of the specific Annual Athletic Pre-Participation Physical Examination Form.

This process begins with the parents and student-athletes answering questions about *symptoms* during exercise (such as chest pain, dizziness, fainting, palpitations or shortness of breath); and questions about *family health history*.

The primary healthcare provider needs to know if any family member died suddenly during physical activity or during a seizure. They also need to know if anyone in the family under the age of 50 had an unexplained sudden death such as drowning or car accidents. This information must be provided annually for each exam because it is so *essential to identify those at risk for sudden cardiac death.*

The required physical exam includes measurement of blood pressure and a careful listening examination of the heart, especially for murmurs and rhythm abnormalities. If there are no warning signs reported on the health history and no abnormalities discovered on exam, no further evaluation or testing is recommended.

**When should a student athlete see a heart specialist?**

If the primary healthcare provider or school physician has concerns, a referral to a child heart specialist, a pediatric cardiologist, is recommended. This specialist will perform a more thorough evaluation, including an electrocardiogram (ECG), which is a graph of the electrical activity of the heart. An echocardiogram, which is an ultrasound test to allow for direct visualization of the heart structure, will likely also be done. The specialist may also order a treadmill exercise test and a monitor to enable a longer recording of the heart rhythm. None of the testing is invasive or uncomfortable.

**Can sudden cardiac death be prevented just through proper screening?**

A proper evaluation should find most, but not all, conditions that would cause sudden death in the athlete. This is because some diseases are difficult to uncover and may only develop later in life. Others can develop following a normal screening evaluation, such as an infection of the heart muscle from a virus.

This is why screening evaluations and a review of the family health history need to be performed on a yearly basis by the athlete's primary healthcare provider. With proper screening and evaluation, most cases can be identified and prevented.

**Why have an AED on site during sporting events?**

The only effective treatment for ventricular fibrillation is immediate use of an automated external defibrillator (AED). An AED can restore the heart back into a normal rhythm. An AED is also life-saving for ventricular fibrillation caused by a blow to the chest over the heart (commotio cordis).

The American Academy of Pediatrics/New Jersey Chapter recommends that schools:

- Have an AED available at every sports event (three minutes total time to reach and return with the AED)
- Have personnel available who are trained in AED use present at practices and games.
- Have coaches and athletic trainers trained in basic life support techniques (CPR)
- Call 911 immediately while someone is retrieving the AED.

Annals of Internal Medicine | IDEAS AND OPINIONS

# Appropriate Use of Screening and Diagnostic Tests to Foster High-Value, Cost-Conscious Care

Amir Qaseem, MD, PhD, MHA; Patrick Alguire, MD; Paul Dallas, MD; Lawrence E. Feinberg, MD; Faith T. Fitzgerald, MD; Carrie Horwitch, MD, MPH; Linda Humphrey, MD, MPH; Richard LeBlond, MD; Darilyn Moyer, MD; Jeffrey G. Wiese, MD; and Steven Weinberger, MD

Unsustainable rising health care costs in the United States have made reducing costs while maintaining high-quality health care a national priority. The overuse of some screening and diagnostic tests is an important component of unnecessary health care costs. More judicious use of such tests will improve quality and reflect responsible awareness of costs. Efforts to control expenditures should focus not only on benefits, harms, and costs but on the value of diagnostic tests—meaning an assessment of whether a test provides health benefits that are worth its costs or harms. To begin to identify ways that practicing clinicians can contribute to the delivery of high-value, cost-conscious health care, the American College of Physicians convened a workgroup of physicians to identify, using a consensus-based process, common clinical situations in which screening and diagnostic tests are used in ways that do not reflect high-value care. The intent of this exercise is to promote thoughtful discussions about these tests and other health care interventions to promote high-value, cost-conscious care.

*Ann Intern Med.* 2012;156:147-149. www.annals.org

For author affiliations, see end of text.

*Table.* **Clinical Situations in Which a Test Does Not Reflect High-Value Care***

1. Repeating screening ultrasonography for abdominal aortic aneurysm following a negative study
2. Performing coronary angiography in patients with chronic stable angina with well-controlled symptoms on medical therapy or who lack specific high-risk criteria on exercise testing
3. Performing echocardiography in asymptomatic patients with innocent-sounding heart murmurs, most typically grade I–II/VI short systolic, midpeaking murmurs that are audible along the left sternal border
4. Performing routine periodic echocardiography in asymptomatic patients with mild aortic stenosis more frequently than every 3–5 y
5. Routinely repeating echocardiography in asymptomatic patients with mild mitral regurgitation and normal left ventricular size and function
6. Obtaining electrocardiograms to screen for cardiac disease in patients at low to average risk for coronary artery disease
7. Obtaining exercise electrocardiogram for screening in low-risk asymptomatic adults
8. Performing an imaging stress test (echocardiographic or nuclear) as the initial diagnostic test in patients with known or suspected coronary artery disease who are able to exercise and have no resting electrocardiographic abnormalities that may interfere with interpretation of test results
9. Measuring brain natriuretic peptide in the initial evaluation of patients with typical findings of heart failure
10. Annual lipid screening for patients not receiving lipid-lowering drug or diet therapy in the absence of reasons for changing lipid profiles
11. Using MRI rather than mammography as the breast cancer screening test of choice for average-risk women
12. In asymptomatic women with previously treated breast cancer, performing follow-up complete blood counts, blood chemistry studies, tumor marker studies, chest radiography, or imaging studies other than appropriate breast imaging
13. Performing dual-energy x-ray absorptiometry screening for osteoporosis in women younger than 65 y in the absence of risk factors
14. Screening low-risk individuals for hepatitis B virus infection
15. Screening for cervical cancer in low-risk women aged 65 y or older and in women who have had a total hysterectomy (uterus and cervix) for benign disease
16. Screening for colorectal cancer in adults older than 75 y or in adults with a life expectancy of less than 10 y
17. Repeating colonoscopy within 5 y of an index colonoscopy in asymptomatic patients found to have low-risk adenomas
18. Screening for prostate cancer in men older than 75 y or with a life expectancy of less than 10 y
19. Using CA-125 antigen levels to screen women for ovarian cancer in the absence of increased risk
20. Performing imaging studies in patients with nonspecific low back pain
21. Performing preoperative chest radiography in the absence of a clinical suspicion for intrathoracic pathology
22. Ordering routine preoperative laboratory tests, including complete blood count, liver chemistry tests, and metabolic profiles, in otherwise healthy patients undergoing elective surgery
23. Performing preoperative coagulation studies in patients without risk factors or predisposing conditions for bleeding and with a negative history of abnormal bleeding
24. Performing serologic testing for suspected early Lyme disease
25. Performing serologic testing for Lyme disease in patients with chronic nonspecific symptoms and no clinical evidence of disseminated Lyme disease
26. Performing sinus imaging studies for patients with acute rhinosinusitis in the absence of predisposing factors for atypical microbial causes
27. Performing imaging studies in patients with recurrent, classic migraine headache and normal findings on neurologic examination
28. Performing brain imaging studies (CT or MRI) to evaluate simple syncope in patients with normal findings on neurologic examination
29. Routinely performing echocardiography in the evaluation of syncope, unless the history, physical examination, and electrocardiogram do not provide a diagnosis or underlying heart disease is suspected
30. Performing predischarge chest radiography for hospitalized patients with community-acquired pneumonia who are making a satisfactory clinical recovery
31. Obtaining CT scans in a patient with pneumonia that is confirmed by chest radiography in the absence of complicating clinical or radiographic features
32. Performing imaging studies, rather than a high-sensitivity D-dimer measurement, as the initial diagnostic test in patients with low pretest probability of venous thromboembolism
33. Measuring D-dimer rather than performing appropriate diagnostic imaging (extremity ultrasonography, CT angiography, or ventilation–perfusion scintigraphy), in patients with intermediate or high probability of venous thromboembolism
34. Performing follow-up imaging studies for incidentally discovered pulmonary nodules ≤4 mm in low-risk individuals
35. Monitoring patients with asthma or chronic obstructive pulmonary disease by using full pulmonary function testing that includes lung volumes and diffusing capacity, rather than spirometry alone (or peak expiratory flow rate monitoring in asthma)
36. Performing an antinuclear antibody test in patients with nonspecific symptoms, such as fatigue and myalgia, or in patients with fibromyalgia
37. Screening for chronic obstructive pulmonary disease with spirometry in individuals without respiratory symptoms

# Sudden Cardiac Death and Preparticipation Screening: The Debate Continues—In Support of Electrocardiogram-Inclusive Preparticipation Screening

# *De sexu angelorum?*

# Bethesda Conference #36 and the European Society of Cardiology Consensus Recommendations Revisited

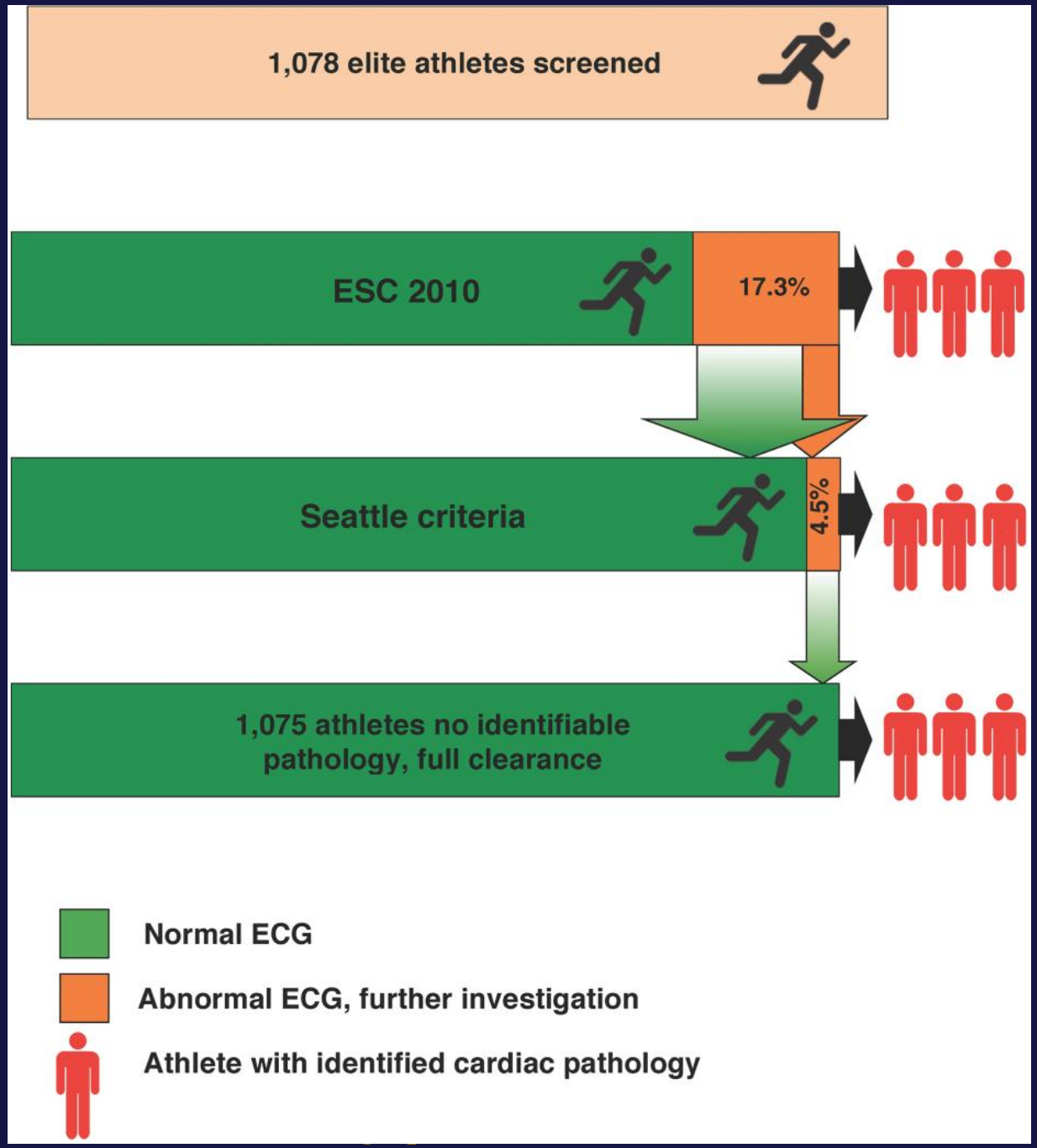
## A Comparison of U.S. and European Criteria for Eligibility and Disqualification of Competitive Athletes With Cardiovascular Abnormalities

Antonio Pelliccia, MD,* Douglas P. Zipes, MD,† Barry J. Maron, MD‡

**Table 1** Summary of Selected Differences Between BC#36 and ESC Recommendations for Competitive Athletes With Selected CV Abnormalities

(J Am Coll Cardiol 2008;52:1990–6)

| | Clinical Criteria and Sports Permitted | |
|---|---|---|
| | **BC#36** | **ESC** |
| Gene carriers without phenotype (HCM, ARVC, DCM, ion channel diseases*) | All sports | Only recreational sports |
| LQTS | >0.47 s in male subjects, >0.48 s in female subjects | >0.44 s in male subjects, >0.46 s in female subjects |
| | Low-intensity competitive sports | Only recreational sports |
| Marfan syndrome | If aortic root <40 mm, no MR, no familial SD, then low-moderate intensity competitive sports permitted | Only recreational sports |
| Asymptomatic WPW | EPS not mandatory | EPS mandatory |
| | All competitive sports (restriction for sports in dangerous environment)† | All competitive sports (restriction for sports in dangerous environment)† |
| Premature ventricular complexes | All competitive sports, when no increase in PVCs or symptoms occur with exercise | All competitive sports, when no increase in PVCs, couplets, or symptoms occur with exercise |
| Nonsustained ventricular tachycardia | If no CV disease, all competitive sports | If no CV disease, all competitive sports |
| | If CV disease, only low-intensity competitive sports | If CV disease, only recreational sports |


1,078 elite athletes screened
ESC 2010
17.3%
Seattle criteria
4.5%
1,075 athletes no identifiable pathology, full clearance
Normal ECG
Abnormal ECG, further investigation
Athlete with identified cardiac pathology

# The Seattle Criteria increase the specificity of preparticipation ECG screening among elite athletes

*Br J Sports Med* 2013;**0**:1–8.

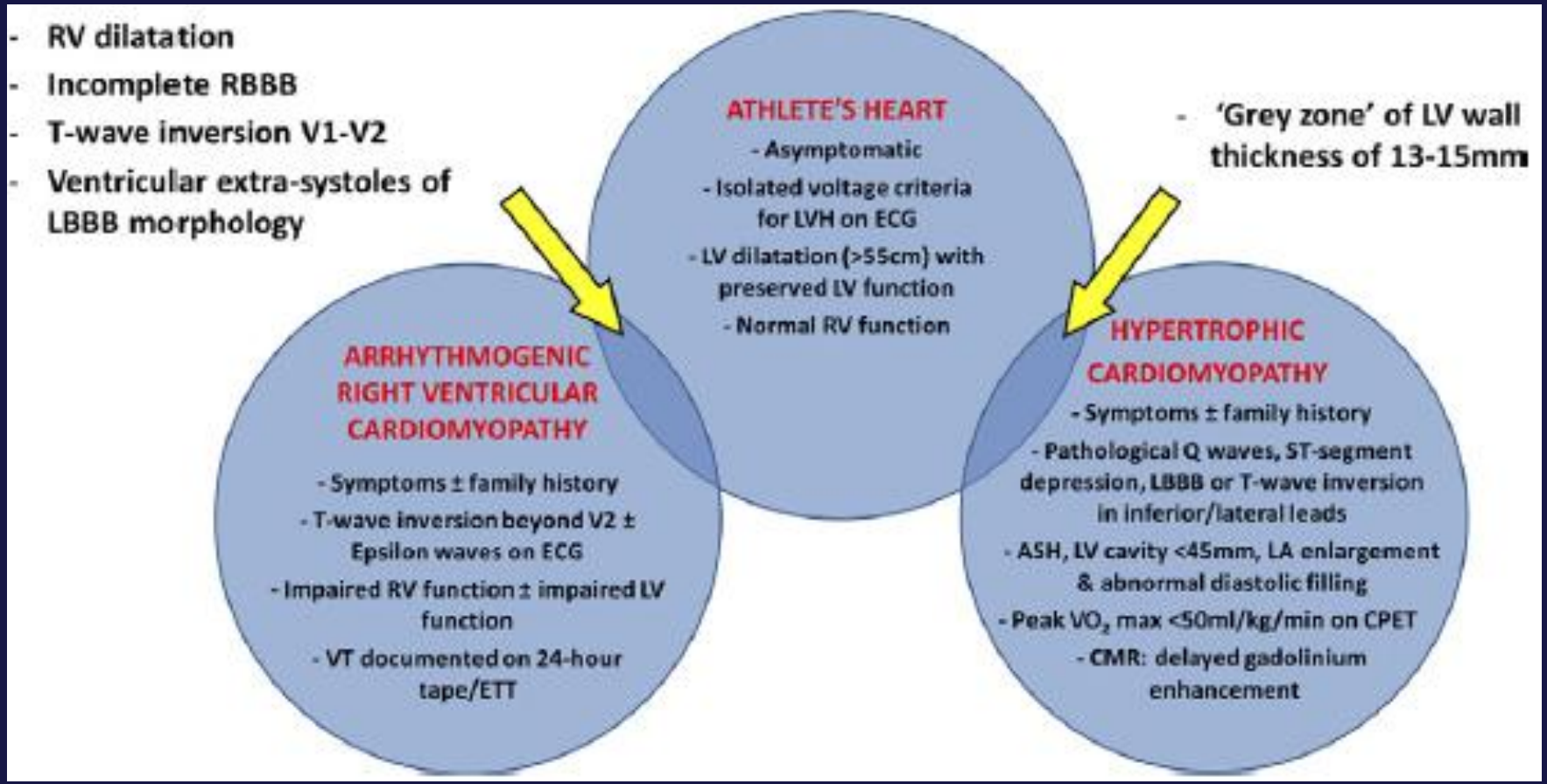
## What are the new findings?

- Group 2 ECG abnormalities using the 2010 European Society of Cardiology recommendations were common, seen in 17.3% of this cohort of truly elite athletes.
- The Seattle Criteria improved the specificity of ECG screening by 74%, reducing the number of athletes who required further investigation from almost 1 in 5 to 1 in 20.
- The Seattle Criteria improved the specificity of screening while still identifying the three athletes (0.3%) with a cardiac abnormality.

**Conclusions** The 'Seattle Criteria' reduced the false-positive rate of ECG screening from 17% to 4.2%, while still identifying the 0.3% of athletes with a cardiac abnormality.

**Table 1** Recommendations for Competitive Sports Participation Among Athletes With Potential Causes of SCD (4,29)

| Condition | 36th Bethesda Conference | European Society of Cardiology |
|---|---|---|
| **Structural cardiac abnormalities** | | |
| HCM | Exclude athletes with a probable or definitive clinical diagnosis from all competitive sports. | Exclude athletes with a probable or definitive clinical diagnosis from all competitive sports. |
| | Genotype-positive/phenotype-negative athletes may still compete. | Exclude genotype-positive/phenotype-negative individuals from competitive sports. |
| ARVC | Exclude athletes with a probable or definitive diagnosis from competitive sports. | Exclude athletes with a probable or definitive diagnosis from competitive sports. |
| CCAA | Exclude from competitive sports. | Not applicable. |
| | Participation in all sports 3 months after successful surgery would be permitted for an athlete with ischemia, ventricular arrhythmia or tachyarrhythmia, or LV dysfunction during maximal exercise testing. | |
| **Electrical cardiac abnormalities** | | |
| WPW | Athletes without structural heart disease, without a history of palpitations, or without tachycardia can participate in all competitive sports. | Athletes without structural heart disease, without a history of palpitations, or without tachycardia can participate in all competitive sports. |
| | In athletes with symptoms, electrophysiological study and ablation are recommended. Return to competitive sports is allowed after corrective ablation, provided that the ECG has normalized. | In athletes with symptoms, electrophysiological study and ablation are recommended. Return to competitive sport is allowed after corrective ablation, provided that the ECG has normalized. |
| LQTS | Exclude any athlete with a previous cardiac arrest or syncopal episode from competitive sports. | Exclude any athlete with a clinical or genotype diagnosis from competitive sports. |
| | Asymptomatic patients restricted to competitive low-intensity sports. | |
| | Genotype-positive/phenotype-negative athletes may still compete. | |
| BrS | Exclude from all competitive sports except those of low intensity. | Exclude from all competitive sports. |
| CPVT | Exclude all patients with a clinical diagnosis from competitive sports. | Exclude all patients with a clinical diagnosis from competitive sports. |
| | Genotype-positive/phenotype-negative patients may still compete in low-intensity sports. | Genotype-positive/phenotype-negative patients are also excluded. |
| **Acquired cardiac abnormalities** | | |
| Commotio cordis | Eligibility for returning to competitive sport in survivors is a matter of individual clinical judgment. Survivors must undergo a thorough cardiovascular workup including 12-lead electrocardiography, ambulatory Holter monitoring, and echocardiography. | Not applicable. |
| Myocarditis | Exclude from all competitive sports. | Exclude from all competitive sports. |
| | Convalescent period of 6 months. | Convalescent period of 6 months. |
| | Athletes may return to competition when test results normalize. | Athletes may return to competition when test results normalize. |

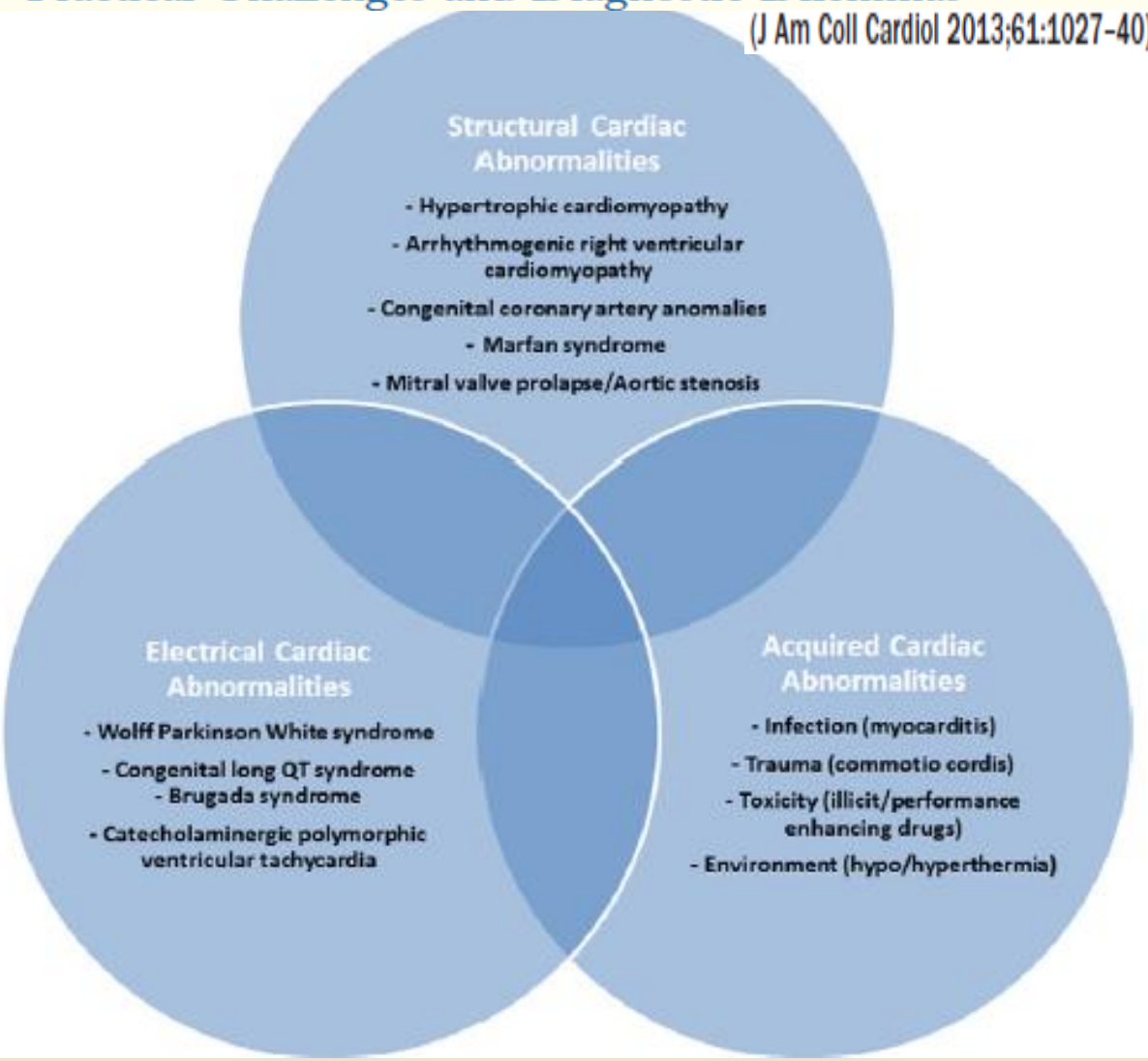



Differentiating Between Physiology and Pathology: 'Athlete's Heart' Versus HCM and ARVC

# Sudden Cardiac Death in Young Athletes

## Practical Challenges and Diagnostic Dilemmas

(J Am Coll Cardiol 2013;61:1027-40)




Common Causes of Sudden Cardiac Death in Young Athletes

THE JOURNAL OF PEDIATRICS • www.jpeds.com

CLINICAL AND LABORATORY OBSERVATIONS

# Do Pediatric Electrophysiologists Read Pre-Participation Screening Electrocardiograms More Accurately than General Pediatric Cardiologists?

Anna L. Harbison, MD[1], Allison C. Hill, MD[2], Kara S. Motonaga, MD[1], Christina Y. Miyake, MD[1], and Anne M. Dubin, MD[1]

Pre-participation ECG screening of athletes is controversial. Pediatric electrophysiologists (Eps)do not interpret screening ECGs more accurately than pediatric cardiologists with average number of correct ECG interpretations of 13.1-12.4 (P = .14). Our study demonstrates that an accurate interpretation of sECGs for athletes is difficult even for pediatric EPs, who receive the most training in interpreting ECGs. The difficulty lies in the challenge of distinguishing various morphologies based on ECG alone without clinical information and among a group of predominantly healthy, normal ECGs. As the debate regarding the role of ECGs in screening athletes continues, attention should be given to the question of who will be able to most accurately read the ECGs and how best to train them."

# Mandatory Electrocardiographic Screening of Athletes to Reduce Their Risk for Sudden Death Proven Fact or Wishful Thinking?

- **Objectives** The purpose of this study was to determine if pre-participation screening of athletes with a strategy including resting and exercise electrocardiography (ECG) reduces their risk for sudden death.
- **Results** There were 24 documented events of sudden death or cardiac arrest events among competitive athletes during the years 1985 through 2009. Eleven occurred before the 1997 legislation and 13 occurred after it. The average yearly incidence of sudden death or cardiac arrest events was 2.6 events per 100,000 athlete-years. The respective averaged yearly incidence during the decade before and the decade after the 1997 legislation was 2.54 and 2.66 events per 100,000 person years, respectively
- **Conclusions** **The incidence of sudden death of athletes in our study is within the range reported by others. However, mandatory ECG screening of athletes had no apparent effect on their risk for cardiac arrest.** (J Am Coll Cardiol 2011)

BMJ

*BMJ* 2012;344:e3502 doi: 10.1136/bmj.e3502 (Published 29 May 2012)



FEATURE

MEDICALISATION

# Preventing overdiagnosis: how to stop harming the healthy

Concern about overdiagnosis does not preclude awareness that many people miss out on much needed healthcare. On the contrary, resources wasted on unnecessary care can be much better spent treating and preventing genuine illness. The challenge is to work out which is which, and to produce and disseminate evidence to help us all make more informed decisions about when a diagnosis might do us more good than harm.

BMJ

*BMJ* 2012;344:e3783 doi: 10.1136/bmj.e3783 (Published 30 May 2012)



EDITOR'S CHOICE

# Preventing overdiagnosis

Fiona Godlee *editor, BMJ*

Yudkin points the finger firmly at the drug industry as probably "the sole beneficiary" of this state of affairs. Moynihan and colleagues spread the blame more widely. They see a mixture of commercial and professional vested interests, legal incentives, and a fixed cultural belief in the merits of early detection.

Editoriale

OPEN ACCESS

# *Overdiagnosis*: la faccia oscura del progresso tecnologico?

**Antonino Cartabellotta**[1*]

Oggi si parla di *overdiagnosis* quando in soggetti asintomatici viene diagnosticata una malattia che non sarà mai sintomatica, né causa di mortalità precoce. Nel senso più ampio del termine, l'*overdiagnosis* include tutte quelle situazioni che contribuiscono a etichettare come malate le persone sane, con problemi lievi e/o a basso rischio: eccesso di medicalizzazione, interventi terapeutici non necessari (*overtreatment*), modifica delle soglie diagnostiche delle malattie, invenzione di nuove entità patologiche (*disease mongering*). La faccia oscura della luna è popolata da tutte le conseguenze negative di essere "etichettati" come malati (*labeling effect*), dai rischi legati a test diagnostici e trattamenti non necessari, dallo spreco di risorse economiche che potrebbero essere utilizzate in maniera più appropriata.

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14/05/2013

## Screening cardiologico per i bambini delle prime elementari del Q.2. Su 338 controlli 31 cardiopatie congenite

*Il presidente Paolucci: "L'obiettivo è prevenire ed educare alla salute"*

Screening cardiologico per i bambini della prima elementare del Quartiere 2. Un modo per prevenire ed educare alla salute fin da piccoli. Il progetto si chiama " Nel cuore nella scuola" e nasce dalla collaborazione del Quartiere 2 con l'Università degli studi di Firenze e l'Azienda Ospedaliera Universitaria Careggi. I bambini controllati (l'iniziativa è partita a febbraio e terminerà alla fine di maggio) fino ad oggi sono circa 340 su 650 iscritti alla prima elementare. Sono state riscontrate 31 cardiopatie congenite lievi e asintomatiche, 20 i bambini in sovrappeso. Il punto sul progetto è

# Driver dell'*overdiagnosis*

- *Evoluzione delle tecnologie diagnostiche che consentono di identificare "anomalie" anche minime*
- *Interessi commerciali e professionali (lobbies)*
- *Gruppi di esperti in palese conflitto di interessi che espandono continuamente le definizioni di malattia e definiscono nuove entità patologiche*
- *Orientamento dell'autorità giudiziaria a condannare l'underdiagnosis, ma non l'overdiagnosis*
- *Sistemi sanitari che incentivano la medicalizzazione*
- *Percezione socio-culturale che "more is better" e che la diagnosi precoce non comporta alcun rischio*

- **E’ possibile giungere ad una sintesi???**

# AHA Science Advisory

## Key Concepts in the Evaluation of Screening Approaches for Heart Disease in Children and Adolescents

### A Science Advisory From the American Heart Association

*Circulation.* 2012

in "Recommendations and Considerations Related to Preparticipation Screening for Cardiovascular Abnormalities in Competitive Athletes: 2007 Update: A Scientific Statement From the American Heart Association Council on Nutrition, Physical Activity, and Metabolism."[3] That panel emphasized the importance of risk assessment with questionnaires and physical examination but did "not believe it to be either prudent or practical to recommend the routine use of tests such as 12-lead ECG or echocardiography in the context of mass, universal screening." …Conclusion↓

Funding studies to evaluate these strategies is essential to address this problem effectively. However, before the AHA endorses universal screening programs, assembling sound data and the support of other key stakeholders such as governmental agencies and the healthcare community will be necessary.

# *Grazie Prof.*

# Grazie per l'attenzione!!!

www.cardiologiapediatricact.com

F. De Luca