THE PRE-PARTICIPATION EXAM
(A.K.A. THE PPE)

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UI Sports Medicine – Department of Family Medicine
45th Annual Refresher Course for the Family Physician
April 5, 2018
PPE OBJECTIVES

• Review purpose of the pre-participation exam
• Discuss logistics of the pre-participation exam
• Discuss effectiveness of the pre-participation exam
• Apply the principles of the PPE to a few cases
Why do we need to do pre-participation exams?

- Identify medical/orthopedic conditions that would preclude athletic competition
  - And possibly remove unnecessary restrictions
- Institute treatment/rehabilitation for illness or injury discovered on examination
- Establish a baseline for comparison if illness or injury occurs
- Fulfill requirements for insurance and liability protection
IOWA ATHLETIC PRE-PARTICIPATION PHYSICAL EXAMINATION
ARTICLE VII 36.14(1) PHYSICAL EXAMINATION. Every year each student (grades 7-12) shall present to the
student’s superintendent a certificate signed by a licensed physician and surgeon, osteopathic physician and surgeon, osteopath,
advanced registered nurse practitioner (ARNP), physician’s assistant or qualified doctor of chiropractic, to the effect that the student
has been examined and may safely engage in athletic competition. This certificate of physical examination is valid for the purposes of
this rule for one (1) calendar year. A grace period, not to exceed thirty (30) days, is allowed for expired certifications of physical
examination.

QUESTIONNAIRE FOR ATHLETIC PARTICIPATION (Please type or neatly print this information)

Student’s Name ___________________________ Male ___ Female ___ Date of Birth ________ Grade ______
Home Address (Street, City, Zip) ___________________________ School District ___________________________
Parent(s)/Guardian’s Name ___________________________ Date _________ Phone # ___________________________
Family Physician ___________________________ Phone # ___________________________

HEALTH HISTORY (The following questions should be completed by the student-athlete with the assistance of a
parent or guardian. A parent or guardian is required to sign on the other side of this form after the examination.)

Yes ___ No ___ Does this student have / ever had?
1. Allergies to medication, pollen, stinging insects, food, etc.? ______
   20. Head injury, concussion, unconsciousness?
   21. Headache, memory loss, or confusion with contact?
   22. Numbness, tingling or weakness in arms or legs with contact?
   23. Severe muscle cramps or illness when exercising in the heat?

   __________ Chest pressure, pain, or tightness with exercise?
   __________ Excessive shortness of breath with exercise?
   __________ Headaches, dizziness or fainting during, or after, exercise?
   __________ Heart problems (Racing, skipped beats, murmur, infection, etc.)?
   __________ High blood pressure or high cholesterol?

   Yes ___ No ___ Family History:
   34. Does anyone in your family have Marfan Syndrome?
   35. Has anyone in your family died of heart problems or any unexpected/unexplained reason before the age of 50?
   36. Does anyone in your family have a heart problem, pacemaker or implanted defibrillator?
   37. Has anyone in your family had unexplained fainting, seizures, or near drowning?
   38. Does anyone in your family have asthma?
   39. Do you or someone in your family have sickle cell trait or disease?

Use this space to explain any “YES” answers from above (questions #1-38) or to provide any additional information:

__________________________________________________________________________________________

40. Are you allergic to any prescription or over-the-counter medications? If yes, list __________
41. List all medications you are presently taking (including asthma inhalers & EpPhurs) and the condition the medication is for:
   A. ___________________________ Condition ___________________________
   B. ___________________________ Condition ___________________________
   C. ___________________________ Condition ___________________________
42. Year of last known vaccination: Tetanus: _________ Menignitis: _________ Influenza: _________
43. What is the most and least you have weighed in the past year? Most _________ Least _________
44. Are you happy with your current weight? Yes _________ No _________ If no, how many pounds would you like to lose or gain?
   Lose _________ Gain _________

FOR FEMALES ONLY:
1. How old were you when you had your first menstrual period? ___________________________
2. How many periods have you had in the last 12 months? ___________________________
**PHYSICAL EXAMINATION RECORD** (To be completed by a licensed medical professional as designated in Article VII 30.14/1). This evaluation is only to determine readiness for sports participation. It should NOT be used as a substitute for regular health maintenance examinations.

<table>
<thead>
<tr>
<th>Athlete’s Name</th>
<th>Height</th>
<th>Weight</th>
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<thead>
<tr>
<th>Pulse</th>
<th>Blood Pressure</th>
<th>(Repeat, if abnormal)</th>
<th>Vision R 20/</th>
<th>L 20/</th>
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<table>
<thead>
<tr>
<th>1. Appearance (esp. Marfan’s)</th>
<th>NORMAL</th>
<th>ABNORMAL FINDINGS</th>
<th>INITIALS</th>
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<th>2. Eyes/Ears/Nose/Throat</th>
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<th>3. Pupil Size (Equal/Unequal)</th>
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<tr>
<th>4. Mouth &amp; Teeth</th>
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<th>5. Neck</th>
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<th>6. Lymph Nodes</th>
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<th>7. Heart (Standing &amp; Lying)</th>
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<th>8. Pulses (esp. femoral)</th>
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<tr>
<th>9. Chest &amp; Lungs</th>
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<thead>
<tr>
<th>10. Abdomen</th>
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<tr>
<th>11. Skin</th>
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<th>12. Genitals - Hernia</th>
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<tr>
<th>13. Musculoskeletal - ROM, strength, etc. (See questions 34-37)</th>
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<tr>
<th>14. Neurological</th>
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<table>
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<tr>
<th>Comments regarding abnormal findings:</th>
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**LICENSED MEDICAL PROFESSIONAL’S ATHLETIC PARTICIPATION RECOMMENDATIONS**

<table>
<thead>
<tr>
<th>FULL &amp; UNLIMITED PARTICIPATION</th>
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<table>
<thead>
<tr>
<th>LIMITED PARTICIPATION - May NOT participate in the following (checked):</th>
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<tbody>
<tr>
<td>Baseball                   Basketball                  Bowling               Cross Country       Football                  Golf                  Soccer</td>
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<tr>
<td>Baseball                   Basketball                  Bowling               Cross Country       Football                  Golf                  Soccer</td>
</tr>
<tr>
<td>Softball                   Tennis                      Track                 Volleyball              Wrestling</td>
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<tr>
<td>CLEARANCE PENDING DOCUMENTED FOLLOW UP OF</td>
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<table>
<thead>
<tr>
<th>NOT CLEARED FOR ATHLETIC PARTICIPATION DUE TO</th>
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<table>
<thead>
<tr>
<th>Licensed Medical Professional’s Name (Printed)</th>
<th>Date of PPE</th>
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<table>
<thead>
<tr>
<th>Licensed Medical Professional’s Signature</th>
<th>Phone</th>
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**PARENT’S OR GUARDIAN’S PERMISSION AND RELEASE**

I hereby verify the accuracy of the information on the opposite side of this form and give my consent for the above named student to engage in approved athletic activities as a representative of his/her school, except those activities indicated above by the licensed professional. I also give my permission for the team’s physician, certified athletic trainer, or other qualified personnel to give first aid treatment to my son or daughter at an athletic event in case of injury.

<table>
<thead>
<tr>
<th>Name of Parent or Guardian (Printed)</th>
<th>Signature of Parent of Guardian</th>
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<table>
<thead>
<tr>
<th>Address (Street/PO Box, City, State, Zip)</th>
<th>Phone Number</th>
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*This form has been developed with the assistance of the Committee on Sports Medicine of the Iowa Medical Society and has been approved for use by the Iowa Department of Education, Iowa High School Athletic Association, and Iowa Girls High School Athletic Union. Schools are encouraged NOT to change this form from its published format. Additional school forms can be attached to this form.*
PPE – CHOICE OF FORMAT

- Mass screening exam
  - Convenience
  - Specialists available
  - Environment
  - Privacy
  - Brief encounter
  - Personal time

- Office-based exam
  - Block of time
  - Incorporate full visit
  - See athlete and parents
  - Schedule in advance
  - School absence
  - Referrals if necessary
PPE – PAST MEDICAL HISTORY

- Heart murmur, high blood pressure, irregular heartbeat
- Concussion
- Asthma
- Syncope/Near-syncope (esp. with exercise)
- Diabetes
- Injury, games missed, surgery
PPE – REVIEW OF SYSTEMS

- Place symptoms in context of exercise
  - Intensity of exercise
  - Frequency of occurrence
- Chest pain, palpitations ("funny heart beat")
- Lightheadedness, dizziness, fainting
- Shortness of breath, especially leading to discontinuation of exercise
PPE – FAMILY HISTORY

• Early sudden death
• Early myocardial infarction
• Arrhythmias (Long QT syndrome, WPW, etc.)
• Hypertension
• Hypercholesterolemia
PPE – MEDICAL ISSUES

- Medications
- Menstrual history for female athletes
- Nutrition
- Supplements
- Performance enhancement
  - Caffeine, Sudafed, Ibuprofen/Tylenol
PPE – ORTHOPEDIC ISSUES

- Prior injury, especially resulting in missed time
- Current use of braces/orthotics
- Weightlifting or strength training participation
PPE - PEARLS

• Timing: Six weeks prior to the season
• Blood pressure - #1 medical indication for follow-up or disqualification
  • College – ADHD meds; baseline PFTs
• BMI
• Cardiac exam – auscultate in multiple positions
• Marfanoid features – wingspan, hyperlaxity
• Male GU exam – hernia, testicular self-exam
PPE - PEARLS

- Orthopedic exam is a general screening exam
- If history warrants, focus a detailed examination on certain joints
- Visual acuity – considerations for protective eyewear
- Custom mouthguards
PPE – SCREENING TESTS

• No utility shown for any screening tests in the asymptomatic, young athlete

• Consider cholesterol/fasting lipid panel based on AAP recommendations

• Iron studies may be useful in endurance athletes, but no clear evidence in the medical literature

• NCAA requirement for sickle cell trait initiated in 2010. Sickle cell trait is associated with 2% of deaths in NCAA football players; newborn metabolic screening tests often include this
SPORTS MEDICINE + ADOLESCENT MEDICINE

- 78% of adolescents use the PPE as a comprehensive examination
- Topics not typically covered on the PPE:
  - Drugs/alcohol/tobacco
  - Sexual activity
  - Violence
  - Mental health
  - Immunizations
CONTRAINDICATIONS FOR SPORTS PARTICIPATION

- Active myocarditis or pericarditis
- Acute enlargement of spleen or liver
- Eating disorder in which athlete is not compliant with therapy and follow-up, or when there is evidence of diminished performance or potential injury because of the eating disorder
- History of recent concussion and symptoms of postconcussion syndrome (no contact or collision sports)
- Hypertrophic cardiomyopathy
- Long QT syndrome
- Poorly controlled convulsive disorder (no archery, riflery, swimming, weight lifting or powerlifting, strength training, or sports involving heights)
- Recurrent episodes of burning upper-extremity pain or weakness, or episodes of transient quadriplegia until stability of cervical spine can be assured (no contact or collision sports)
CONTRAINdications for Sports Participation

• Severe hypertension until controlled by therapy (static resistance activities, such as weight lifting, are particularly contraindicated)

• Sickle cell disease (no high-exertion, contact, or collision sports)

• Suspected coronary artery disease until fully evaluated (patients with impaired resting left ventricular systolic function less than 50%, exercise-induced ventricular dysrhythmias, or exercise-induced ischemia on exercise stress testing are at greatest risk of sudden death)

CASE #1

- A 14-year-old female with Down syndrome wishes to participate in a Special Olympics soccer program. She has no significant cardiac problems as a result of Trisomy 21. She has been participating in regular PE classes at school.
CASE #1

Which of the following will be necessary for her to participate in Special Olympics soccer program?

A) Baseline EKG, with ECHO if any abnormalities
B) Knee x-rays for evaluation of alignment issues
C) Lateral C-spine films in flexion and extension
D) Exercise pulmonary function tests
E) No additional workup other than traditional PPE
CASE #1

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- B) Knee x-rays for evaluation of alignment issues
- C) *Lateral C-spine films in flexion and extension*
- D) Exercise pulmonary function tests
- E) No additional workup other than traditional PPE
DOWN SYNDROME AND ATLANTOAXIAL INSTABILITY

- Instability, subluxation, or dislocation at C1-2
- Reported at 10-20% in Down syndrome
- No known cases of neurological complications in Special Olympics athletes
- Still required for all sports that place stress on head and neck
  - Gymnastics, diving, butterfly swim, pentathlon, soccer, high jump
CASE #2

• A 16-year-old boy who has new onset of seizures asks you about restrictions and limitations of his usual activities, including athletics and driving.
• Of the following, the MOST appropriate response is that:
  • A) He may continue to drive as long as he is chaperoned
  • B) He never should swim alone
  • C) He will have no restrictions if his anticonvulsant drug levels are therapeutic
  • D) His school schedule should be shortened
  • E) There are no athletic restrictions or limitations
CASE #2

Of the following, the MOST appropriate response is that:

- A) He may continue to drive as long as he is chaperoned
- **B) He never should swim alone**
- C) He will have no restrictions if his anticonvulsant drug levels are therapeutic
- D) His school schedule should be shortened
- E) There are no athletic restrictions or limitations
SEIZURE DISORDER AND ATHLETIC PARTICIPATION

• Goals are good seizure control and prevention of dangerous falls/injuries
  • Parallel bars, high diving, rope climbing are problematic
  • Rowing can be a problem too!
  • Swimming should always be supervised
• Contact and collision sports are not automatically eliminated, but should be considered individually for each patient
CASE #3

- You detect a heart murmur in an asymptomatic 17-year-old female long-distance runner. The only remarkable finding on echocardiography is a left ventricular cavity dimension that is larger than the upper limit of normal for age or body size.
CASE #3

Of the following, the MOST appropriate management is:

A) no sports restriction
B) restriction from all sports activities
C) restriction from all varsity level competitive sports
D) restriction from sports that have high dynamic activity
E) restriction from sports that have high static activity
CASE #3

Of the following, the MOST appropriate management is:

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• B) restriction from all sports activities
• C) restriction from all varsity level competitive sports
• D) restriction from sports that have high dynamic activity
• E) restriction from sports that have high static activity
CARDIAC ISSUES IN SPORTS

• For HCM, think septal and LV wall thickness
  • Can see in elite male athletes without HCM
  • For females, LV chamber enlargement is a more common response to conditioning
• For specific heart disease, Bethesda Guidelines spell out restrictions: www.acc.org
CARDIAC ISSUES IN SPORTS

- “Normal” cardiac adaptations to sport:
  - Sinus bradycardia or sinus arrhythmia
  - Prolonged PR interval or 1st degree AV block
  - Junctional rhythm
  - Early repolarization abnormalities
  - Incomplete RBBB pattern
  - LVH voltage criteria without ST segment or T-wave changes
    - Sports Medicine, Harrast and Finnoff, 2012
CARDIAC ISSUES IN SPORTS

- 12 million high school athletes in the U.S.
- Estimated 0.5% risk of sudden cardiac death in young athletes
  - ~60,000 athletes with a potentially life-threatening condition
- Estimated 1/200,000 high school athletes suffer sudden cardiac death each year (60)
  - More recent NCAA data suggests 1/43,000
- Currently, routine screening includes a history and physical exam
CARDIAC HISTORY SCREENING 1.0

- Previous murmur or high BP
- Family history of early MI or sudden death
- Exercise-related symptoms
- Survey of PPE forms from 254 high schools, only 17% had all three questions
CARDIAC HISTORY SCREENING 2.0

- Journal of Pediatrics 2009 - Rausch and Phillips:
  - Review of standard physical forms from 47 states
  - 85% (40/47) had all three elements for cardiac screening on their PPE form
CARDIAC HISTORY SCREENING

• Preparticipation Physical Evaluation, 4th Ed.
• 10 Most important Questions:
CARDIAC HISTORY SCREENING

• Have you ever passed out or nearly passed out during exercise?
• Have you ever passed out or nearly passed out after exercise?
• Have you ever had discomfort, pain, or pressure in your chest during exercise?
• Does your heart race or skip beats during exercise?
CARDIAC HISTORY SCREENING

• Has a doctor ever told you that you have high blood pressure, high cholesterol, a heart murmur, or a heart infection?
• Has a doctor ever ordered a test for your heart?
• Has anyone in your family ever died for no apparent reason?
• Does anyone in your family have a heart problem?
• Has any family member or relative died of heart problems or sudden death before age 50?
• Does anyone in your family have Marfan syndrome?
CARDIAC HISTORY SCREENING

• Same 47 state forms reviewed
• 17% (8/47) completely addressed all of the recommended screening questions
• Forms were generally better at questions addressing exercise related symptoms (79-100%) than past medical or family history (32-45%) with the exception of family history of early sudden/cardiac death (98%)
SUDDEN DEATH IN ATHLETES

- Maron – 1985-1995, 158 sudden deaths among trained athletes
  - 134 were due to cardiovascular disease
  - Only 1 case had findings on PPE
  - 68% of the 158 played basketball or football
<table>
<thead>
<tr>
<th>Cause</th>
<th>No. of Athletes</th>
<th>Percent</th>
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<tbody>
<tr>
<td>Hypertrophic cardiomyopathy</td>
<td>102</td>
<td>26.4</td>
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<tr>
<td>Commotio cordis</td>
<td>77</td>
<td>19.9</td>
</tr>
<tr>
<td>Coronary-artery anomalies</td>
<td>53</td>
<td>13.7</td>
</tr>
<tr>
<td>Left ventricular hypertrophy of indeterminate causation†</td>
<td>29</td>
<td>7.5</td>
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<tr>
<td>Myocarditis</td>
<td>20</td>
<td>5.2</td>
</tr>
<tr>
<td>Ruptured aortic aneurysm (Marfan’s syndrome)</td>
<td>12</td>
<td>3.1</td>
</tr>
<tr>
<td>Arrhythmogenic right ventricular cardiomyopathy</td>
<td>11</td>
<td>2.8</td>
</tr>
<tr>
<td>Tunneled (bridged) coronary artery;†</td>
<td>11</td>
<td>2.8</td>
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<tr>
<td>Aortic-valve stenosis</td>
<td>10</td>
<td>2.6</td>
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<tr>
<td>Atherosclerotic coronary artery disease</td>
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<td>2.6</td>
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<tr>
<td>Dilated cardiomyopathy</td>
<td>9</td>
<td>2.3</td>
</tr>
<tr>
<td>Myxomatous mitral-valve degeneration</td>
<td>9</td>
<td>2.3</td>
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<tr>
<td>Asthma (or other pulmonary condition)</td>
<td>8</td>
<td>2.1</td>
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<td>Heat stroke</td>
<td>6</td>
<td>1.6</td>
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<td>Drug abuse</td>
<td>4</td>
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<tr>
<td>Other cardiovascular cause</td>
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<td>1.0</td>
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<td>Long-QT syndrome†</td>
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<td>0.8</td>
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<td>Cardiac sarcoidosis</td>
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<td>0.8</td>
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<tr>
<td>Trauma involving structural cardiac injury</td>
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<td>0.8</td>
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<tr>
<td>Ruptured cerebral artery</td>
<td>3</td>
<td>0.8</td>
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THE QUESTION

• Should young athletes in the U.S. be routinely screened beyond the pre-participation history and physical for cardiac abnormalities?
CARDIOVASCULAR EVALUATION, INCLUDING RESTING AND EXERCISE ELECTROCARDIOGRAPHY, BEFORE PARTICIPATION IN COMPETITIVE SPORTS: CROSS SECTIONAL STUDY
BMJ 2008

• ~30,000 Italian athletes
• Demographics (78% male, 98% white)
• Sports (31.3% soccer, 17.7% volleyball)
• Resting EKG – 6% abnormal
  • Upon further review, only 1.2% true positives
  • Under age 30, only 0.65% true positives
• Exercise EKG – 4.9% abnormal
  • Under age 30, 4.1% abnormal
• 159 athletes DQ’s = 0.46%
WHAT IF IN THE U.S.?

- 12 million high school athletes
- Baseline, resting EKGs – 720,000 initially abnormal
  - Only 78,000 true positives
- Exercise EKGs – 492,000 abnormal
- DQs – 55,200 athletes (13,800 annually thereafter)
- Cost: $600 million in year one, then $150 million annually thereafter if only one screening for entry into high school sports
- ~$11,000 per athlete DQ’d
WHAT IF IN THE U.S.?

- Hypertrophic Cardiomyopathy
  - Prevent 16 deaths annually
  - $2.475 million per death prevented (costs of ECHO)
- Commotio Cordis
  - Prevent 8 of 12 deaths annually
  - Safety baseballs @ 10 dozen per team, $3 per baseball, and 15,500 HS teams
  - ~$700,000 per death prevented
Perhaps a refined approach...

- Suggestion has been made to develop unified ECG screening criteria that recognize ECG changes consistent and inconsistent with athletic training – “normal” and “abnormal”
  - Attempt to balance sensitivity and specificity
  - Bridge gap in recommendations between IOC, European Cardiology associations and AHA
- [Document URL](http://www.cardiology.org/projects_athletic_14_3136203759.pdf)
**SEATTLE CRITERIA**

- Table 1 Abnormal ECG criteria in Athletes
- Any abnormal finding is considered training-unrelated and suggests the possibility of underlying pathological cardiac disease, requiring further diagnostic work-up.
- Abnormal ECG finding Definition
- T wave inversion >1 mm in depth from baseline in two or more adjacent leads not including aVR or V1 (note exception below—figure 1)
- ST segment depression ≥1 mm in depth in two or more adjacent leads
- Pathological Q waves >3 mm in depth or >0.04 s in duration in two or more leads
- Complete left bundle branch block QRS >0.12 s, predominantly negative QRS complex in lead V1 (QS or rS), and upright monophasic R wave in leads I and V6 (figure 2)
- Complete right bundle branch block QRS >0.12 s, terminal R wave in lead V1 (rsR0), and wide terminal S wave in leads I and V6 (figure 3)
SEATTLE CRITERIA

- Intraventricular conduction delay Non-specific, QRS >0.12 s
- Left atrial enlargement Prolonged P wave duration of >0.12 s in leads I or II with negative portion of the P wave ≥1 mm in depth and ≥0.04 s in duration in lead V1
- Left axis deviation −30° to −90°
- Right atrial enlargement High/pointed P wave ≥2.5 mm in leads II and III or V1
- Right ventricular hypertrophy Right axis deviation ≥120°, tall R wave in V1+persistent precordial S waves (R-V1+S−V5>10.5 mm)
- Mobitz type II 2° AV block Intermittently non-conducted P waves not preceded by PR prolongation and not followed by PR shortening
- 3° AV block Complete heart block
- Ventricular pre-excitation PR interval <0.12 s with a delta wave (slurred upstroke in the QRS complex—figure 4)
- Long QT interval QTc ≥0.47 s (99% males)
SEATTLE CRITERIA

- QTc ≥0.48 s (99% females)
- QTc ≥0.50 s (unequivocal LQTS; figure 5)
- Short QT interval QTc ≤0.34 s
- Brugada-like ECG pattern High take-off and downsloping ST segment elevation in V1–V3 (figure 6)
- Epsilon wave Small negative deflection just beyond the QRS in V1 or V2 (figure 7)
- Profound sinus bradycardia <30 BPM or sinus pauses ≥3 s
- Atrial tachyarrhythmias Supraventricular tachycardia, atrioventricular nodal reentrant tachycardia, atrial-fibrillation and atrial-flutter
- Premature ventricular contractions ≥2 per tracing
- Ventricular arrhythmias Couplets, triplets and non-sustained ventricular tachycardia
SEATTLE CRITERIA AND EUROPEAN SOCCER (SCAND J MED SCI SPORTS JUNE 2014)

- 587 male professional soccer players, ECG and independent ECHO
- European Society of Cardiology – 29.3% Abnormal
- Seattle Criteria – 11.2% Abnormal
- ECHO – 1.7% Abnormal – all normal by Seattle
  - 8 cases of valve insufficiency; 1 atrial septal aneurysm; 1 “athlete’s heart”
CASE #4

- A 15-year-old football player is knocked unconscious for 5 minutes on the playing field. After regaining consciousness, his only complaint is a mild headache.
CASE #4

Of the following, the BEST management of this player is to:

- A) allow him to return to competition after he has been asymptomatic for 2 weeks
- B) allow him to return to the game after a 30 minute observation period
- C) allow him to return to the game immediately
- D) ban him from play for 1 year
- E) disqualify him for the 3 months remaining in the football season
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HOW WELL DO WE TAKE A HISTORY?

2008 CJSM VALOVICH MCLEOD ET AL
### How Well Do We Take a History?

#### 2008 CJSM Valovich McLeod et al

<table>
<thead>
<tr>
<th>Symptom</th>
<th>%(+) Responses</th>
<th># Episodes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Headache</td>
<td>43.5</td>
<td>3.1 ± 2.1</td>
</tr>
<tr>
<td>Dazed or Confused</td>
<td>23.8</td>
<td>2.6 ± 1.8</td>
</tr>
<tr>
<td>Dizziness or Balance Problems</td>
<td>20.8</td>
<td>2.5 ± 1.8</td>
</tr>
<tr>
<td>Trouble Concentrating</td>
<td>18.7</td>
<td>3.4 ± 2.1</td>
</tr>
</tbody>
</table>
QUESTION:

- You are evaluating a 14 year-old boy for his pre-participation sports physical examination before he tries out for the freshman football team. He has no chronic health problems and no previous history of head injuries. His mother expresses concern about recent reports of professional football players sustaining cognitive damage due to repeated concussions.
Of the following, the MOST appropriate statement to include in your counseling regarding head injuries in contact sports is that:

• A. baseline, detailed neuropsychological testing has been well established as a tool to use in the management of head injuries in pediatric athletes.

• B. Most athletic participants who sustain concussions lose consciousness

• C. return-to-play guidelines for pediatric athletes are well established and evidence based

• D. seasonal and lifetime sports exclusion guidelines for pediatric athletes after head injury are well established and evidence based

• E. the pre-participation visit history of an athlete should include the number of prior concussions, timing and severity of each, and description of resulting symptoms.
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- D. seasonal and lifetime sports exclusion guidelines for pediatric athletes after head injury are well established and evidence based
- **E. the pre-participation visit history of an athlete should include the number of prior concussions, timing and severity of each, and description of resulting symptoms.**
QUESTION:

- You are performing screening sports participation examinations at the local high school. One of the students, a 16-year-old boy, reports that his father has hypertrophic cardiomyopathy but that none of his three older brothers has it. He also reports that he was seen by a cardiologist at age 10 years and was "fine." As you take his history, you find that he has never had shortness of breath, chest pain, exercise intolerance, dizziness, or fainting. He has always participated in sports and has excelled.
Of the following, the BEST plan of management for this patient is:

• A. Chest radiography
• B. Electrocardiography
• C. Genetic Testing for Hypertrophic cardiomyopathy
• D. Referral to a cardiologist
• E. Unrestricted sports participation unless symptoms develop
Of the following, the BEST plan of management for this patient is:

- A. Chest radiography
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- C. Genetic Testing for Hypertrophic cardiomyopathy
- D. **Referral to a cardiologist**
- E. Unrestricted sports participation unless symptoms develop
ADDITIONAL QUESTIONS?

THANK YOU!