PPE: Preparticipation Physical Evaluation

David T. Bernhardt, MD, FAAP
University of Wisconsin
Department of Pediatrics, Orthopedics and Rehab
Division of Sports Medicine

William O. Roberts, MD, MS, FACSM, FAAFP
University of Minnesota
Department of Family Medicine and Community Health
Disclosure

• In the past 12 months, we have not had a significant financial interest or other relationship with the manufacturer(s) of the product(s) or provider(s) of the service(s) that will be discussed in our presentation.

• This presentation will not include discussion of pharmaceuticals or devices that have not been approved by the FDA.

• Statements and opinions expressed are those of the authors and not necessarily those of the American Academy of Pediatrics.

• Mead Johnson sponsors programs such as this to give healthcare professionals access to scientific and educational information provided by experts. The presenters have complete and independent control over the planning and content of the presentation, and are not receiving any compensation from Mead Johnson for this presentation. The presenters’ comments and opinions are not necessarily those of Mead Johnson. In the event that the presentation contains statements about uses of drugs that are not within the drugs' approved indications, Mead Johnson does not promote the use of any drug for indications outside the FDA-approved product label.
Objectives

- Be able to justify student athletes needing to undergo a preparticipation physical examination (PPE) prior to participation in sports.
- Understand this is more than preventing sudden death or injury or filling out a waiver form.
- Medical home and the primary care provider as the ideal environment and provider for the PPE.
PPE 5

Evidence Based Exam?

“Expert opinion unless otherwise specified”

Research

The evidence for the preparticipation physical evaluation (PPE) remains limited, and substantial work is needed to study the validity, content, and process. In an era of measuring quality and cost, we must consider the scientific basis and economic impact of our recommendations. The purpose of this chapter is to emphasize areas for which further investigation is needed and thoughtfully weigh alternatives to the present process.

- WHETHER TO PERFORM A PPE AT ALL
  Important questions remain as to whether PPE should be required for sports participation, and if required, should it be separated from or integrated into the standard health super-
PPE 5 Emphasis

- Incorporate the PPE into routine health supervision care visits for all children.
  - Start at age 6
  - Every 2–3 years

- Integrating the PPE into the medical home may be more easily achieved if the PPE portion of the examination is addressed every 2 to 3 years, rather than annually, to allow a different focus each year for evolving child and adolescent risk.
PPE Best Practice

- The writing group opinion
  - Student athletes should schedule in medical home with PCP.
  - Integrated into routine health supervision exams
    - Access to medical records
    - Adjust treatment of chronic medical conditions
New for PPE 5

- Mental Health
- Expanded “Athletes With a Disability”
- Transgender Athletes

H. Mental Health

HISTORY FORM QUESTIONS

Patient Health Questionnaire Version 4 (PHQ-4)¹⁻³

Athletes With a Disability

Transgender Athletes
## Mental Health Screening

Patient Health Questionnaire Version 4 (PHQ-4)

Over the last 2 weeks, how often have you been bothered by any of the following problems? (Circle response.)

<table>
<thead>
<tr>
<th>Feeling</th>
<th>Not at all</th>
<th>Several days</th>
<th>Over half the days</th>
<th>Nearly every day</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feeling nervous, anxious, or on edge</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Not being able to stop or control worrying</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Little interest or pleasure in doing things</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Feeling down, depressed, or hopeless</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>

(A sum of $\geq 3$ is considered positive on either subscale [questions 1 and 2, or questions 3 and 4] for screening purposes.)
The PPE History

- Not developed as an evidence-based process
- Lack of outcomes data to demonstrate effectiveness
  - Even after several decades of use among athletes
- Widely performed
  - Every state requires a PPE for high school athletes
- Implies public health message
  - All children and adolescents should be active
The PPE

- Provides medical background for shared decision-making
  - History
  - Physical exam
  - Case finding studies
- Determine medical eligibility and potential physical activity limitations
Goal

Promote the health and safety of the “athlete” in training and competition.
Purpose of PPE

- Systematic review of >20,000 examinations
  - Identified only 3 athletes excluded
- Most individual PPE studies report
  - 0.3%–1.3% of athletes denied medical eligibility to participate
  - 3.2%–13.9% require further evaluation before allowing participation

Disease Screening
Medication Review
Growth & Development
Promote Wellness
Anticipatory Guidance

Prevent sudden cardiac death
Promote safe participation
**Injury assessment and prevention**
Meet liability standards
Disease Screening
Medication Review
Growth and Development
Promote Wellness
Anticipatory Guidance

Prevent sudden cardiac death
Promote safe participation
Injury assessment and prevention
Meet liability standards
Conditions that May Predispose to Injury or Illness

- PPE may identify medical or musculoskeletal (MSK) conditions that may predispose an athlete to injury or illness
- No outcomes-based data to support the ability of the PPE to reduce injury or illness
Life-threatening or Disabling Conditions

- Opportunity to investigate potentially life-threatening or disabling medical or MSK conditions
- Personal and family history to search for red flags
- No evidence that screening will reliably identify all clinically silent conditions
  - Cardiac conditions associated with sudden cardiac death (SCD)
- No outcomes-based evidence

Controversies

- Does the PPE identify conditions that affect health and safety of the “athlete”?
- Is there evidence that people who undergo PPE have less morbidity and mortality?
- What is special about the high school, collegiate, or professional athlete to determine clearance?
- Why is this not considered standard of care for all?

Percentage of Total Deaths in the United States Due to Firearms

Treat with confidence. Trusted answers from the American Academy of Pediatrics.
SCD & PPE Screening

- SCD prevalence/incidence baseline
  - All children
  - All child athletes
- Conditions potentially linked to SCD “detectable”
- Discrepancy between detected conditions and outcomes
- No outcomes data
  - Need large RCT
- Patient-centered medical decision-making

Life-threatening or Disabling Conditions

- Author group consensus
  - Comprehensive, uniformly applied approach offers best opportunity to meet this objective
  - Natural experiments
    - Different protocols allow comparison

- Controversy related to augmenting history and physical exam with ECGs for general population
  - Selective use for higher risk populations
The PPE Most Likely to Find

- Acute, recurrent, chronic, or untreated injuries or illnesses
- Inadequate neuromuscular control predisposing to injury
- Inadequately rehabilitated prior injuries
- Congenital or developmental problems

G. Musculoskeletal Concerns

- HISTORY FORM QUESTIONS
  
  **Bone and Joint Questions**
  1. Have you ever had a stress fracture or an injury to a bone, muscle, ligament, joint, or tendon that caused you to miss a practice or game?
  2. Do you have a bone, muscle, ligament, or joint injury that bothers you?
Qualifications of Examiners

- Doctor of medicine (MD), doctor of osteopathic medicine (DO), or advanced practice providers (nurse practitioners [NPs] and physician assistants [PAs])

- Essential to have clinical training
  - Knowledge and expertise to conduct the evaluation
  - Address the broad range of problems
  - Determine medical eligibility

- Clinical training for problems encountered during the PPE

- Individual state laws vary (NP, PA, doctor of chiropractic [DC])

- Seek consultation when appropriate
State Regulations Determine Who Can Perform PPEs for Public Schools

- 2017 National Federation of State High School Associations (NFHS) survey (Heinz W)
  - All allow MD/DO
  - All but 1 allow PA or NP signature
  - 22 allow DC to sign
    - 1 state requires certification
Timing of Evaluation

- Health supervision care during birth month
- Well in advance of season
  - Time to evaluate, treat, or rehabilitate identified problems
  - 6 weeks
Frequency of Evaluation

- No outcomes-based data to guide the recommendations
- American Heart Association recommends every 2 years for cardiac evaluation
  - Arbitrary recommendation
  - Assumes cardiac changes detectable at 2-year intervals
- Little evidence to support any interval recommendations between 1 and 4 years

2017 NFHS Associations Survey (Heinz W)

Required evaluations

- 39 states every 12 to 13 months
  - 4 states 13-month interval for insurance requirements
- 1 state every 18 months
- 7 states every other year (interim questionnaire)
- 2 states every 3 years (interim questionnaires)
- 1 state frequency up to individual school districts
- 1 state at entry to high school sports (annual questionnaires)
- 17 states use PPE 4 form
PPE Writing Group Consensus

- A comprehensive PPE every 2 to 3 years
  - Grade school, middle school, and high school
  - Integrate into medical home health supervision examinations

- Annual questionnaire
  - Heart, head, heat injury, and mental health issues
  - Problem-focused examination if concerns
Group-based Examinations

- College settings with formal medical teams
  - Group exams may be preferred when full access to past medical history is available
- Last resort for high school and younger athletes

---

Table 3-1. Elements of a Coordinated Medical Evaluation

<table>
<thead>
<tr>
<th>Stage</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Waiting area</td>
<td>Sign-in, registration, and review, including careful instruction about completing required forms.</td>
</tr>
<tr>
<td>Vitals station (private setting)</td>
<td>Height, weight, body mass index, blood pressure, heart rate, and visual acuity may be performed by qualified personnel such as medical assistants, student athletic trainers, and medical students.</td>
</tr>
<tr>
<td>General medical examination station</td>
<td>History review and physical examination performed by a single physician for a given student-athlete. Medical eligibility status or referral plan determined.</td>
</tr>
<tr>
<td>Specialty examination stations</td>
<td>Orthopedic assessment, cardiological evaluation, pulmonary function testing, or other systems-based examination.</td>
</tr>
<tr>
<td>Optional stations</td>
<td>Education and immunization areas.</td>
</tr>
<tr>
<td>Stage</td>
<td>Purpose</td>
</tr>
<tr>
<td>-------------------------------------------</td>
<td>--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Waiting area</td>
<td>Sign-in, registration, and review, including careful instruction about completing required forms.</td>
</tr>
<tr>
<td>Vitals station (private setting)</td>
<td>Height, weight, body mass index, blood pressure, heart rate, and visual acuity may be performed by qualified personnel such as medical assistants, student athletic trainers, and medical students.</td>
</tr>
<tr>
<td>General medical examination station</td>
<td>History review and physical examination performed by a single physician for a given student-athlete. Clearance status or referral plan determined.</td>
</tr>
<tr>
<td>Specialty examination stations</td>
<td>Orthopedic assessment, cardiological evaluation, pulmonary function testing, or other systems-based examination.</td>
</tr>
<tr>
<td>Optional stations</td>
<td>Education and immunization areas.</td>
</tr>
</tbody>
</table>
HIPAA, FERPA, & Athlete Privacy

- Age 18 is the most common legal age of majority
  - Some states, age 19 or 21

- State laws vary greatly regarding
  - Emancipation
  - Mature minor determination
  - Consent and privacy for the treatment of certain medical conditions
    - Pregnancy
    - Sexually transmitted infection
    - Mental health

Abbreviations: HIPAA, Health Insurance Portability and Accountability Act; FERPA, Family Educational Rights and Privacy Act
Determining Medical Eligibility

5 categories:
1. All activities without restriction
2. All activities with recommendations for further evaluation or treatment (eg, “Check BP in one month.”)
3. Not for any activities until additional evaluation, treatment, or rehabilitation is completed
4. Not in specific activities
5. Not in any sports or physical activities
PPE Medical Eligibility Form

- Check box
  - “Not medically eligible for certain sports”
  - “Not medically eligible for any sports”

- Communicate medical eligibility to school without breaking confidentiality rules

---

**PREPARTICIATION PHYSICAL EVALUATION**

**MEDICAL ELIGIBILITY FORM**

Name: ___________________________ Date of birth: ___________________________

- [ ] Medically eligible for all sports without restriction
- [ ] Medically eligible for all sports without restriction with recommendations for further evaluation or treatment of

- [ ] Medically eligible for certain sports

- [ ] Not medically eligible pending further evaluation
- [ ] Not medically eligible for any sports

Recommendations: ___________________________
Coding & PPE Outcomes

- ICD-10-CM code for sport PPE is Z02.5
- Coding the PPE (1° or 2° position) allows EMR tracking
- Diligent coding
  - Research into short- and long-term PPE outcomes
- Large systems - “big data” in relatively short time
- Help determine PPE outcomes and address gaps
  - Utility of the current exam
  - Predictive value of the exams
  - Reasonable exam frequency
  - Shape the future PPE
Top Research Gaps

- Do PPEs change the mortality rate of the target population?

- Are individuals excluded from sports participation necessarily “lives saved” by screening?

- Are abnormalities found at PPEs for target population?
  - Different than those found at health supervision visits?
  - Clinically meaningful?
  - Are outcomes modifiable?
Top Research Gaps

- Do PPE requirements adversely affect sports participation rates, and are those participation rates disproportionately affecting individuals at a socioeconomic or medical disadvantage?

- Do requirements for follow-up testing for abnormalities discovered at the PPE lead to harm, reduce participation, or disproportionately affect individuals on the basis of race, socioeconomic factors, or availability of medical resources?

- What is the relative importance of each of the questions in the questionnaire in preventing or modifying morbidity or mortality from sports participation?
Top Research Gaps

- Are the adolescents who have their PPE performed somewhere other than their primary medical home otherwise receiving routine comprehensive or preventive care?

- What is the accuracy of a PPE, for detecting known or suspected conditions that may affect risk or participation status, performed in another setting compared with that obtained in the individual’s medical home?

- Is there any physical examination or any functional movement tests that predict or prevent injury to warrant inclusion in universal screening?
Top Research Gaps

- What findings from screening tests performed as part of the PPE are discovered in truly asymptomatic individuals at no apparent increased risk?

- Does regional capture and storage of electronic PPE findings reduce fragmentation of the medical record, improve follow-up on abnormal results, reduce errors, or reduce legal risk?
What Did We Learn

- The PPE is not an evidence-based exam.
- Incorporating the PPE into health prevention visits within the health care home is best practice.
- History and physical exam should drive case finding studies.
- Universal ECG screening is not recommended.
- Use shared medical decision making to determine medical eligibility for sports participation.
- There are many knowledge gaps in the PPE.
- Coding the PPE may allow big data to inform PPE.
Preparticipation Physical Evaluation 5th Edition

This best-selling resource guides health care professionals through the preparticipation physical evaluation (PPE) process in the medical home for young athletes from middle school through college.

Available for order at:
Visit *Pediatric Care Online* today for additional information on this and other topics.

http://pediatriccare.solutions.aap.org

*Pediatric Care Online* is a convenient electronic resource for immediate expert help with virtually every pediatric clinical information need with must-have resources that are included in a comprehensive reference library and time-saving clinical tools.

**Don’t have a subscription to PCO?**

Then take advantage of a free trial today!

Call Mead Johnson Nutrition at 888/363-2362 or, for more information, go to

http://pediatriccare.solutions.aap.org/SS/Free_Trial.aspx