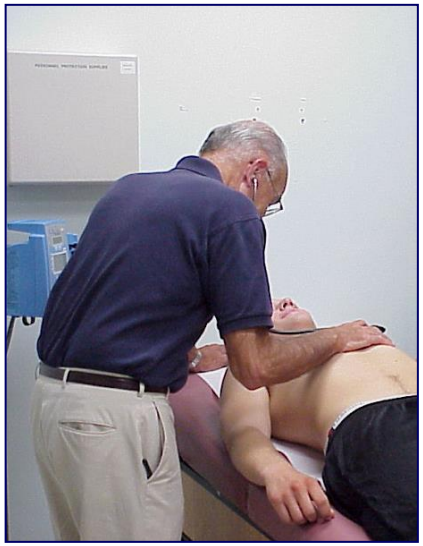
2021 Napa Primary Care Conference

The Preparticipation Examination (PPE): The Primary Care Provider's Survival Guide 2021



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Disclosure Information

The information presented in this activity represents the opinions of the author and not those of the Department of Defense or the Uniformed Services University

Francis G. O'Connor, MD, MPH, has no financial interests or relationships to disclose.

John is a Rising High School Senior

- John is a 17/o male being seen for his PPE.
- He is a multiple sport athlete and intends to play football, basketball and track.
- He has potential for a college scholarship as a wide receiver.
- **Practice starts tomorrow**.

You have a Resident helping with Preparticipation Examinations

- **Jason is a third year Resident in Family Medicine helping you with PPEs.**
- **Jason has lots of questions!**

Objectives

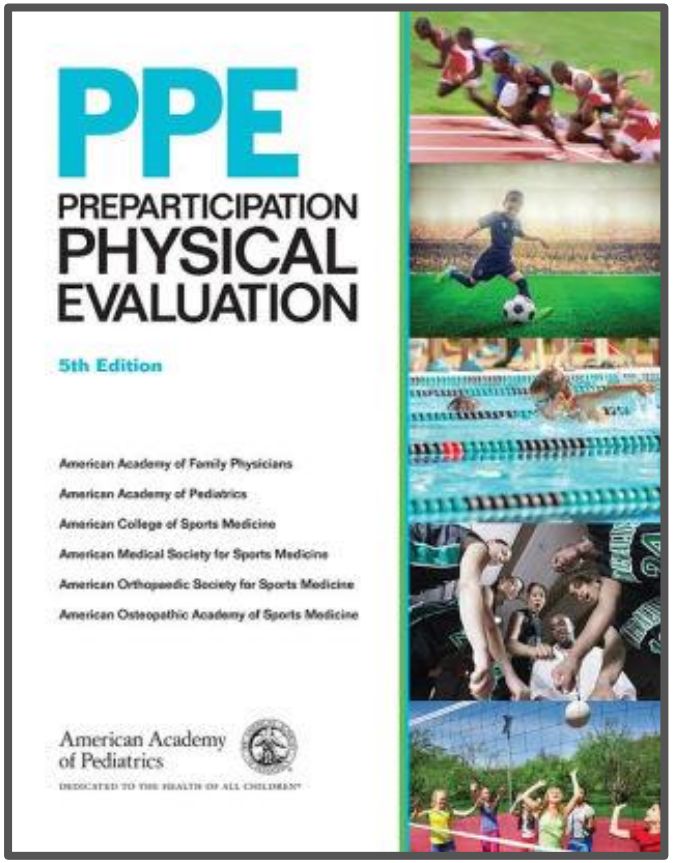
- **Identify** Standard of Care **Resources** for performing preparticipation examination (PPE)
- **Discuss** the **New Features** of **PPE Monograph 5**
- **Discuss** the **Purpose**, **Timing**, **Frequency** and **Setting** of the PPE
- **Identify and Discuss** history questions and physical examination findings on the PPE **Not to Miss**!
- **Discuss** the role of **Special Tests**
- **Discuss** common **Clearance** Issues

What should I read?

- **Jason inquires as to what references or resources might be available to assist with PPEs in the future?**

Preparticipation Evaluation Physical Evaluation Fifth Edition

- American Academy of Family Physicians
- American Academy of Pediatrics
- American College of Sports Medicine
- American Medical Society for Sports Medicine
- American Orthopedic Society of Sports Medicine
- American Osteopathic Academy of sports Medicine



46th Bethesda Conference: Recommendations for Determining Eligibility for Competition in Athletes with Cardiovascular Abnormalities

Maron BJ, Zipes DP, Kovacs RJ; American Heart Association Electrocardiography and Arrhythmias Committee of Council on Clinical Cardiology, Council on Cardiovascular Disease in Young, Council on Cardiovascular and Stroke Nursing, Council on Functional Genomics and Translational Biology, and American College of Cardiology. ELIGIBILITY AND DISQUALIFICATION RECOMMENDATIONS FOR COMPETITIVE ATHLETES WITH CARDIOVASCULAR ABNORMALITIES: Preamble, Principles, and General Considerations: A Scientific Statement From the American Heart Association and American College of Cardiology. Circulation. 2015 Dec 1;132(22):e256-61.

46th Bethesda Conference Guidelines

- **Recommendations for Determining Eligibility for Competition in Athletes with Cardiovascular Abnormalities 2015**
  - 15 Distinct Task Force Reports

Task Forces and Authors	
Preamble, Principles, and General Considerations	Barry J. Maron, MD, FACC, Co-Chair; Douglas P. Zipes, MD, FAHA, MACC, Co-Chair; Richard J. Kovacs, MD, FAHA, FACC, Co-Chair
Task Force 1: Classification of Sport: Dynamic, Static and Impact	Benjamin D. Levine, MD, FAHA, FACC, Chair; Aaron L. Baggish, MD, FACC; Richard J. Kovacs, MD, FAHA, FACC; Mark S. Link, MD, FACC; Martin S. Maron, MD, FACC; Jere H. Mitchell, MD, FACC
Task Force 2: Preparticipation Screening for Cardiovascular Disease in Competitive Athletes	Barry J. Maron, MD, FACC, Chair; Benjamin D. Levine, MD, FAHA, FACC; Reginald L. Washington, MD, FAHA; Aaron L. Baggish, MD, FACC; Richard J. Kovacs, MD, FAHA, FACC; Martin S. Maron, MD, FACC
Task Force 3: Hypertrophic Cardiomyopathy, Arrhythmogenic Right Ventricular Cardiomyopathy and Other Cardiomyopathies, and Myocarditis	Barry J. Maron, MD, FACC, Chair; James E. Udelson, MD, FAHA, FACC; Robert O. Bonow, MD, MS, FAHA, MACC; Rick Nishimura, MD, FAHA, MACC; Michael J. Ackerman, MD, PhD, FACC; N.A. Mark Estes III, MD, FACC; Leslie T. Cooper, Jr, MD, FAHA, FACC; Mark S. Link, MD, FACC; Martin S. Maron, MD, FACC
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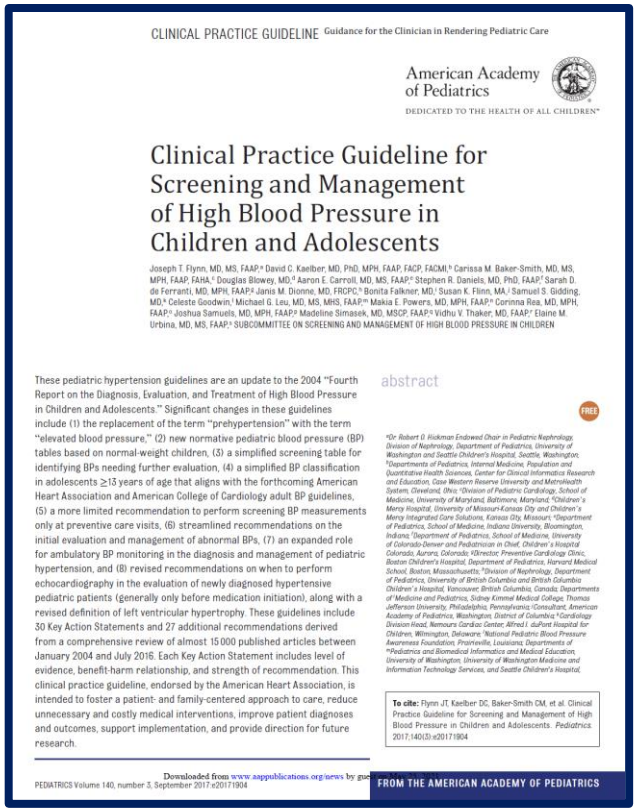
Task Force 5: Valvular Heart Disease	Robert O. Bonow, MD, MS, FAHA, MACC, Chair; Rick Nishimura, MD, FAHA, MACC; Paul D. Thompson, MD, FAHA, FACC; James E. Udelson, MD, FAHA, FACC
Task Force 6: Hypertension	Henry R. Black, MD, FAHA, Chair; Domenic Sica, MD; Keith Ferdinand, MD, FAHA, FACC; William B. White, MD
Task Force 7: Aortic Diseases, Including Marfan Syndrome	Alan C. Braverman, MD, FACC, Chair; Kevin M. Harris, MD, FACC; Richard J. Kovacs, MD, FAHA, FACC; Barry J. Maron, MD, FACC
Task Force 8: Coronary Artery Disease	Paul D. Thompson, MD, FAHA, FACC, Chair; Robert J. Myerburg, MD, FACC; Benjamin D. Levine, MD, FAHA, FACC; James E. Udelson, MD, FAHA, FACC; Richard J. Kovacs, MD, FAHA, FACC
Task Force 9: Arrhythmias and Conduction Defects	Douglas P. Zipes, MD, FAHA, MACC, Chair; Mark S. Link, MD, FACC; Michael J. Ackerman, MD, PhD, FACC; Richard J. Kovacs, MD, FAHA, FACC; Robert J. Myerburg, MD, FACC; N.A. Mark Estes III, MD, FACC
Task Force 10: The Cardiac Channelopathies	Michael J. Ackerman, MD, PhD, FACC, Chair; Douglas P. Zipes, MD, FAHA, MACC; Richard J. Kovacs, MD, FAHA, FACC; Barry J. Maron, MD, FACC
Task Force 11: Drugs and Performance Enhancing Substances	N.A. Mark Estes III, MD, FACC, Chair; Richard J. Kovacs, MD, FAHA, FACC; Aaron L. Baggish, MD, FACC; Robert J. Myerburg, MD, FACC
Task Force 12: Emergency Action Plans, Resuscitation, CPR, and AEDs	Mark S. Link, MD, FACC, Chair; Robert J. Myerburg, MD, FACC; N.A. Mark Estes III, MD, FACC
Task Force 13: Commotio Cordis	Mark S. Link, MD, FACC, Chair; N.A. Mark Estes III, MD, FACC; Barry J. Maron, MD, FACC
Task Force 14: Sickle Cell Trait	Barry J. Maron, MD, FACC, Chair; Kevin M. Harris, MD, FACC; Paul D. Thompson, MD, FAHA, FACC; E. Randy Eichner, MD; Martin H. Steinberg, MD
Task Force 15: Legal Aspects of Medical Eligibility and Disqualification Recommendations	Matthew J. Mitten, JD, Chair; Douglas P. Zipes, MD, FAHA, MACC; Barry J. Maron, MD, FACC; William J. Bryant, JD

Hypertension



CLINICAL PRACTICE GUIDELINE Guidance for the Clinician in Rendering Pediatric Care

American Academy of Pediatrics

DEDICATED TO THE HEALTH OF ALL CHILDREN™

Clinical Practice Guideline for Screening and Management of High Blood Pressure in Children and Adolescents

Joseph T. Flynn, MD, MS, FAAP,[a] David C. Kaelber, MD, PhD, MPH, FAAP, FACP, FACMI,[b] Carissa M. Baker-Smith, MD, MS, MPH, FAAP, FAHA,[c] Douglas Blowey, MD,[d] Aaron E. Carroll, MD, MS, FAAP,[e] Stephen R. Daniels, MD, PhD, FAAP,[f] Sarah D. de Ferranti, MD, MPH, FAAP,[g] Janis M. Dionne, MD, FRCPC,[h] Bonita Falkner, MD,[i] Susan K. Flinn, MA,[j] Samuel S. Gidding, MD,[k] Celeste Goodwin,[l] Michael G. Leu, MD, MS, MHS, FAAP,[m] Makia E. Powers, MD, MPH, FAAP,[n] Corinna Rea, MD, MPH, FAAP,[o] Joshua Samuels, MD, MPH, FAAP,[p] Madeline Simasek, MD, MSCP, FAAP,[q] Vidhu V. Thaker, MD, FAAP,[r] Elaine M. Urbina, MD, MS, FAAP,[s] SUBCOMMITTEE ON SCREENING AND MANAGEMENT OF HIGH BLOOD PRESSURE IN CHILDREN

These pediatric hypertension guidelines are an update to the 2004 "Fourth Report on the Diagnosis, Evaluation, and Treatment of High Blood Pressure in Children and Adolescents." Significant changes in these guidelines include (1) the replacement of the term "prehypertension" with the term "elevated blood pressure," (2) new normative pediatric blood pressure (BP) tables based on normal-weight children, (3) a simplified screening table for identifying BPs needing further evaluation, (4) a simplified BP classification in adolescents ≥13 years of age that aligns with the forthcoming American Heart Association and American College of Cardiology adult BP guidelines, (5) a more limited recommendation to perform screening BP measurements only at preventive care visits, (6) streamlined recommendations on the initial evaluation and management of abnormal BPs, (7) an expanded role for ambulatory BP monitoring in the diagnosis and management of pediatric hypertension, and (8) revised recommendations on when to perform echocardiography in the evaluation of newly diagnosed hypertensive pediatric patients (generally only before medication initiation), along with a revised definition of left ventricular hypertrophy. These guidelines include 30 Key Action Statements and 27 additional recommendations derived from a comprehensive review of almost 15 000 published articles between January 2004 and July 2016. Each Key Action Statement includes level of evidence, benefit-harm relationship, and strength of recommendation. This clinical practice guideline, endorsed by the American Heart Association, is intended to foster a patient- and family-centered approach to care, reduce unnecessary and costly medical interventions, improve patient diagnoses and outcomes, support implementation, and provide direction for future research.

abstract

FREE

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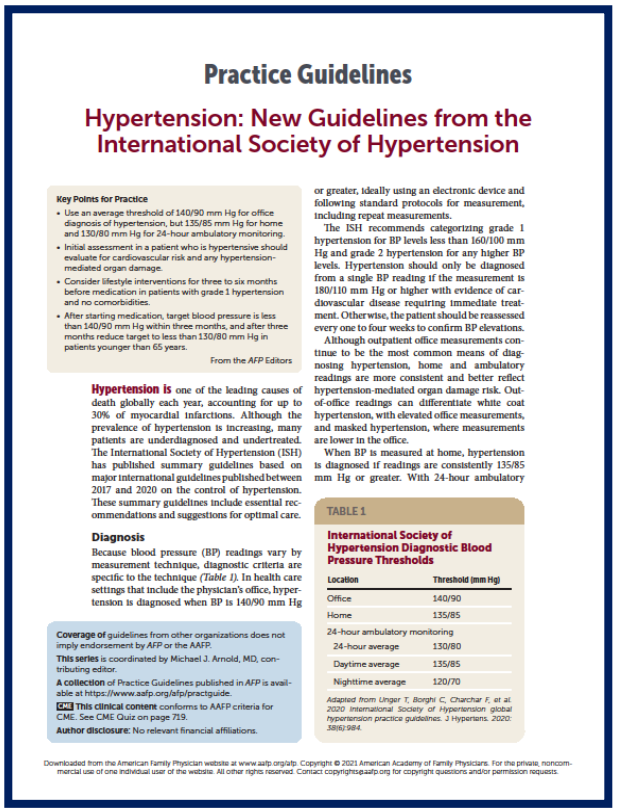
To cite: Flynn JT, Kaelber DC, Baker-Smith CM, et al. Clinical Practice Guideline for Screening and Management of High Blood Pressure in Children and Adolescents. *Pediatrics*. 2017;140(3):e20171904



Practice Guidelines

Hypertension: New Guidelines from the International Society of Hypertension

Key Points for Practice

- Use an average threshold of 140/90 mm Hg for office diagnosis of hypertension, but 135/85 mm Hg for home and 130/80 mm Hg for 24-hour ambulatory monitoring.
- Initial assessment in a patient who is hypertensive should evaluate for cardiovascular risk and any hypertension-mediated organ damage.
- Consider lifestyle interventions for three to six months before medication in patients with grade 1 hypertension and no comorbidities.
- After starting medication, target blood pressure is less than 140/90 mm Hg within three months, and after three months reduce target to less than 130/80 mm Hg in patients younger than 65 years.

From the *AFP* Editors

Hypertension is one of the leading causes of death globally each year, accounting for up to 30% of myocardial infarctions. Although the prevalence of hypertension is increasing, many patients are underdiagnosed and undertreated. The International Society of Hypertension (ISH) has published summary guidelines based on major international guidelines published between 2017 and 2020 on the control of hypertension. These summary guidelines include essential recommendations and suggestions for optimal care.

Diagnosis

Because blood pressure (BP) readings vary by measurement technique, diagnostic criteria are specific to the technique *(Table 1)*. In health care settings that include the physician's office, hypertension is diagnosed when BP is 140/90 mm Hg or greater, ideally using an electronic device and following standard protocols for measurement, including repeat measurements.

The ISH recommends categorizing grade 1 hypertenston for BP levels less than 160/100 mm Hg and grade 2 hypertenson for any higher BP levels. Hypertension should only be diagnosed from a single BP reading if the measurement is 180/110 mm Hg or higher with evidence of cardiovascular disease requiring immediate treatment. Otherwise, the patient should be reassessed every one to four weeks to confirm BP elevations.

Although outpatient office measurements continue to be the most common means of diagnosing hypertenston, home and ambulatory readings are more consistent and better reflect hypertenston-mediated organ damage risk. Out-of-office readings can differentiate white coat hypertenston, with elevated office measurements, and masked hypertenston, where measurements are lower in the office.

When BP is measured at home, hypertenston is diagnosed if readings are consistently 135/85 mm Hg or greater. With 24-hour ambulatory

TABLE 1

International Society of Hypertension Diagnostic Blood Pressure Thresholds

Location	Threshold (mm Hg)
Office	140/90
Home	135/85
24-hour ambulatory monitoring	
24-hour average	130/80
Daytime average	135/85
Nighttime average	120/70

Adapted from Unger T, Borghi C, Charchar F, et al. 2020 International Society of Hypertension global hypertension practice guidelines. J Hypertens. 2020; 38(6):984.

Coverage of guidelines from other organizations does not imply endorsement by *AFP* or the AAFP.

This series is coordinated by Michael J. Arnold, MD, contributing editor.

A collection of Practice Guidelines published in *AFP* is available at https://www.aafp.org/afp/practguide.

This clinical content conforms to AAFP criteria for CME. See CME Quiz on page 719.

Author disclosure: No relevant financial affiliations.

Flynn JT, Kaelber DC, Baker-Smith CM, et al; Subcommittee on Screening and Management of High Blood Pressure in Children. Clinical Practice Guideline for Screening and Management of High Blood Pressure in Children and Adolescents. *Pediatrics.* 2017;140(3):e20171904. Pediatrics. 2018 Sep;142(3):e20181739.

Buelt A, Richards A, Jones AL. Hypertension: New Guidelines from the International Society of Hypertension. Am Fam Physician. 2021 Jun 15;103(12):763-765.

American Family Physician Article 2021

The Preparticipation Physical Evaluation

James MacDonald, MD, MPH, Nationwide Children's Hospital, Ohio State University College of Medicine, Columbus, Ohio
Marie Schaefer, MD, Cleveland Clinic Lerner College of Medicine of Case Western Reserve University, Cleveland, Ohio
Justin Stumph, DO, Cleveland Clinic Family Medicine Residency Program, Cleveland, Ohio

The preparticipation physical evaluation (PPE) is a common reason for young athletes to see a primary care physician. An annual PPE is required by most state high school athletic associations for participation in school-based sports, although there is limited evidence to support its effectiveness for detecting conditions that predispose athletes to injury or illness. In 2019, the American Academy of Pediatrics, with representatives from the American Academy of Family Physicians and other organizations, published updated PPE recommendations (PPE5). According to the guideline, the general goals of the PPE are determining general physical and psychological health; evaluating for life-threatening or disabling conditions, including risk of sudden cardiac arrest and other conditions that may predispose the athlete to illness or injury; and serving as an entry point into the health care system for those without a medical home or primary care physician. The guideline recommends that the evaluation take place in the physician's office rather than in a group setting. The PPE should include a structured physical examination that focuses on the cardiovascular, musculoskeletal, and neurologic systems. Screening for depression, anxiety disorders, and attention-deficit/hyperactivity disorder is also recommended. Clinicians should recognize any findings suggestive of the relative energy deficiency in sport syndrome. Additional consideration is required to address the needs and concerns of transgender athletes and athletes with physical and intellectual disabilities. Finally, guidelines have been published regarding return to play for athletes who have had COVID-19. (*Am Fam Physician*. 2021;103(9):539-546.

Illustration by Jennifer E. Fairman

MacDonald J, Schaefer M, Stumph J. The Preparticipation Physical Evaluation. Am Fam Physician. 2021 May 1;103(9):539-546.

PPE Next Steps

The Cardiovascular Preparticipation Evaluation (PPE) for the Primary Care and Sports Medicine Physician, Part I

Editors: Irfan M. Asif, MD; William O. Roberts, MD, MS, FACSM; Michael Fredericson, MD, FACSM; and Vic Froelicher, MD

Purpose: To provide a rational approach to positive responses to the American Heart Association (AHA) 12-Step Questionnaire and fourth-edition "Preparticipation Physical Evaluation" (PPE) monograph for assessing cardiovascular (CV) risk in athletes. This will assist primary care and sports medicine physicians in determining the need for the following:

1. Follow-up questions to a positive response that will enhance the history and help determine whether a condition that puts an athlete at increased CV risk exists
2. Any basic diagnostic tests to further assess the athlete and that will assist with making an informed decision
3. The need for a consultation or referral to an appropriate specialist

Our goal is to help the primary care and sports medicine physician with the critical decision making regarding positive responses to the AHA 12-Step Questionnaire and criteria for athlete clearance, as follows:

1. Could this be a potentially lethal problem?
2. Does this need additional workup or just an electrocardiogram?
3. Does this require consultation with a specialist (and which specialty)?

For example, to address a positive response to the question regarding "excessive shortness of breath or fatigue with exercise beyond what is expected for your level of fitness," it would be useful for physicians to know which elements in the history, physical, or diagnostic tests point to a potentially lethal CV diagnosis versus an easily treated pulmonary issue like exercise-induced asthma. If a lethal diagnosis can be excluded, the responsible physician may be able to determine that no restriction is warranted and clear the athlete for appropriate activity without a referral to a cardiologist or another specialist.

While there are some differences in the questions from the AHA 12 points and the CV questions in the PPE fourth-edition monograph, the underlying intent is the same and the information provided is easily utilized for both question sets.

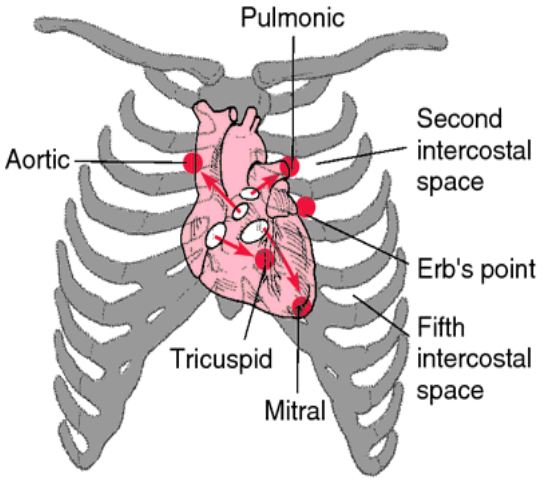
History and Application of the AHA 12 Points for Assessing Cardiovascular Risk in Athletes

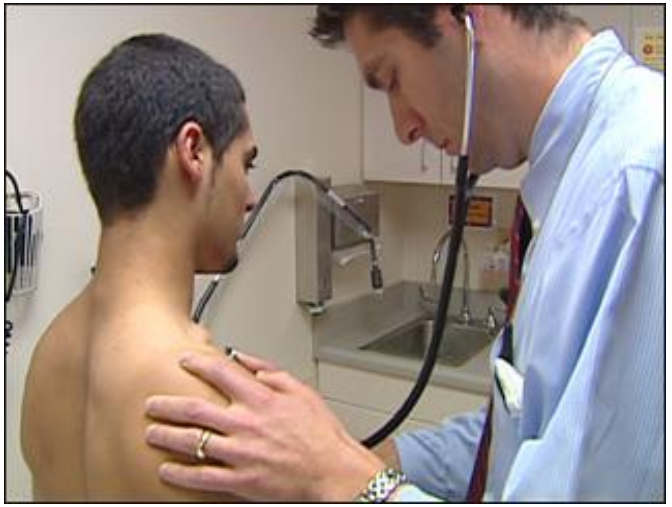
Abhimanyu (Manu) Uberoi, MD, MS and William O. Roberts, MD, MS

The cardiovascular (CV) evaluation, one important part of the preparticipation physical examination (PPE), is the focus of this special communication. Cardiac events during sporting events, albeit rare, can be fatal, and these events are often very public (5,7,10). In the United States, most athlete PPE for ages 6 to 24 years are performed by family physicians and pediatricians (8), some with subspecialty training in sports medicine. Often, the PPE is the first encounter with the health care system for adolescents and serves as the sole opportunity for general screening, risk factor evaluation, and health education. This may be especially true for adolescents in lower income strata. The PPE is intended to reduce the risk of adverse outcomes without unduly restricting athlete participation. A thorough history examination can uncover a large portion of the athlete's risk for injury or illness, and the physical examination unveils other abnormalities. There are very few proven screening methods that assure an athlete's health, but the PPE provides a framework to assess and stratify sport participation risk. The intent of these evaluations is to deliver to health care providers pertinent information to educate athletes and parents and enable them to make an informed participation decision.

The first PPE monograph was published in 1992 by five organizations (American Academy of Family Physicians, American Academy of Pediatrics, American Medical Society for Sports Medicine, American Orthopedic Society for Sports Medicine, and American Osteopathic Academy of Sports Medicine). The American College of Sports Medicine joined for the third edition in 2005, and the fourth edition was published in 2010 (1). The American Heart Association (AHA) developed CV preparticipation screening recommendations for young athletes in 1996 and updated the statement in 2007 (8). The AHA and the American College of Cardiology have reaffirmed their position regarding the CV PPE and electrocardiography (ECG) screening in healthy 12- to 25-year-old young people with a comprehensive review that endorses the 12-element history and physical examination in the 2014 Scientific Statement (9). This recent document added two elements regarding palpitations and previous evaluations similar to those in the fourth PPE. The question sets from the two examination recommendations are similar, and the fourth PPE monograph uses the same general questions, with some differences in syntax and depth of question content. The question wording of the third PPE monograph was based on input from parent and high school athlete focus group sessions to enhance the "understandability" of the questions for the end users. Of note, the question sets are based on expert opinion and have not been subjected to scientific study.

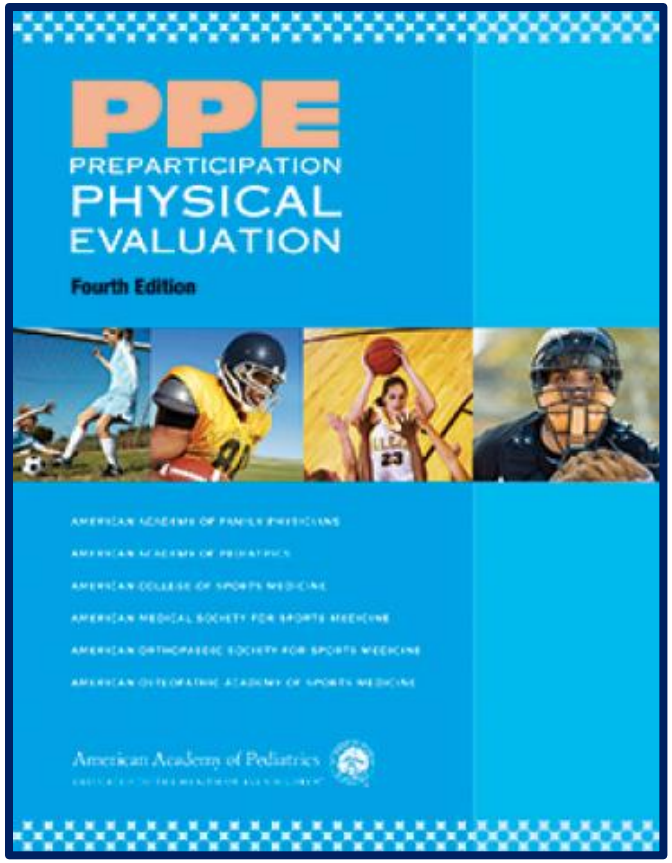
In the late 1990s, after surveys showed poor compliance with both the use of consensus-based forms and the AHA question set, some high schools and colleges across the country incorporated the elements of the PPE and the AHA

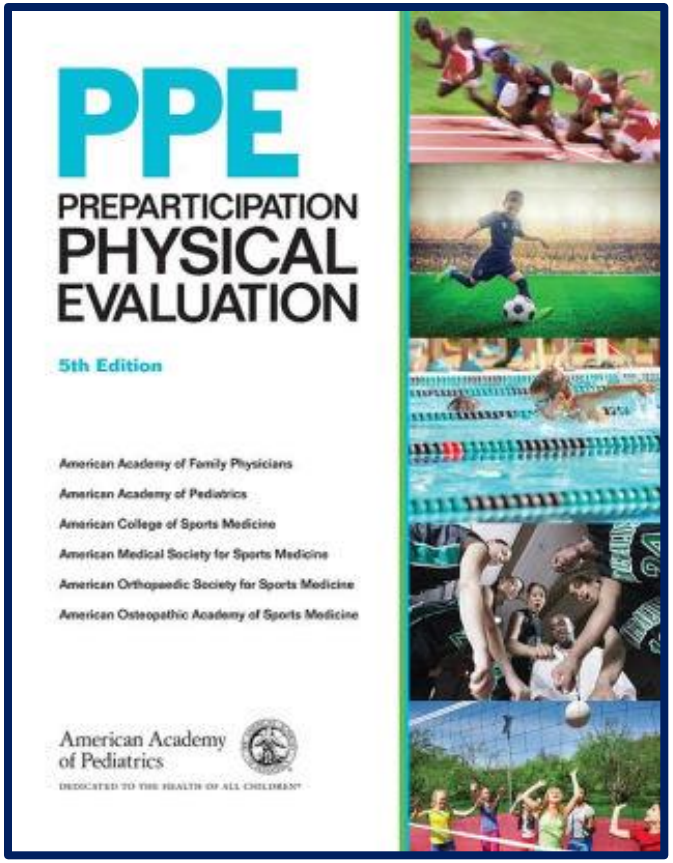




Current Sports Medicine Reports. 2015 May-Jun;14(3):254-6

Jason Inquires as to What's New?

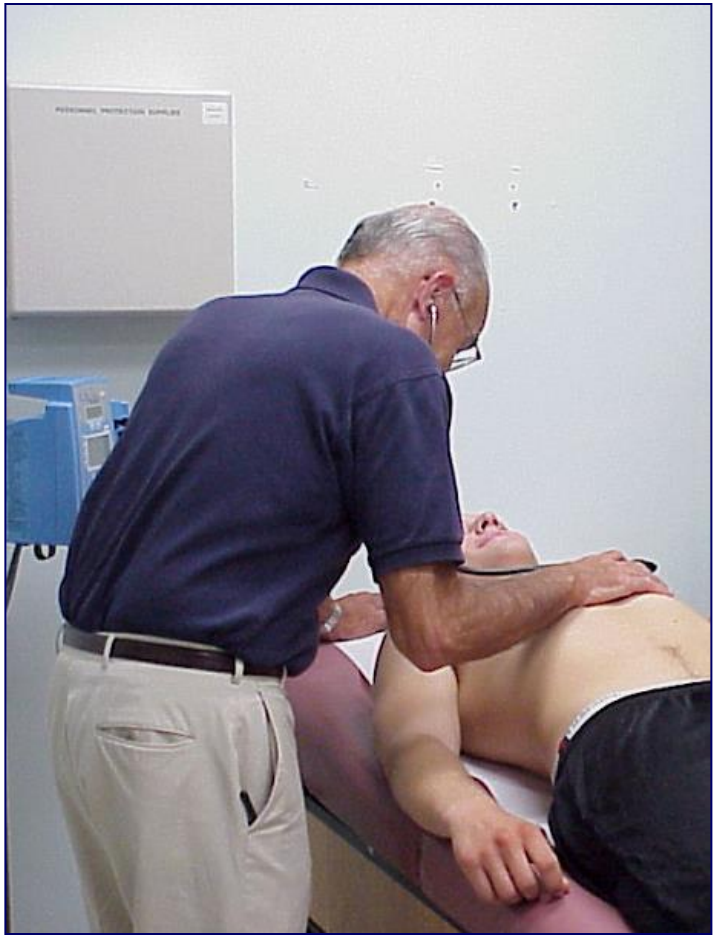




The Senior Editors' Thoughts: Key Points of Emphasis

PPE Goals…

- Determine **general physical & PSYCHOLOGICAL HEALTH**
- Evaluate for conditions that predispose to injury or illness
- Evaluate for **life-threatening** or disabling conditions
- Opportunity for discussion of health & lifestyle issues
- **Entry point into A HEALTH CARE HOME**

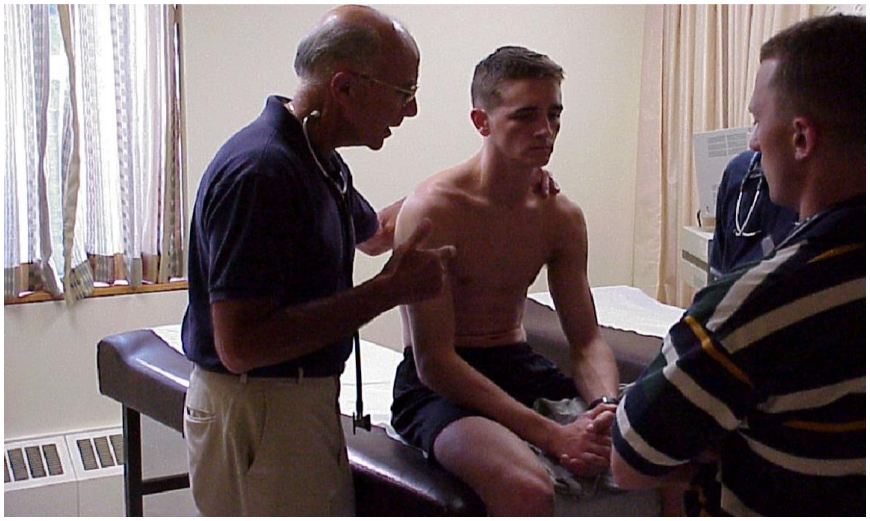


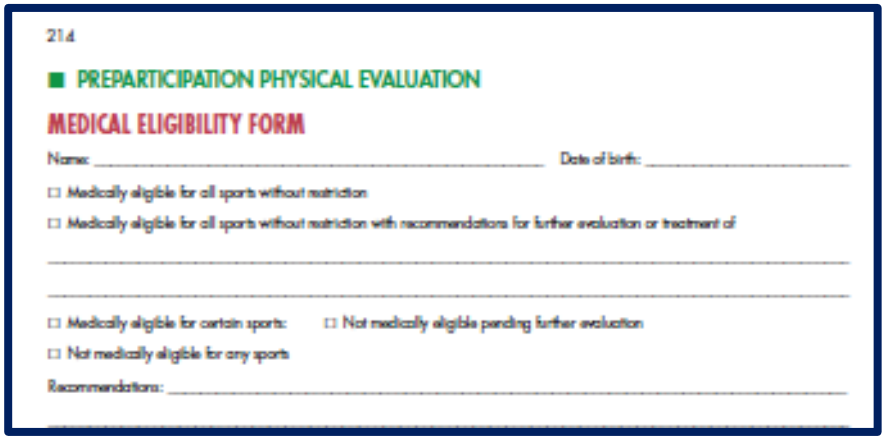
PPE5 Emphasis…

- 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 **health care 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 & adolescent risk.

Finally, the PPE…

- **Provides** medical background for **shared medical decision-making**
- **Determines** the **medical eligibility & potential physical activity limitations**
- **Helps** athletes participate **"safely"**
- **And** there is now an **ICD-10-CM code** for the PPE Z02.5





214

PREPARTICIPATION 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: _____

Why are we doing these PPEs?

- **Jason inquires as to why are we doing these PPEs NOW, in the SCHOOL GYM, with the OFFICE NPs, and in particular on a Friday night when he may have issues with work hour restrictions?**

Purpose of the PPE

- **Primary Objectives:**
  - Screen for conditions that may be **life threatening** or disabling.
  - Screen for conditions that may **predispose to illness** or injury.
- **Secondary Objectives:**
  - Determine **general health**.
  - Serve as an entry point to the health care system for adolescents.
  - Provide an opportunity to initiate discussion on **health related topics**.

American Academy of Family Physicians, American Academy of Pediatrics, American College of Sports Me. Preparticipation Physical Evaluation, 5th ed, Bernhardt D, Roberts W (Eds), American Academy of Pediatrics, Elk Grove Village, IL 2010.

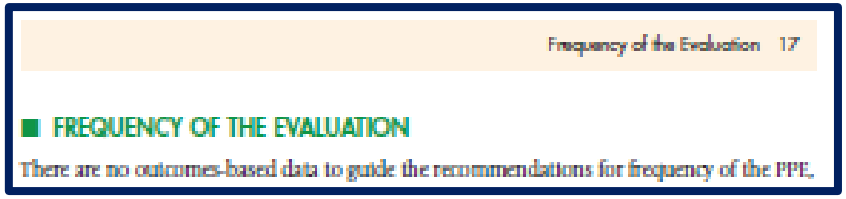
Timing and Frequency of the PPE

- **Timing:**
  - Ideally, the preparticipation physical evaluation (PPE) should take place **four to six weeks before the season starts**, permitting time to evaluate and treat medical problems and/or rehabilitate musculoskeletal injuries before sports participation.
- **Frequency:**
  - Most sports medicine clinicians recommend that the PPE be conducted **before each new level of participation** (eg, middle school, junior high, high school, and college), with **yearly updates** of the history and targeted physical examinations.
  - Requirements for the frequency of PPE **vary by state**, but most state high school athletic associations require annual evaluations.
  - The AHA recommends that a PPE examination be **performed every two years** during sports participation, with an **interim history taken in the intervening years**.

Maron BJ, Thompson PD, Puffer JC, et al. Cardiovascular preparticipation screening of competitive athletes. A statement for health professionals from the Sudden Death Committee (clinical cardiology) and Congenital Cardiac Defects Committee (cardiovascular disease in the young), American Heart Association. Circulation 1996; 94:850.

PPE Writing Group Consensus

- **A comprehensive PPE every 2 to 3 years**
  - Grade school, middle school, & high school
  - **Integrate into HCH health supervision examinations**
- Annual questionnaire
  - Heart, head, heat injury, & mental health issues
  - Problem-focused examination if concerns


Frequency of the Evaluation 17

FREQUENCY OF THE EVALUATION

There are no outcomes-based data to guide the recommendations for frequency of the PPE,

Setting of the PPE: Office versus Station Based

- **Office setting:**
  - Examination in the office setting by the athlete's primary care provider has the advantages of **privacy, continuity of care, and the provider's knowledge of past medical and family history**.
  - However, the complete examination is time consuming and may have **insufficient focus on the important sports-related components** of the PPE.

Setting of the PPE: Office versus Station Based

- **Station approach:**
  - In the station approach, the athlete is examined by **multiple examiners** through a series of stations specific to individual components of the evaluation.
  - The station approach is time efficient, sports oriented, and inexpensive, and has a high yield for identifying abnormalities; however, it generally **does not afford confidentiality and may not provide for continuity of care**.

Qualifications of Examiners…

- **MD, DO, or advanced practice providers (NP & PA)**
- Essential to have clinical training
  - Knowledge & expertise to conduct the evaluation
  - Address the broad range of problems
  - Determine medical eligibility
- Clinical training for problems encountered during PPE
- Individual state laws vary (NP, PA, DC)
- Seek consultation when appropriate

Exertional Sudden Death in Athletes

- **Jason inquires as to what are the more common causes of exertional illness and sudden death that we are screening for?**

Epidemiology of Sudden Death in Young Athletes

- Sudden cardiac death in athletes is an **uncommon** event.
- Risk in young athletes is approximately 1:50,000 - 100,000/yr.
- Risk ranges from 1:15,000 to 1:50,000/yr In older athletes.

THE NATION'S NEWSPAPER 50 CENTS

USA TODAY

NO. 1 IN THE USA . . . FIRST IN DAILY READERS

WHEN IS AN AVERAGE KID NOT GOOD ENOUGH?

WHEN YOU'RE A BOOMER PARENT WHO BUYS BOOKS LIKE 'TOILET TRAINING IN A DAY'; CHILLING OUT, 1D

MEL BROOKS PUTS THE MERRY MEN IN ★★ 'TIGHTS' 8D

WEDNESDAY

20th Century Fox

TRACEY ULLMAN: Crone Latrine, 8D

Boston star Lewis collapses, dies at 27

by Jack Carey
USA TODAY

Boston Celtics captain Reggie Lewis, 27, who passed out during an NBA playoff game in April, died Tuesday night after collapsing while shooting baskets.

"It's a time of incredible grief," said Celtics executive Dave Gavitt late Tuesday.

After Lewis' April collapse, team doctor Arnold Scheller said he had a life-threatening heart ailment like the one that killed college basketball star Hank Gathers in 1990, and probably would not play again.

"You can die from this," Scheller said he told Lewis, a 1987 first-round draft pick.

But Lewis, against team wishes, sought a second opinion and was told he had a nerve condition that could be controlled.

Lewis arrived at Brandeis University at about 4 p.m. ET Tuesday and was shooting baskets, said Brandeis' Jack Molloy.

Witnesses said Lewis fell to the court about 5 p.m., was limp and shaking, stopped breathing and had no pulse.

Lewis "wasn't doing anything too strenuous," said Amir Weiss, who was at the gym.

Local paramedics said they found Lewis in complete cardiac arrest; he was pronounced dead at 7:30 p.m. ET at Waltham-Weston Hospital.

Celtics' president Red Auerbach, who is recovering from heart bypass surgery, called Lewis "a warm, kind, gentle and generous man."

He is survived by his wife, Donna Harris, and a son, Reggie Jr.

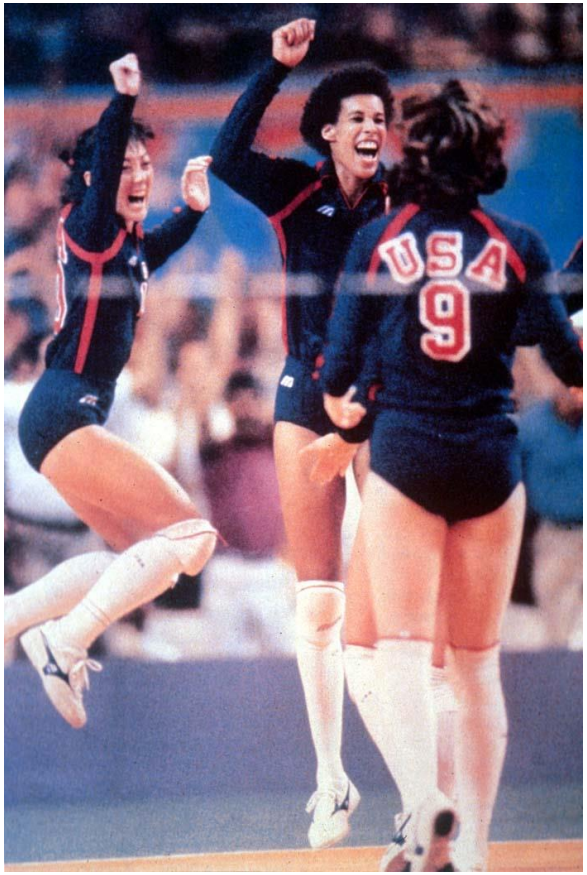
▶ 'Hearts are very heavy,' 1,9C

REGGIE LEWIS USA TODAY

Sudden cardiac arrest is the leading cause of EXERTIONAL death in Young Athletes!

Epidemiology of Exertional Sudden Death

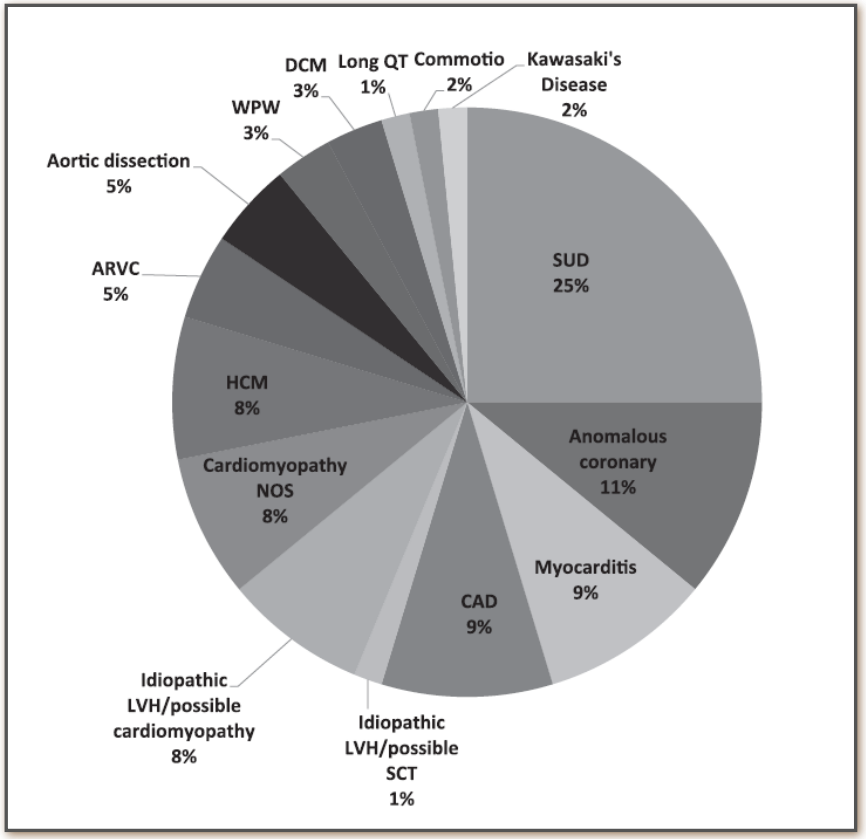
- Estimated death rates in **male athletes are 5X higher than in female** athletes.
- Estimated death rates in **college athletes are 2X higher than in high school** athletes.
- Non-cardiac deaths account for 22% of deaths.
- **Football and basketball** account for the majority of sudden deaths.
- **African Americans** appear to be at greater risk.



VanCamp SP et al: Nontraumatic sports deaths in high school and college athletes. MSSE 1992;24(3):279-80.

Sudden Unexplained Cardiac Death (SUD)

- The most common findings at autopsy were a**utopsy-negative sudden unexplained death** in 16 (25%), and definitive evidence for hypertrophic cardiomyopathy was seen in 5 (8%).
- The incidence of SCD in Division 1 male basketball athletes was 1:5200 AY.



Harmon KG et al: Incidence, Cause, and Comparative Frequency of Sudden Cardiac Death in National Collegiate Athletic Association Athletes: A Decade in Review. Circulation. 2015 Jul 7;132(1):10-9.

An Appropriate History and Physical Examination

- **Jason inquires as to appropriate questions to ask athletes as you begin the preparticipation examinations.**

PREPARTICIPATION PHYSICAL EVALUATION
HISTORY FORM

(Note: This form is to be filled out by the patient and parent prior to seeing the physician. The physician should keep this form in the chart.)

Date of Exam _____

Name _____ Date of birth _____

Sex _____ Age _____ Grade _____ School _____ Sport(s) _____

Medicines and Allergies: Please list all of the prescription and over-the-counter medicines and supplements (herbal and nutritional) that you are currently taking

Do you have any allergies? ☐ Yes ☐ No If yes
☐ Medicines ☐ Pollens

Explain "Yes" answers below. Circle questions you don't k

GENERAL QUESTIONS	Yes	No
1. Has a doctor ever denied or restricted your participation in sp any reason?		
2. Do you have any ongoing medical conditions? If so, please ide below: ☐ Asthma ☐ Anemia ☐ Diabetes ☐ Infec Other:		
3. Have you ever spent the night in the hospital?		
4. Have you ever had surgery?		
HEART HEALTH QUESTIONS ABOUT YOU		
5. Have you ever passed out or nearly passed out DURING or AFTER exercise?		
6. Have you ever had discomfort, pain, tightness, or pressure in chest during exercise?		
7. Does your heart ever race or skip beats (irregular beats) duri		
8. Has a doctor ever told you that you have any heart problems check all that apply: ☐ High blood pressure ☐ A heart murmur ☐ High cholesterol ☐ A heart infection ☐ Kawasaki disease Other:		
9. Has a doctor ever ordered a test for your heart? (For example echocardiogram)		
10. Do you get lightheaded or feel more short of breath than exp during exercise?		
11. Have you ever had an unexplained seizure?		
12. Do you get more tired or short of breath more quickly than your friends during exercise?		
HEART HEALTH QUESTIONS ABOUT YOUR FAMILY	**Yes**	**No**
13. Has any family member or relative died of heart problems or had an unexpected or unexplained sudden death before age 50 (including drowning, unexplained car accident, or sudden infant death syndrome)?		
14. Does anyone in your family have hypertrophic cardiomyopathy, Marfan syndrome, arrhythmogenic right ventricular cardiomyopathy, long QT syndrome, short QT syndrome, Brugada s polymorphic ventricular tachycardia?		
15. Does anyone in your family have a heart implanted defibrillator?		
16. Has anyone in your family had unexplaine seizures, or near drowning?		
BONE AND JOINT QUESTIONS		
17. Have you ever had an injury to a bone, m that caused you to miss a practice or a g		
18. Have you ever had any broken or fracture		
19. Have you ever had an injury that required injections, therapy, a brace, a cast, or cru		
20. Have you ever had a stress fracture?		
21. Have you ever been told that you have or instability or atlantoaxial instability? (Down syndrome or dwarfism)		
22. Do you regularly use a brace, orthotics, or other assistive device?		
23. Do you have a bone, muscle, or joint injury that bothers you?		
24. Do any of your joints become painful, swollen, feel warm, or look red?		
25. Do you have any history of juvenile arthritis or connective tissue disease?		

43. Have you had any problems with your eyes or vision?		
44. Have you had any eye injuries?		
45. Do you wear glasses or contact lenses?		
46. Do you wear protective eyewear, such as goggles or a face shield?		
47. Do you worry about your weight?		
48. Are you trying to or has anyone recommended that you gain or lose weight?		

I hereby state that, to the best of my knowledge, my answers to the above questions are complete and correct.

Signature of athlete _____ Signature of parent/guardian _____ Date _____

HE0503 9-2681/0410

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News Release

Sports and Medical Organizations Encourage COVID-19 Vaccine Conversations be Part of all Sports Physicals

News Room / Sports and Medical Organizations Encourage COVID-19 Vaccine Conversations be Part of all Sports Physicals

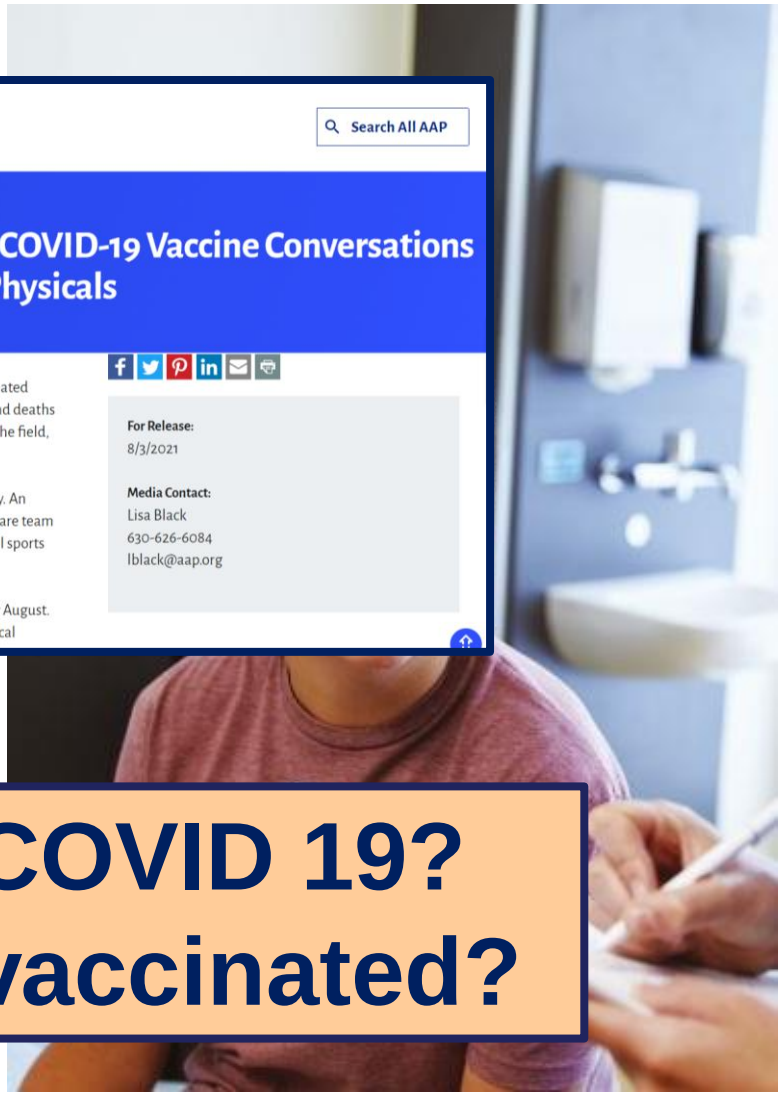
We, the undersigned organizations, believe all athletes who do not have contraindications should be vaccinated against COVID-19 as soon as they are eligible. Vaccination prevents widespread disease, hospitalizations, and deaths due to COVID-19 and will help keep students in the classroom, athletes in the game, and athletic teams on the field, while protecting our communities.

It is important for athletes to begin their vaccination now, since it takes several weeks to reach full immunity. An annual well visit or sports physical provides an excellent opportunity to talk with your physician or athletic care team about the vaccine and to begin the series. We urge all medical providers to ask about COVID-19 vaccine at all sports physicals.

We will be releasing updated preparticipation evaluation forms and guidance for medical providers in early August. We encourage all youth sports and state athletic associations to work in their communities, with local medical

For Release:
8/3/2021

Media Contact:
Lisa Black
630-626-6084
lblack@aap.org



Have you had COVID 19?
Have you been vaccinated?

14 Point AHA Update

TABLE. The 12-Element AHA Recommendations for Preparticipation Cardiovascular Screening of Competitive Athletes

Medical history*

Personal history

1. Exertional chest pain/discomfort
2. Unexplained syncope/near-syncope†
3. Excessive exertional and unexplained dyspnea/fatigue, associated with exercise
4. Prior recognition of a heart murmur
5. Elevated systemic blood pressure

Family history

6. Premature death (sudden and unexpected, or otherwise) before age 50 years due to heart disease, in ≥1 relative
7. Disability from heart disease in a close relative <50 years of age
8. Specific knowledge of certain cardiac conditions in family members: hypertrophic or dilated cardiomyopathy, long-QT syndrome or other ion channelopathies, Marfan syndrome, or clinically important arrhythmias

Physical examination

9. Heart murmur‡
10. Femoral pulses to exclude aortic coarctation
11. Physical stigmata of Marfan syndrome
12. Brachial artery blood pressure (sitting position)§

Table 1. The 14-Element AHA Recommendations for Preparticipation Cardiovascular Screening of Competitive Athletes

Medical history*

Personal history

1. Chest pain/discomfort/tightness/pressure related to exertion
2. Unexplained syncope/near-syncope†
3. Excessive and unexplained dyspnea/fatigue or palpitations, associated with exercise
4. Prior recognition of a heart murmur
5. Elevated systemic blood pressure
6. Prior restriction from participation in sports
7. Prior testing for the heart, ordered by a physician

Family history

8. Premature death (sudden and unexpected, or otherwise) before 50 y of age attributable to heart disease in ≥1 relative
9. Disability from heart disease in close relative <50 y of age
10. Hypertrophic or dilated cardiomyopathy, long-QT syndrome, or other ion channelopathies, Marfan syndrome, or clinically significant arrhythmias; specific knowledge of genetic cardiac conditions in family members

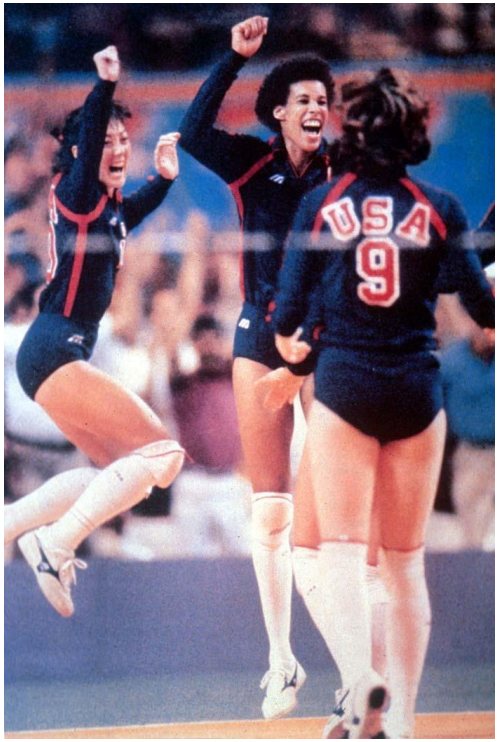
Physical examination

11. Heart murmur‡
12. Femoral pulses to exclude aortic coarctation
13. Physical stigmata of Marfan syndrome
14. Brachial artery blood pressure (sitting position)§

Maron BJ, Levine BD, Washington RL, et al. Eligibility and Disqualification Recommendations for Competitive Athletes With Cardiovascular Abnormalities: Task Force 2: Preparticipation Screening for Cardiovascular Disease in Competitive Athletes: A Scientific Statement From the American Heart Association and American College of Cardiology. Circulation 2015; 132:e267.

AHA Recommendations

- **Family History**
  - Premature death (sudden and unexpected, or otherwise) **before age 50** years due to heart disease in a close relative
  - **Disability** from heart disease in a close relative **<50 years of age**
  - Specific knowledge of certain cardiac conditions in **family members**: hypertrophic or dilated cardiomyopathy, long QT syndrome or other ion channelopathies, Marfan Syndrome, or clinically important arrhythmias.



Maron BJ, Thompson PD, Puffer JC, et al. Cardiovascular preparticipation screening of competitive athletes. A statement for health professionals from the Sudden Death Committee (clinical cardiology) and Congenital Cardiac Defects Committee (cardiovascular disease in the young), American Heart Association. Circulation 1996; 94:850.

AHA Recommendations

- **Personal History**
  - Exertional chest pain/discomfort
  - Unexplained syncope/**presyncope**
  - Excessive exertional and unexplained dyspnea/fatigue, associated with exercise
  - Prior recognition of a heart murmur
  - Elevated systemic blood pressure

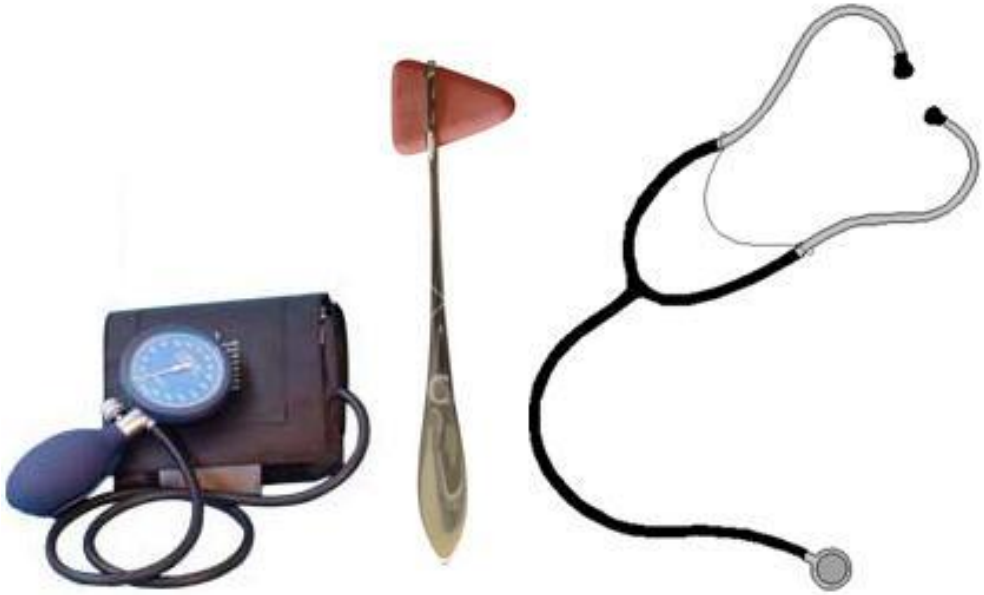
Maron BJ, Thompson PD, Puffer JC, et al. Cardiovascular preparticipation screening of competitive athletes. A statement for health professionals from the Sudden Death Committee (clinical cardiology) and Congenital Cardiac Defects Committee (cardiovascular disease in the young), American Heart Association. Circulation 1996; 94:850.

Not to be Forgotten!

- **Musculoskeletal Symptoms**
  - Status of rehabilitation of prior injuries
- **Concussion Symptoms**
  - Baseline symptoms
- **Respiratory Symptoms**
  - Occult asthma
- **Eating Disorders**
- **Psychologic Stress**

An Appropriate History and Physical Examination

- **Jason inquires as to how detailed the physical examination needs to be?**



PREPARTICIPATION PHYSICAL EVALUATION
PHYSICAL EXAMINATION FORM

Name _____ Date of birth _____

PHYSICIAN REMINDERS

1. Consider additional questions on more sensitive issues:
   - Do you feel stressed out or under a lot of pressure?
   - Do you ever feel sad, hopeless, depressed, or anxious?
   - Do you feel safe at your home or residence?
   - Have you ever tried cigarettes, chewing tobacco, snuff, or dip?
   - During the past 30 days, did you use chewing tobacco, snuff, or dip?
   - Do you drink alcohol or use any other drugs?
   - Have you ever taken anabolic steroids or used any other performance supplement?
   - Have you ever taken any supplements to help you gain or lose weight or improve your performance?
   - Do you wear a seat belt, use a helmet, and use condoms?
2. Consider reviewing questions on cardiovascular symptoms (questions 5–14).

EXAMINATION		
Height _____ Weight _____ ☐ Male ☐ Female		
BP ____/____ (____/____) Pulse _____ Vision R 20/_____ L 20/_____ Corrected: ☐ Y ☐ N		
MEDICAL	**NORMAL**	**ABNORMAL FINDINGS**
Appearance • Marfan stigmata (kyphoscoliosis, high-arched palate, pectus excavatum, arachnodactyly, arm span > height, hyperlaxity, myopia, MVP, aortic insufficiency)		
Eyes/ears/nose/throat • Pupils equal • Hearing		
Lymph Nodes		
Heart* • Murmurs (auscultation standing, supine, +/- Valsalva) • Location of point of maximal impulse (PMI)		
Pulses • Simultaneous femoral and radial pulses		
Lungs		
Abdomen		
Genitourinary (males only)†		
Skin • HSV, lesions suggestive of MRSA, tinea corporis		
Neurologic‡		
MUSCULOSKELETAL		
Neck		
Back		
Shoulder/arm		
Elbow/forearm		
Wrist/hand/fingers		
Hip/thigh		
Knee		
Leg/ankle		
Foot/toes		
Functional • Duck-walk, single leg hop		

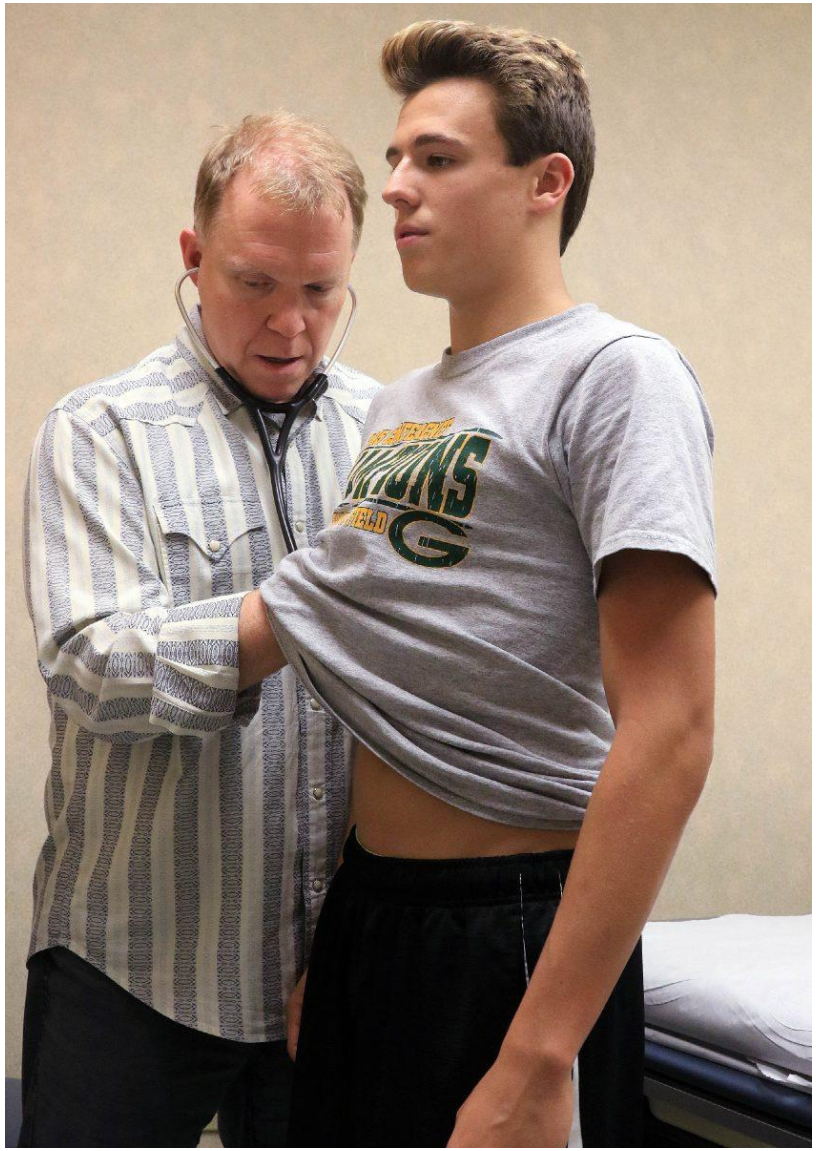
*Consider ECG, echocardiogram, and referral to cardiology for abnormal cardiac history or exam.
†Consider GU exam if in private setting. Having third party present is recommended.
‡Consider cognitive evaluation or baseline neuropsychiatric testing if a history of significant concussion.

I certify that the above student has been medically evaluated for participation in athletics and deemed:

1. ☐ CLEARED WITHOUT RESTRICTIONS
2. ☐ Cleared for LIMITED PARTICIPATION
   - ☐ Not cleared for (specific sports) _____
   - ☐ Cleared only for (specific sports) _____
3. Requires further evaluation before a final recommendation
4. Not cleared for participation
   - ☐ Reasons: _____
5. Other recommendations: _____

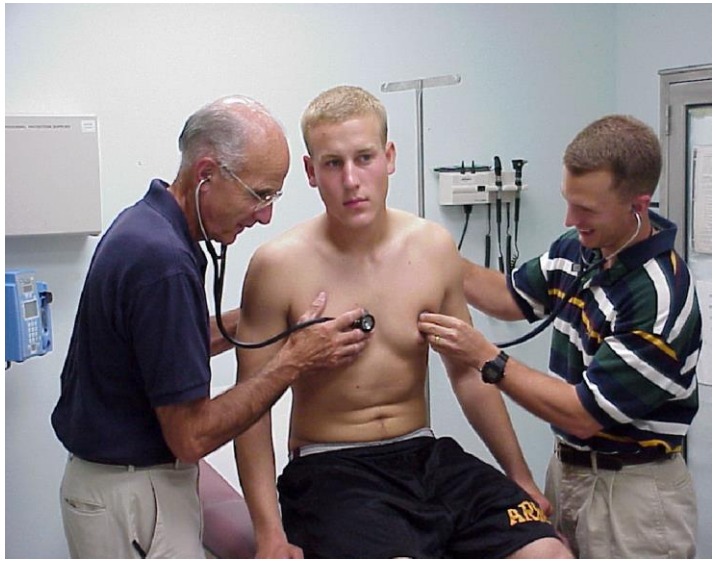
Name of physician (printed/typed): _____ Date of Examination: _____

Signature of physician: _____

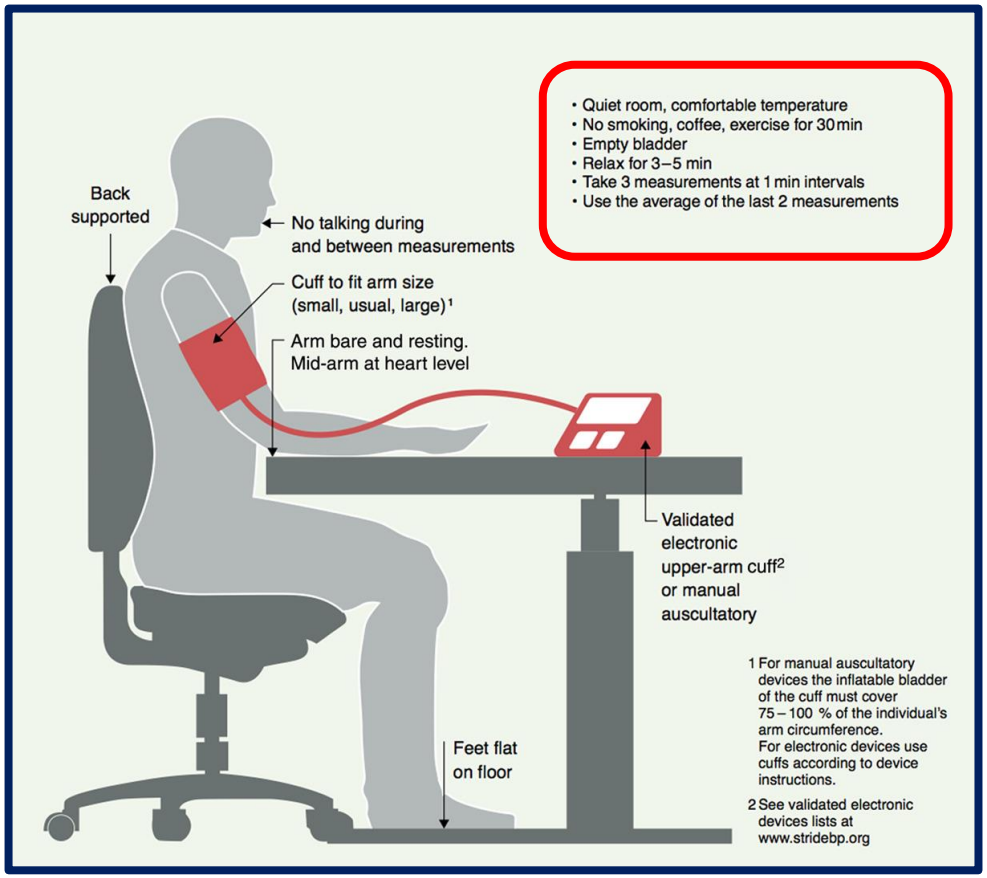


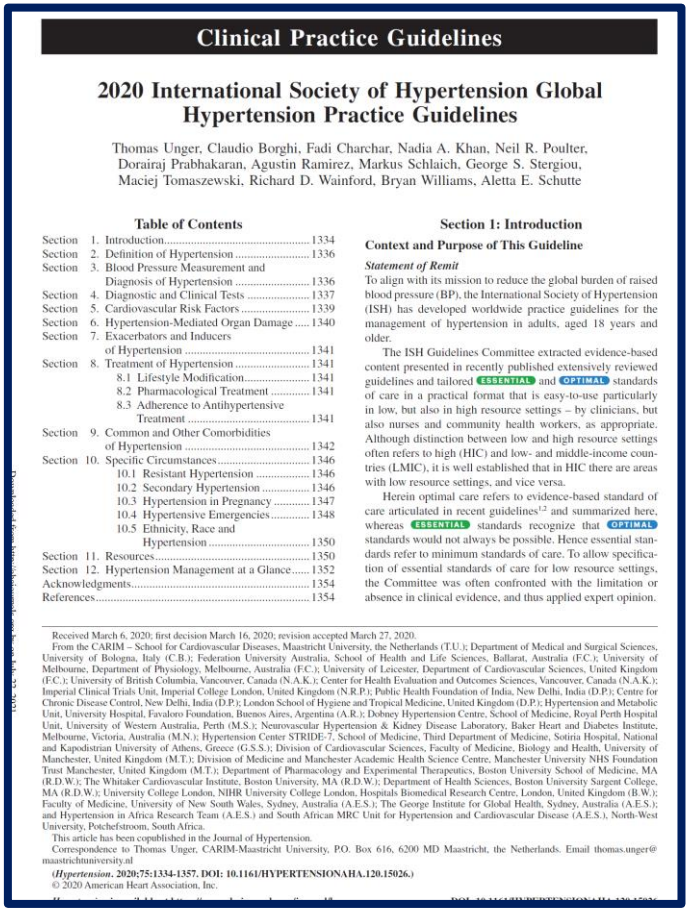
14 Element AHA Recommendations

- **Physical Examination**
  - Brachial Artery Blood Pressure
  - Femoral Pulses to Exclude Aortic Coarcation
  - Physical Stigmata of Marfan Syndrome
  - Heart Murmur (Supine and standing, or Valsalva to identify murmur of dynamic left ventricle outflow obstruction)



Blood Pressure Assessment





Clinical Practice Guidelines

2020 International Society of Hypertension Global Hypertension Practice Guidelines

Thomas Unger, Claudio Borghi, Fadi Charchar, Nadia A. Khan, Neil R. Poulter, Dorairaj Prabhakaran, Agustin Ramirez, Markus Schlaich, George S. Stergiou, Maciej Tomaszewski, Richard D. Wainford, Bryan Williams, Aletta E. Schutte

Table of Contents

Section 1. Introduction 1334
Section 2. Definition of Hypertension 1336
Section 3. Blood Pressure Measurement and Diagnosis of Hypertension 1336
Section 4. Diagnostic and Clinical Tests 1337
Section 5. Cardiovascular Risk Factors 1339
Section 6. Hypertension-Mediated Organ Damage 1340
Section 7. Exacerbators and Inducers of Hypertension 1341
Section 8. Treatment of Hypertension 1341
8.1 Lifestyle Modification 1341
8.2 Pharmacological Treatment 1341
8.3 Adherence to Antihypertensive Treatment 1341
Section 9. Common and Other Comorbidities of Hypertension 1342
Section 10. Specific Circumstances 1346
10.1 Resistant Hypertension 1346
10.2 Secondary Hypertension 1346
10.3 Hypertension in Pregnancy 1347
10.4 Hypertensive Emergencies 1348
10.5 Ethnicity, Race and Hypertension 1350
Section 11. Resources 1350
Section 12. Hypertension Management at a Glance 1352
Acknowledgments 1354
References 1354

Section 1: Introduction

Context and Purpose of This Guideline

Statement of Remit

To align with its mission to reduce the global burden of raised blood pressure (BP), the International Society of Hypertension (ISH) has developed worldwide practice guidelines for the management of hypertension in adults, aged 18 years and older.

The ISH Guidelines Committee extracted evidence-based content presented in recently published extensively reviewed guidelines and tailored ESSENTIAL and OPTIMAL standards of care in a practical format that is easy-to-use particularly in low, but also in high resource settings – by clinicians, but also nurses and community health workers, as appropriate. Although distinction between low and high resource settings often refers to high (HIC) and low- and middle-income countries (LMIC), it is well established that in HIC there are areas with low resource settings, and vice versa.

Herein optimal care refers to evidence-based standard of care articulated in recent guidelines[1,2] and summarized here, whereas ESSENTIAL standards recognize that OPTIMAL standards would not always be possible. Hence essential standards refer to minimum standards of care. To allow specification of essential standards of care for low resource settings, the Committee was often confronted with the limitation or absence in clinical evidence, and thus applied expert opinion.

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From the CARIM – School for Cardiovascular Diseases, Maastricht University, the Netherlands (T.U.); Department of Medical and Surgical Sciences, University of Bologna, Italy (C.B.); Federation University Australia, School of Health and Life Sciences, Ballarat, Australia (F.C.); University of Melbourne, Department of Physiology, Melbourne, Australia (F.C.); University of Leicester, Department of Cardiovascular Sciences, United Kingdom (F.C.); University of British Columbia, Vancouver, Canada (N.A.K.); Center for Health Evaluation and Outcomes Sciences, Vancouver, Canada (N.A.K.); Imperial Clinical Trials Unit, Imperial College London, United Kingdom (N.R.P.); Public Health Foundation of India, New Delhi, India (D.P.); Centre for Chronic Disease Control, New Delhi, India (D.P.); London School of Hygiene and Tropical Medicine, United Kingdom (D.P.); Hypertension and Metabolic Unit, University Hospital, Favaloro Foundation, Buenos Aires, Argentina (A.R.); Dobney Hypertension Centre, School of Medicine, Royal Perth Hospital Unit, University of Western Australia, Perth (M.S.); Neurovascular Hypertension & Kidney Disease Laboratory, Baker Heart and Diabetes Institute, Melbourne, Victoria, Australia (M.N.); Hypertension Center STRIDE-7, School of Medicine, Third Department of Medicine, Sotiria Hospital, National and Kapodistrian University of Athens, Greece (G.S.S.); Division of Cardiovascular Sciences, Faculty of Medicine, Biology and Health, University of Manchester, United Kingdom (M.T.); Division of Medicine and Manchester Academic Health Science Centre, Manchester University NHS Foundation Trust Manchester, United Kingdom (M.T.); Department of Pharmacology and Experimental Therapeutics, Boston University School of Medicine, MA (R.D.W.); The Whitaker Cardiovascular Institute, Boston University, MA (R.D.W.); Department of Health Sciences, Boston University Sargent College, MA (R.D.W.); University College London, NIHR University College London, Hospitals Biomedical Research Centre, London, United Kingdom (B.W.); Faculty of Medicine, University of New South Wales, Sydney, Australia (A.E.S.); The George Institute for Global Health, Sydney, Australia (A.E.S.); and Hypertension in Africa Research Team (A.E.S.) and South African MRC Unit for Hypertension and Cardiovascular Disease (A.E.S.), North-West University, Potchefstroom, South Africa.
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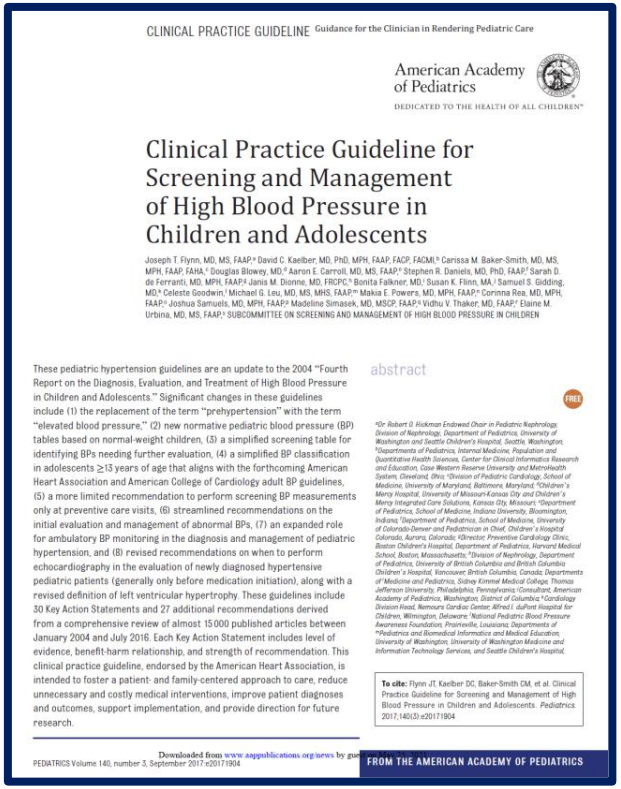
Unger T, Borghi C, Charchar F, Khan NA, Poulter NR, Prabhakaran D, Ramirez A, Schlaich M, Stergiou GS, Tomaszewski M, Wainford RD, Williams B, Schutte AE. 2020 International Society of Hypertension global hypertension practice guidelines. J Hypertens. 2020 Jun;38(6):982-1004.

Blood Pressure Assessment: Young Athlete

- **Diagnosis:**

TABLE 3 Updated Definitions of BP Categories and Stages

For Children Aged 1–13 y	For Children Aged ≥13 y
Normal BP: <90th percentile	Normal BP: <120/<80 mm Hg
Elevated BP: ≥90th percentile to <95th percentile or 120/80 mm Hg to <95th percentile (whichever is lower)	Elevated BP: 120/<80 to 129/<80 mm Hg
Stage 1 HTN: ≥95th percentile to <95th percentile + 12 mmHg or 130/80 to 139/89 mm Hg (whichever is lower)	Stage 1 HTN: 130/80 to 139/89 mm Hg
Stage 2 HTN: ≥95th percentile + 12 mm Hg, or ≥140/90 mm Hg (whichever is lower)	Stage 2 HTN: ≥140/90 mm Hg



CLINICAL PRACTICE GUIDELINE Guidance for the Clinician in Rendering Pediatric Care

American Academy of Pediatrics

DEDICATED TO THE HEALTH OF ALL CHILDREN™

Clinical Practice Guideline for Screening and Management of High Blood Pressure in Children and Adolescents

abstract

These pediatric hypertension guidelines are an update to the 2004 "Fourth Report on the Diagnosis, Evaluation, and Treatment of High Blood Pressure in Children and Adolescents." Significant changes in these guidelines include (1) the replacement of the term "prehypertension" with the term "elevated blood pressure," (2) new normative pediatric blood pressure (BP) tables based on normal-weight children, (3) a simplified screening table for identifying BPs needing further evaluation, (4) a simplified BP classification in adolescents ≥13 years of age that aligns with the forthcoming American Heart Association and American College of Cardiology adult BP guidelines, (5) a more limited recommendation to perform screening BP measurements only at preventive care visits, (6) streamlined recommendations on the initial evaluation and management of abnormal BPs, (7) an expanded role for ambulatory BP monitoring in the diagnosis and management of pediatric hypertension, and (8) revised recommendations on when to perform echocardiography in the evaluation of newly diagnosed hypertensive pediatric patients (generally only before medication initiation), along with a revised definition of left ventricular hypertrophy. These guidelines include 30 Key Action Statements and 27 additional recommendations derived from a comprehensive review of almost 15 000 published articles between January 2004 and July 2016. Each Key Action Statement includes level of evidence, benefit-harm relationship, and strength of recommendation. This clinical practice guideline, endorsed by the American Heart Association, is intended to foster a patient- and family-centered approach to care, reduce unnecessary and costly medical interventions, improve patient diagnoses and outcomes, support implementation, and provide direction for future research.

FREE

To cite: Flynn JT, Kaelber DC, Baker-Smith CM, et al. Clinical Practice Guideline for Screening and Management of High Blood Pressure in Children and Adolescents. *Pediatrics*. 2017;140(3):e20171904

FROM THE AMERICAN ACADEMY OF PEDIATRICS

Blood Pressure Assessment: Adult

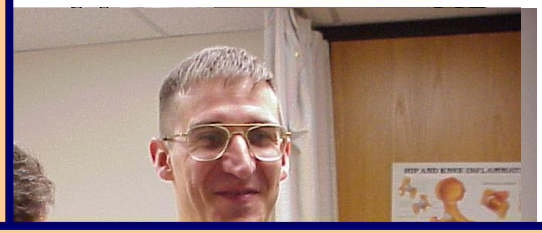
Other Risk Factors, HMOD, or Disease	High-Normal SBP 130–139 DBP 85–89	Grade 1 SBP 140–159 DBP 90–99	Grade 2 SBP ≥160 DBP ≥100
No other risk factors	Low	Low	Moderate / High
1 or 2 risk factors	Low	Moderate	High
≥3 risk factors	Low / Moderate	High	High
HMOD, CKD grade 3, diabetes mellitus, CVD	High	High	High

Unger T, Borghi C, Charchar F, Khan NA, Poulter NR, Prabhakaran D, Ramirez A, Schlaich M, Stergiou GS, Tomaszewski M, Wainford RD, Williams B, Schutte AE. 2020 International Society of Hypertension global hypertension practice guidelines. J Hypertens. 2020 Jun;38(6):982-1004.

mination - scultation

Normal:

- systolic ejection murmur
- begins after first heart sound
- ends before the second heart sound
- crescendo-decrescendo profile
- normal inspiratory S2 split
- normal dynamic assessment

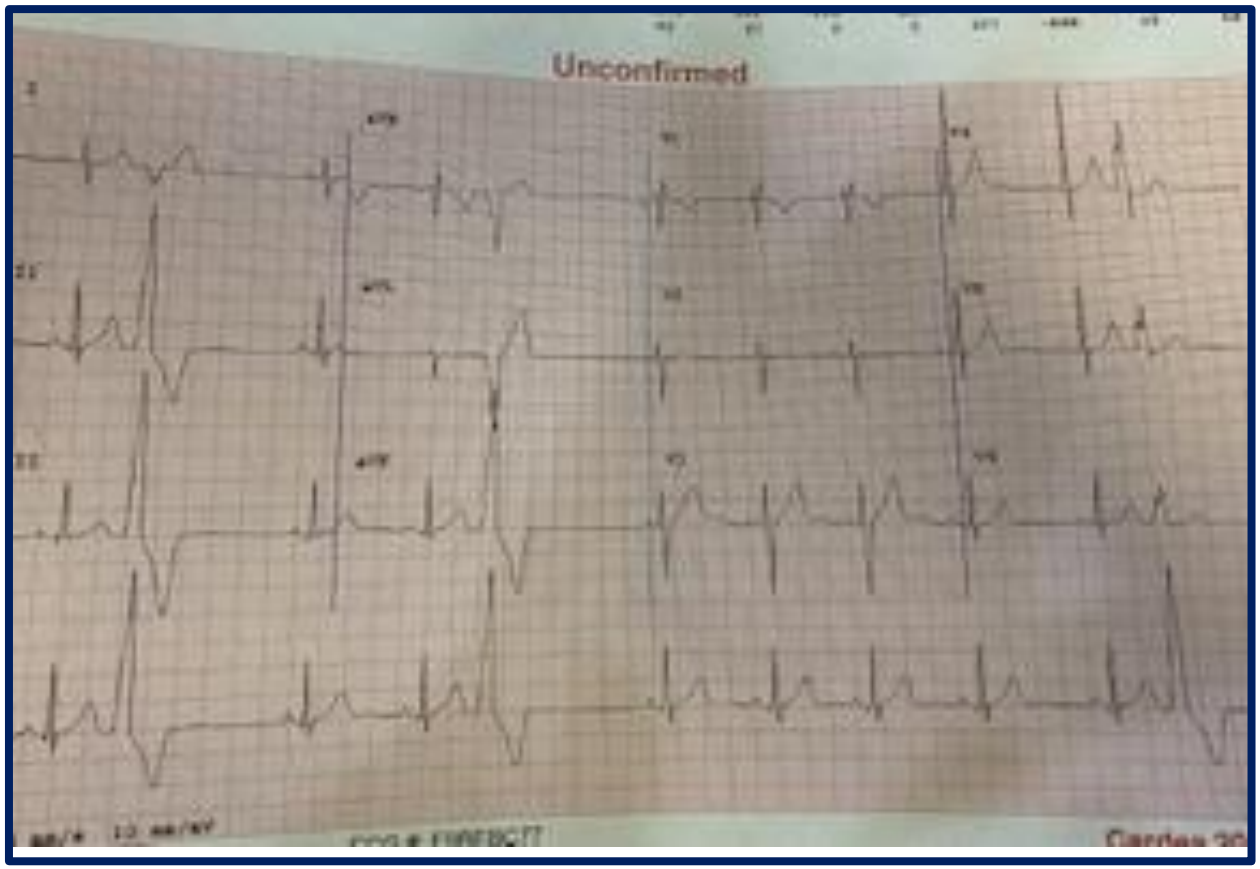


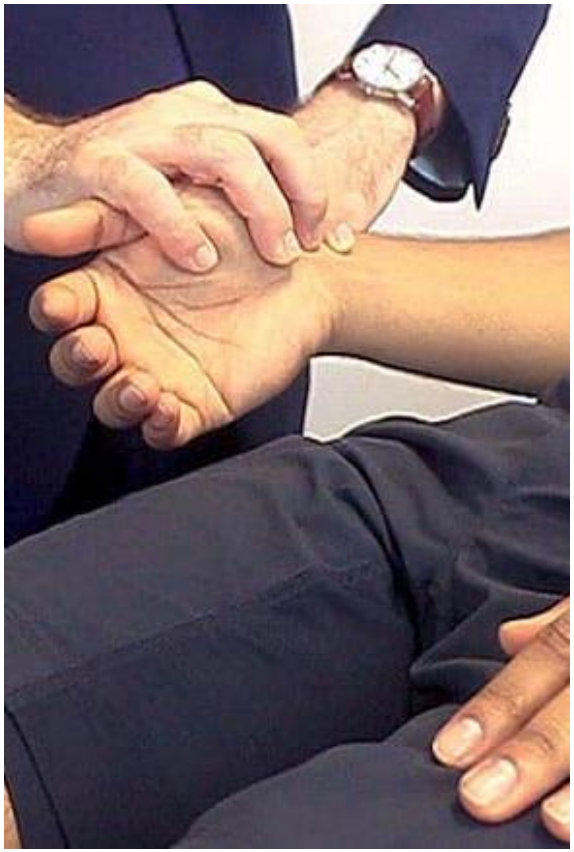
- Splitting
- Dynamic exam
- Pathologic vs N

Suspicious:

- diastolic, holosystolic, or continuous
- grade III or greater in intensity
- abnormal S2 splitting
- abnormal dynamic assessment

Don’t Forget to Check the Pulse!





PPE 5th Monograph

Table 6A-5. Significance of Abnormal Heart Murmurs

Auscultatory Finding	Significance
• Harsh, loud (usually ≥ grade 3), systolic ejection murmur • Loudest right upper sternal border • Increases with maneuvers that decrease venous return (ie, Valsalva, or moving from squatting to standing)	HCM-associated LV outflow tract obstruction
• Systolic ejection murmur heard best at right upper sternal border • Radiation to neck • Diminishes with maneuvers that decrease venous return • (ie, Valsalva) and increases with maneuvers that increase venous return (ie, squatting)	Aortic stenosis
• Holosystolic murmur heard best at the apex • Radiation to axilla	Mitral valve regurgitation and possible dilated cardiomyopathy or HCM
• Diastolic murmur heard at right upper sternal border • Murmur accentuated with hand grip (increased systemic vascular resistance)	Aortic valve insufficiency and possible Marfan syndrome or bicuspid aortic valve
• High-frequency diastolic murmur heard best at left upper sternal border	Pulmonary valve insufficiency from primary pulmonary hypertension (Graham Steele murmur)
• Soft early systolic murmur heard best at the upper sternal border while supine (increased venous return) • Murmur often absent or diminished when standing or sitting and with Valsalva maneuver	Physiological (hyperdynamic) flow murmur in a well-trained athlete

Abbreviations: HCM, hypertrophic cardiomyopathy; LV, left ventricular.

American Academy of Family Physicians, American Academy of Pediatrics, American College of Sports Me. Preparticipation Physical Evaluation, 4th ed, Bernhardt D, Roberts W (Eds), American Academy of Pediatrics, Elk Grove Village, IL 2010.

Screening for Marfan Syndrome
PPE 5th Monograph

Table 6A-2. Diagnostic Criteria for Marfan Syndrome

The diagnosis of Marfan syndrome relies on a set of defined clinical criteria (the 2010 Ghent nosology) developed to facilitate accurate recognition of the syndrome and improve patient treatment and counseling. The diagnostic criteria put more weight onto the cardiovascular manifestations of the disorder. Aortic root aneurysm and ectopia lentis (dislocated lenses) are now cardinal features.

- In the absence of any family history, the presence of these 2 features is sufficient for the unequivocal diagnosis of Marfan syndrome.
- In the absence of one of these 2 cardinal features, the presence of either an *FBN1* mutation or a positive systemic score is required.
- In some cases, genetic testing can be helpful.

Experts expect that while use of new diagnostic criteria makes a definitive diagnosis of Marfan syndrome take longer, it decreases the risk of a premature or missed diagnosis.

In the Absence of Family History	In the Presence of Family History
1. Aortic root dilatation *z* score ≥2 *and* ectopia lentis = Marfan syndrome. 2. Aortic root dilatation *z* score ≥2 *and* an *FBN1* mutation = Marfan syndrome. 3. Aortic root dilatation *z* score ≥2 *and* a systemic score ≥7 points = Marfan syndrome. 4. Ectopia lentis *and* an *FBN1* mutation associated with aortic root dilatation = Marfan syndrome.	1. Ectopia lentis *and* family history of Marfan syndrome (as defined to the left) = Marfan syndrome. 2. A systemic score ≥7 points *and* family history of Marfan syndrome (as defined to the left) = Marfan syndrome. 3. Aortic root dilatation z score ≥2 if patient age ≥20 y, or ≥3 if patient age <20 y, *and* family history of Marfan syndrome (as defined to the left) = Marfan syndrome.

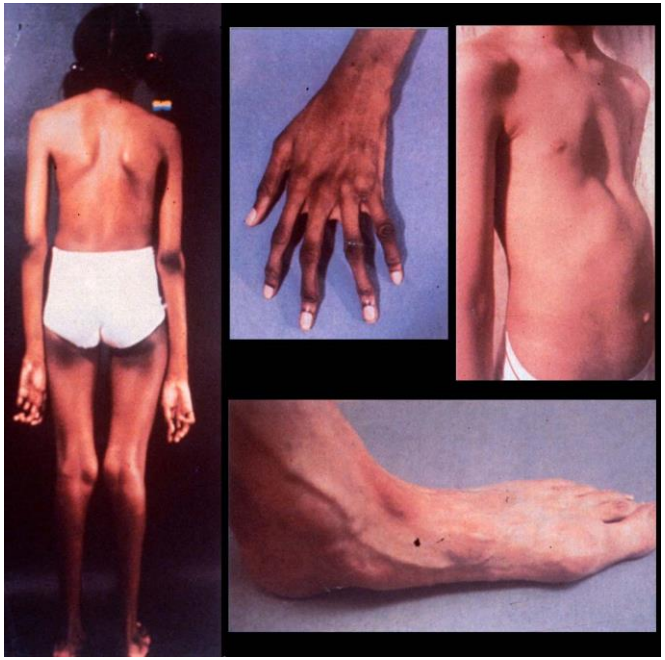
Table 6A-1. Systemic Score Suggestive of Marfan Syndrome

Feature	Score
Wrist AND thumb sign	+3
Wrist OR thumb sign	+1
Pectus Carinatum Deformity	+2
Pectus Excavatum or Chest Asymmetry	+1
Hindfoot Deformity	+2
Plain Flat Foot	+1
Spontaneous Pneumothorax	+2
Dural Ectasia	+2
Protucia Acetabulae	+2
Scoliosis or Thoracolumbar Kyphosis	+1
Reduced Elbow Extension	+1
3 of 5 Facial Features	+1
Skin Striae	+1
Severe Myopia	+1
Mitral Valve Prolapse	+1
Reduced Upper Segment / Lower Segment & Increased Arm Span to Height Ratio	+1

American Academy of Family Physicians, American Academy of Pediatrics, American College of Sports Me. Preparticipation Physical Evaluation, 5th ed, Bernhardt D, Roberts W (Eds), American Academy of Pediatrics, Elk Grove Village, IL 2010.

Screening for Marfan Syndrome

- www.marfan.org
  - **wrist sign** - thumb overlaps the distal phalanx of the fifth digit when grasping the contralateral wrist.
  - **thumb sign** - entire nail of the thumb projects beyond the ulnar border of the hand when the hand is clenched without assistance.
- www.MarfanDX.org



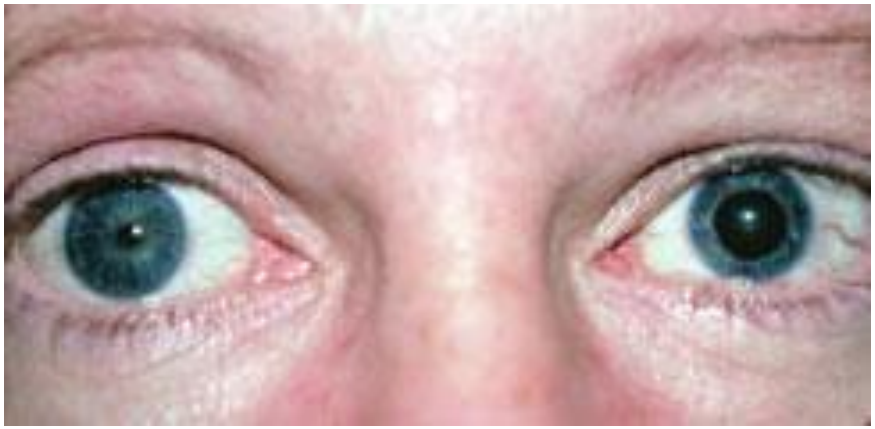
National Marfan Foundation

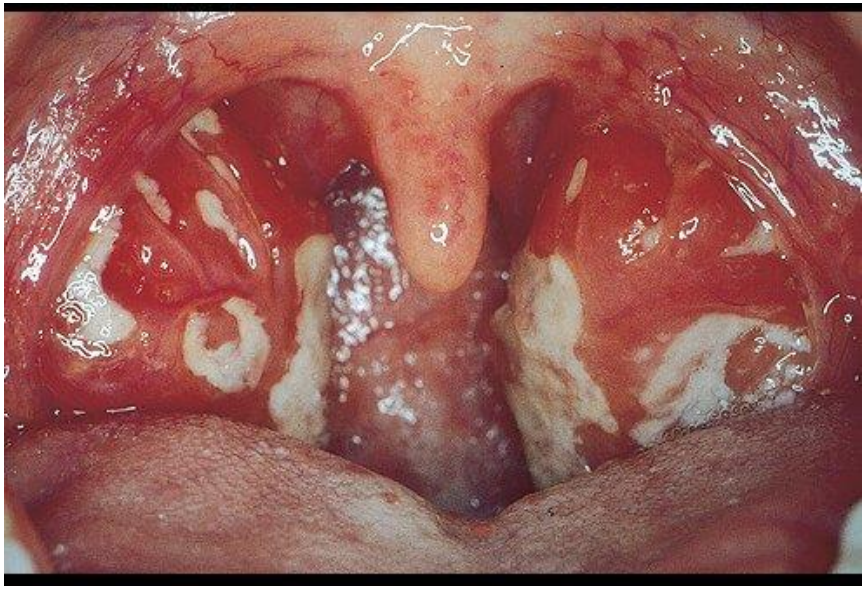
Not to be Forgotten!

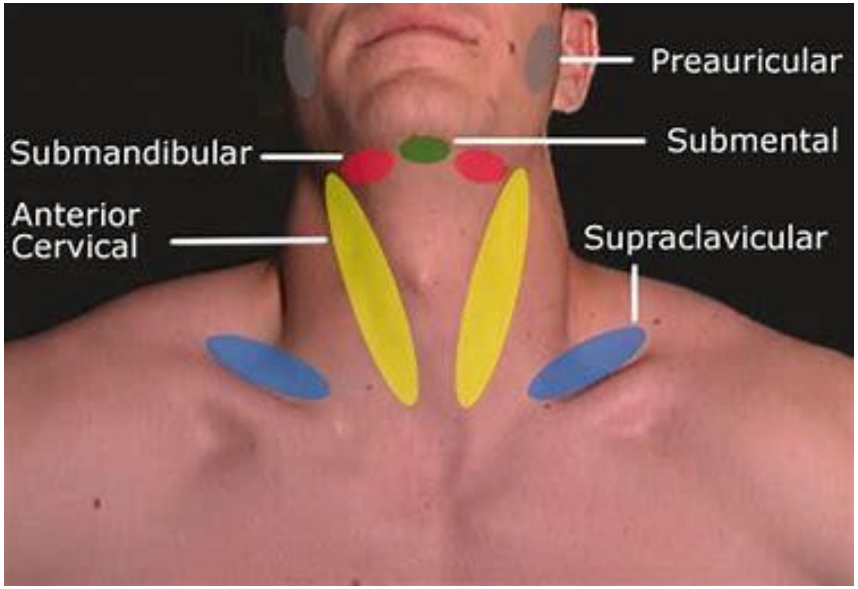
- Musculoskeletal Screening Examination
- Pulmonary Examination
- HEENT/Skin
- Abdomen/Genital Examination
- Functional Testing

HEENT

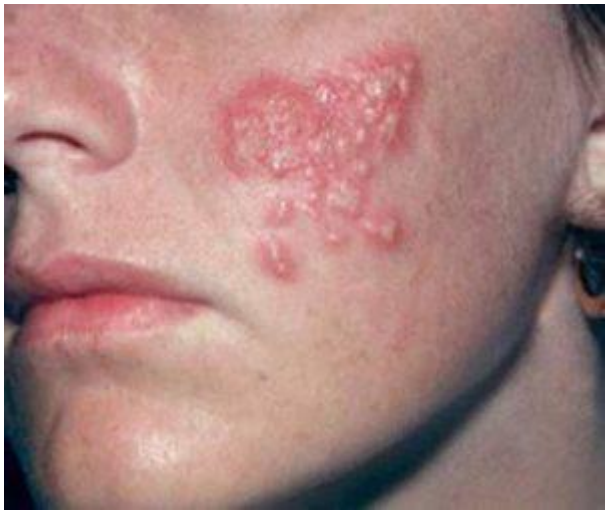

E
F P
T O Z

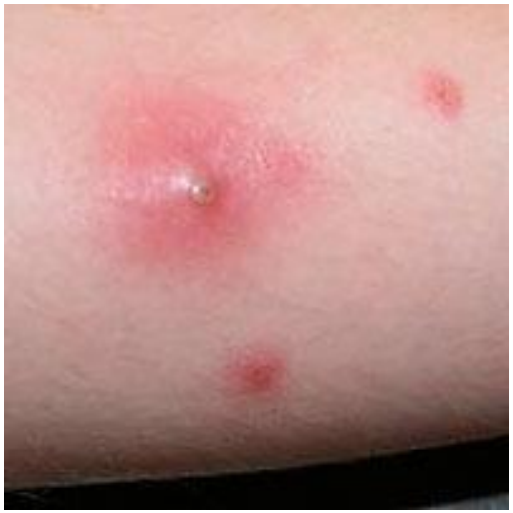


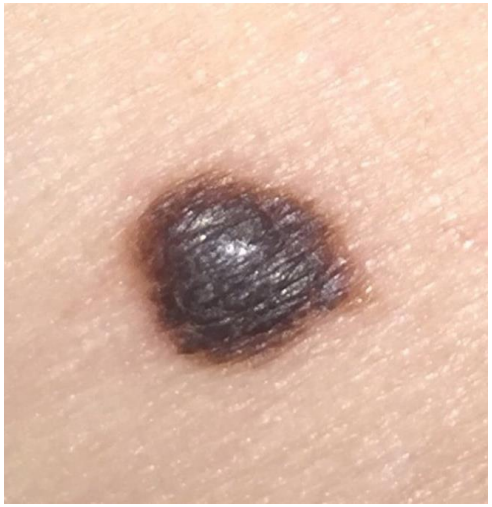


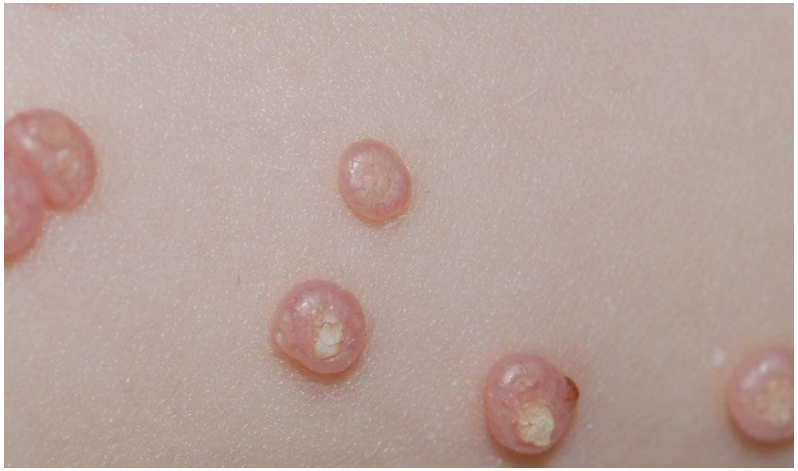

Preauricular
Submandibular
Submental
Anterior
Cervical
Supraclavicular

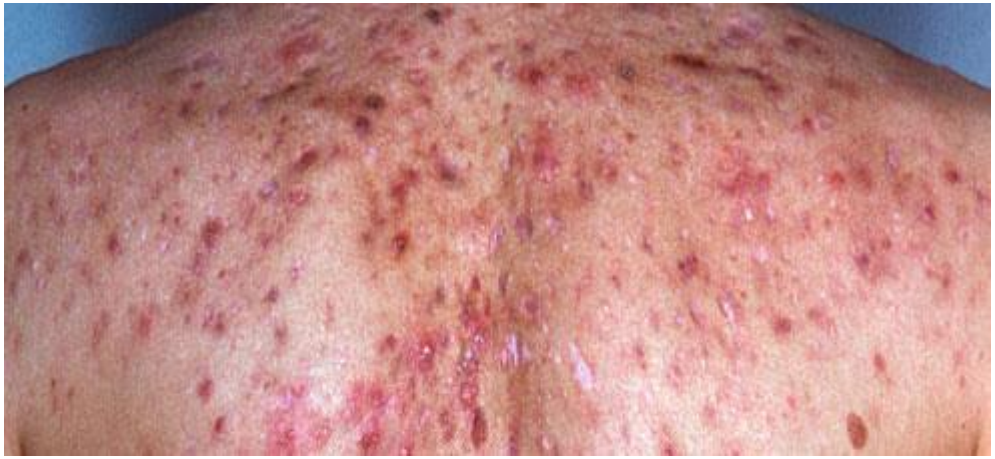
Skin





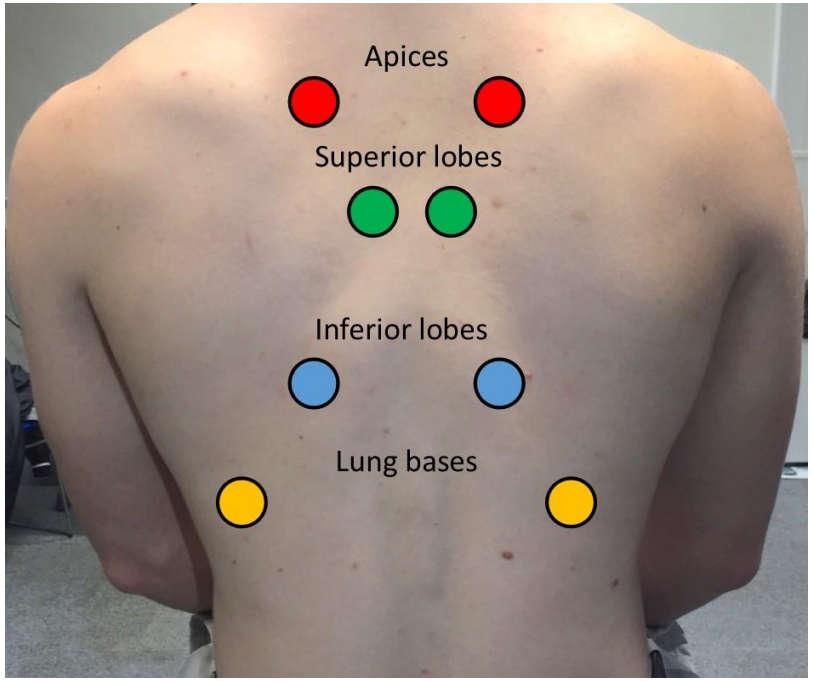


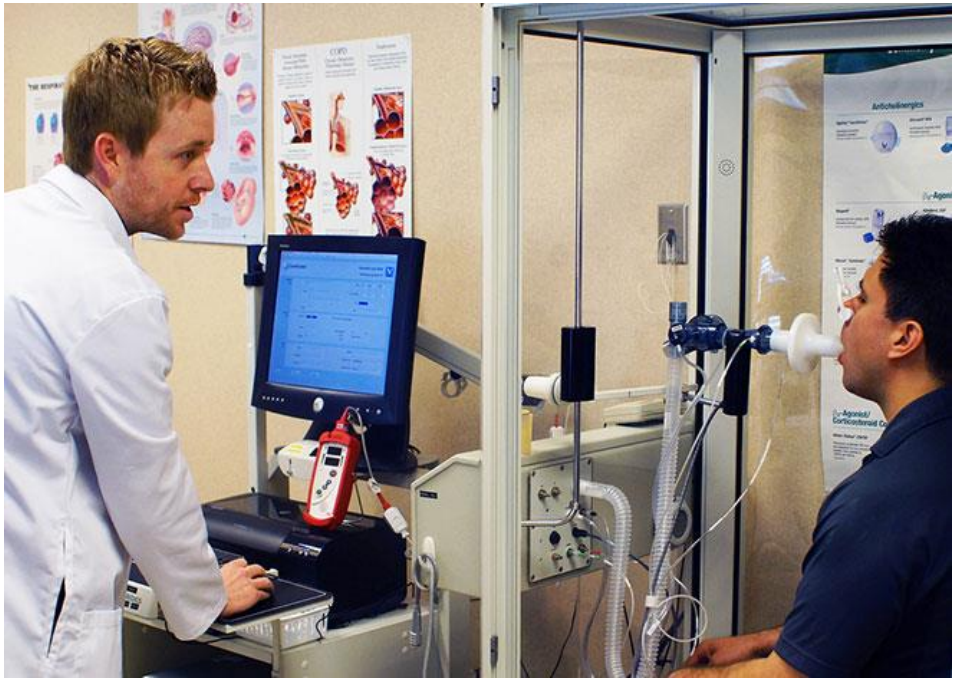




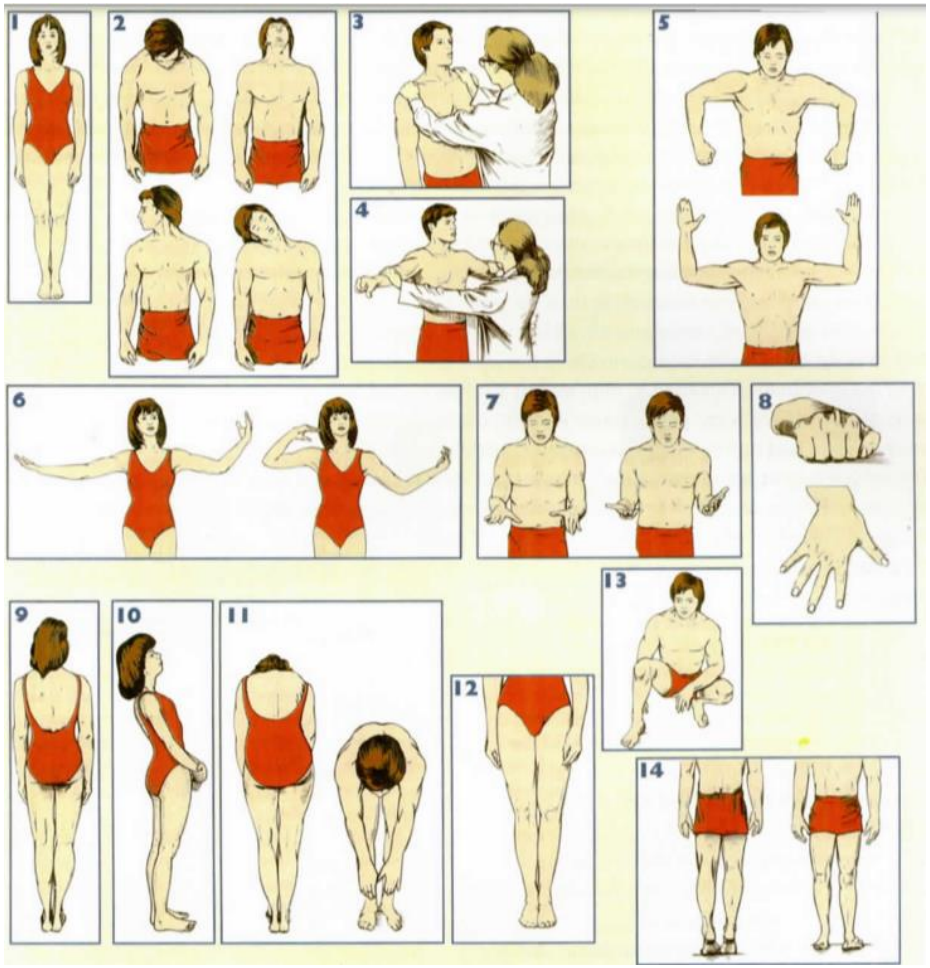
Abdominal/Genitourinary

Pulmonary Auscultation





Musculoskeletal Screening Examination



Screening for Musculoskeletal Laxity

Beighton Hypermobility Score

Maneuver	Image	Right side scoring	Left side scoring
Ability to passively dorsiflex the fifth metacarpophalangeal joint ≥ 90 degrees		___ / 1 point	___ / 1 point
Ability to oppose the thumb to the volar aspect of the ipsilateral forearm		___ / 1 point	___ / 1 point
Ability to hyperextend the elbow joint > 10 degrees		___ / 1 point	___ / 1 point
Ability to hyperextend the knee joint > 10 degrees		___ / 1 point	___ / 1 point
Ability to place hands flat on the floor by bending forward with knees fully extended		___ / 1 point	
		Total	___ / 9 points

Note: The Beighton score is the summed total of the scores from each extremity and bending forward.

Criteria for generalized joint hypermobility*

1. Beighton score ≥ 6 in prepubertal children and adolescents
2. Beighton score ≥ 5 from puberty up to 50 years of age
3. Beighton score ≥ 4 in persons older than 50 years

Add one point if five-point questionnaire is positive (i.e., two or more yes answers)

Five-point questionnaire†

Five-point questionnaire is positive if patient answers yes to two or more questions

1. Can you now (or could you ever) place your hands flat on the floor without bending your knees?
2. Can you now (or could you ever) bend your thumb to touch your forearm?
3. As a child, did you amuse your friends by contorting your body into strange shapes or could you do the splits?
4. As a child or teenager, did your shoulder or kneecap dislocate on more than one occasion?
5. Do you consider yourself double-jointed?

Yew KS, Kamps-Schmitt KA, Borge R. Hypermobile Ehlers-Danlos Syndrome and Hypermobility Spectrum Disorders. Am Fam Physician. 2021 Apr 15;103(8):481-492.

Functional Testing

The Functional Movement Screen

1. Squatting

2. Stepping

3. Lunging

4. Reaching

5. Leg Raising

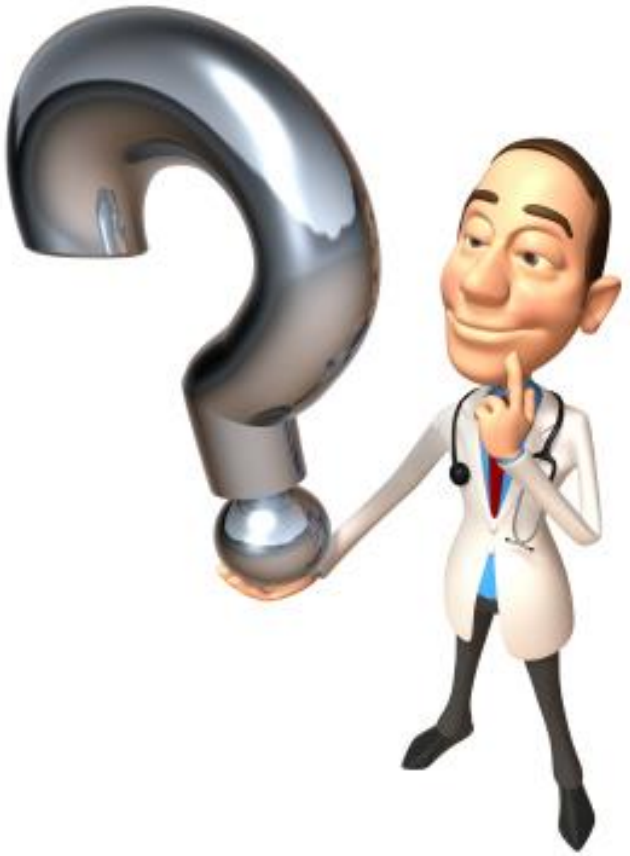
6. Push-up

7. Rotary Stability

FUNCTIONAL MOVEMENT SYSTEMS FMS FUNCTIONALMOVEMENT.COM

The Role of Special Tests

- **Jason asks about a number of special tests that he has heard might be valuable in athletes:**
  - **CBC and UA**
  - **Electrocardiogram and Echocardiography**
  - **Sickle Cell Screening**
  - **Neurocognitive Testing**



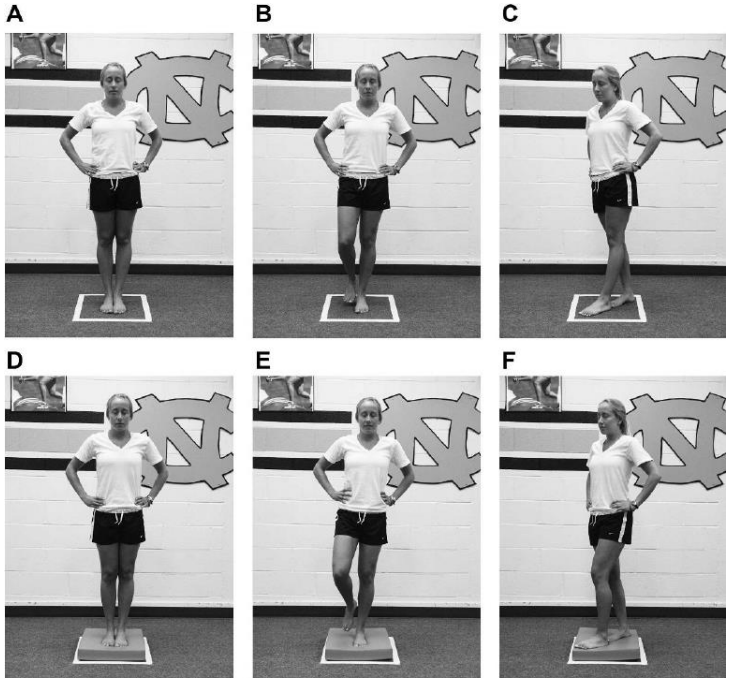
Routine Blood Tests and UA

- Routine laboratory testing is not recommended as part of the preparticipation physical evaluation (PPE) in the absence of symptoms.

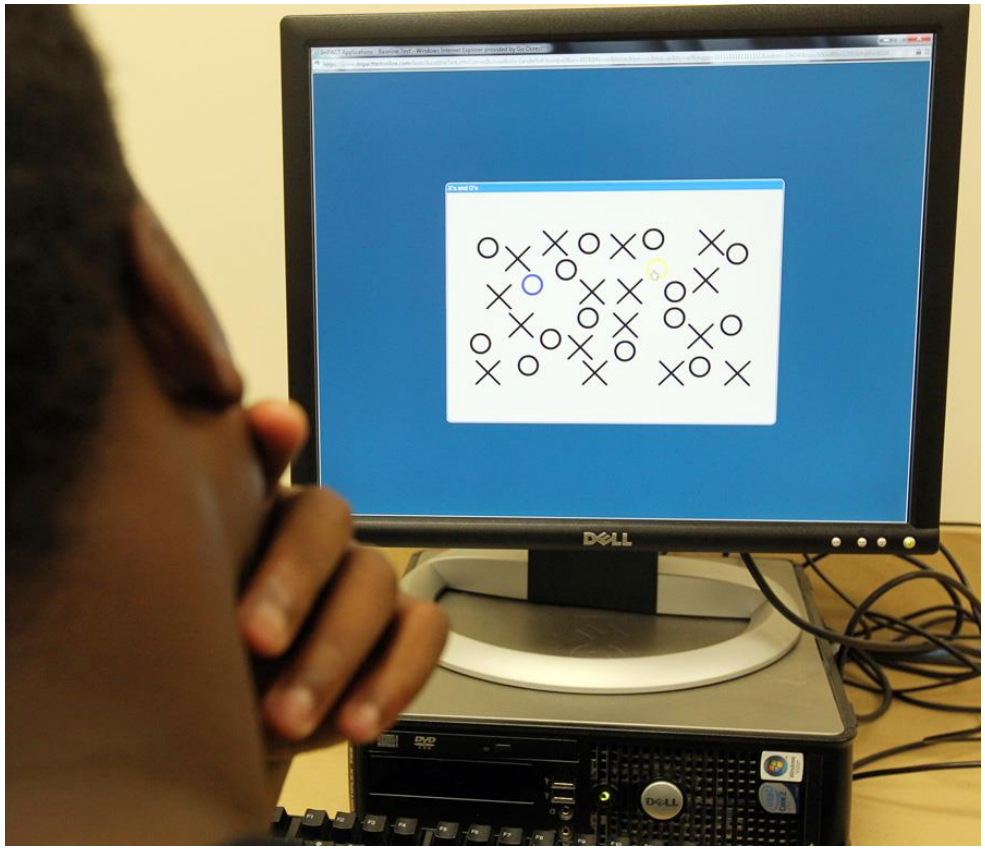
American Academy of Family Physicians, American Academy of Pediatrics, American College of Sports Me. Preparticipation Physical Evaluation, 4th ed, Bernhardt D, Roberts W (Eds), American Academy of Pediatrics, Elk Grove Village, IL 2010.

Baseline Concussion Testing

- A **one-time, pre-participation baseline concussion assessment** for all varsity student-athletes should include, but not necessarily be limited to:
  - A brain injury/concussion history.
  - Symptom evaluation.
  - **Cognitive assessment**.
  - **Balance evaluation**.
  - The team physician should determine pre-participation clearance and/or the need for additional consultation or testing.



Neurocognitive Testing



BJSM Online First, published on April 26, 2017 as 10.1136/bjsports-2017-097506SCAT5
To download a clean version of the SCAT tools please visit the journal online (http://dx.doi.org/10.1136/bjsports-2017-097506SCAT5)

SCAT5© SPORT CONCUSSION ASSESSMENT TOOL – 5TH EDITION
DEVELOPED BY THE CONCUSSION IN SPORT GROUP
FOR USE BY MEDICAL PROFESSIONALS ONLY

supported by

Patient details

Name: _____
DOB: _____
Address: _____
ID number: _____
Examiner: _____
Date of Injury: _____ Time: _____

WHAT IS THE SCAT5?

The SCAT5 is a standardized tool for evaluating concussions designed for use by physicians and licensed healthcare professionals[1]. The SCAT5 cannot be performed correctly in less than 10 minutes.

If you are not a physician or licensed healthcare professional, please use the Concussion Recognition Tool 5 (CRT5). The SCAT5 is to be used for evaluating athletes aged 13 years and older. For children aged 12 years or younger, please use the Child SCAT5.

Preseason SCAT5 baseline testing can be useful for interpreting post-injury test scores, but is not required for that purpose.Detailed instructions for use of the SCAT5 are provided on page 7. Please read through these instructions carefully before testing the athlete. Brief verbal instructions for each test are given in italics. The only equipment required for the tester is a watch or timer.

Recognise and Remove

A head impact by either a direct blow or indirect transmission of force can be associated with a serious and potentially fatal brain injury. If there are significant concerns, including any of the red flags listed in Box 1, then activation of emergency procedures and urgent transport to the nearest hospital should be arranged.

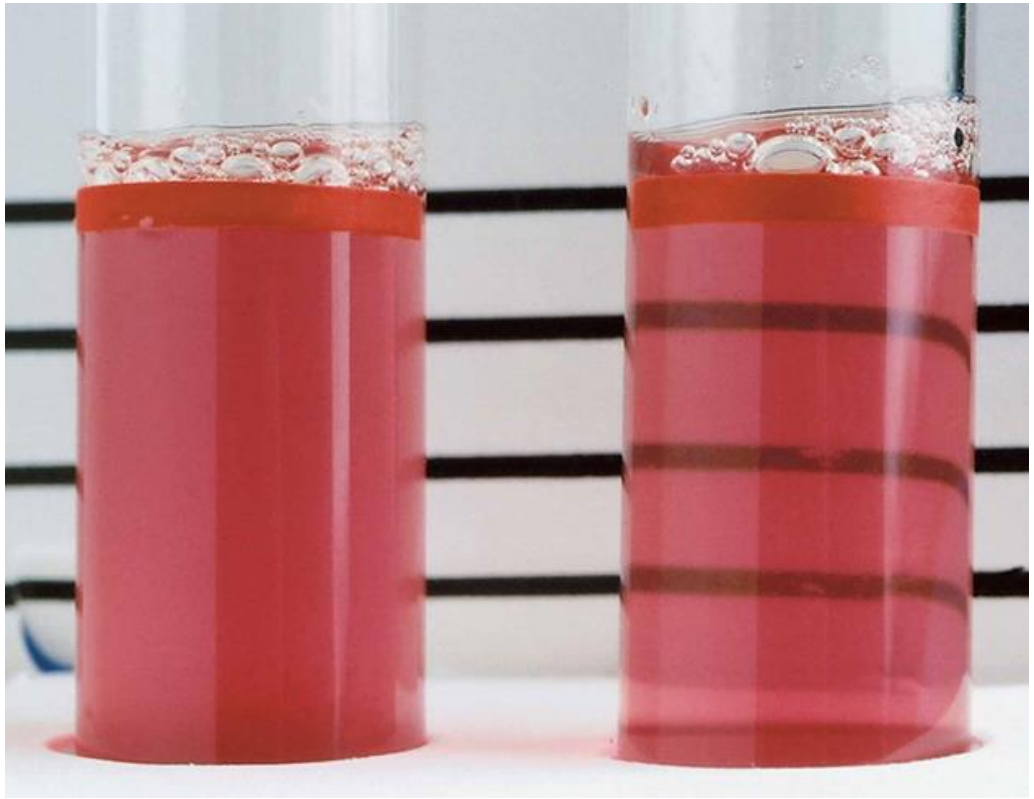
Key points

- Any athlete with suspected concussion should be REMOVED FROM PLAY, medically assessed and monitored for deterioration. No athlete diagnosed with concussion should be returned to play on the day of injury.
- If an athlete is suspected of having a concussion and medical personnel are not immediately available, the athlete should be referred to a medical facility for urgent assessment.
- Athletes with suspected concussion should not drink alcohol, use recreational drugs and should not drive a motor vehicle until cleared to do so by a medical professional.
- Concussion signs and symptoms evolve over time and it is important to consider repeat evaluation in the assessment of concussion.
- The diagnosis of a concussion is a clinical judgment, made by a medical professional. The SCAT5 should NOT be used by itself to make, or exclude, the diagnosis of concussion. An athlete may have a concussion even if their SCAT5 is "normal".

Remember:

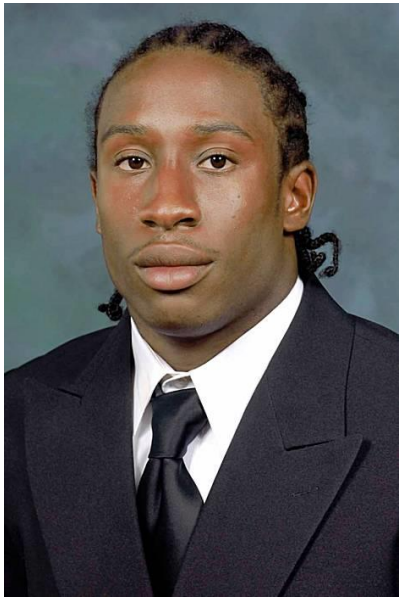
- The basic principles of first aid (danger, response, airway, breathing, circulation) should be followed.
- Do not attempt to move the athlete (other than that required for airway management) unless trained to do so.
- Assessment for a spinal cord injury is a critical part of the initial on-field assessment.
- Do not remove a helmet or any other equipment unless trained to do so safely.

Sickle Cell Screening



Primary Prevention

- The National Collegiate Athletic Association (NCAA) adopted a policy requiring Division I institutions to perform sickle cell trait testing for all incoming student athletes.
- Policy was partly in response to legal settlement with Dale Lloyd Case.



Advanced Cardiac Screening

NCAA Guidance 2016

Consensus statement and guidelines: Interassociation consensus statement on cardiovascular care of college student-athletes

Brian Hainline,[1] Jonathan Drezner,[2] Aaron Baggish,[3] Kimberly G Harmon,[2] Michael S Emery,[4] Robert J Myerburg,[5] Eduardo Sanchez,[6] Silvana Molossi,[7] John T Parsons,[1] Paul D Thompson[8]

► Additional material is published online only. To view

ABSTRACT
Cardiovascular evaluation and care of college student-

F. to educate student-athletes regarding health risks, health-related behaviour, and pertin-

Pediatrics, Baylor College of Medicine, Houston, Texas, USA
[8]Division of Cardiology, Hartford Hospital, Hartford, Connecticut, USA

Correspondence to
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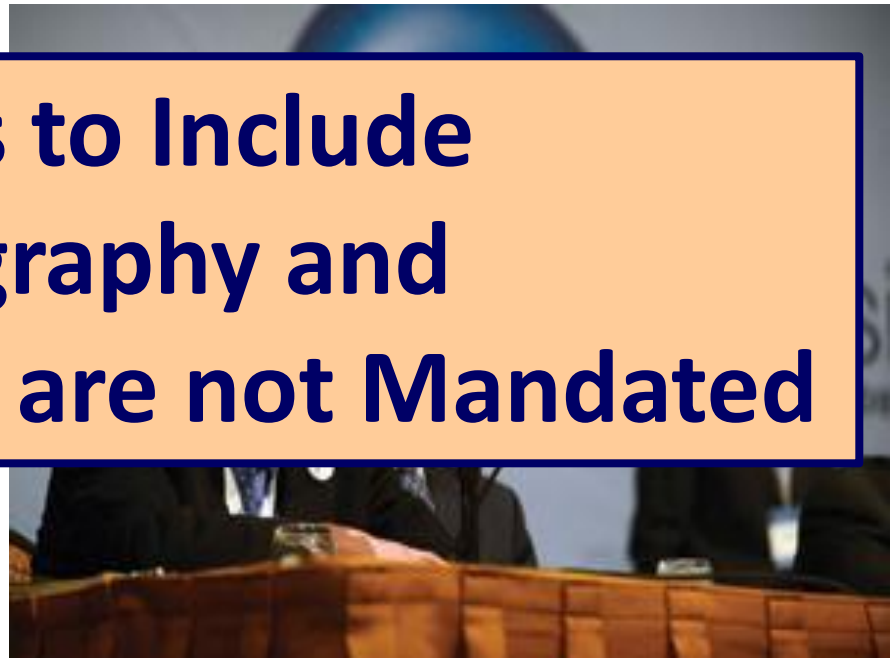
STUDENT-ATHLETES

The preparticipation evaluation

1. The purpose of the preparticipation evaluation is to identify conditions that may put the student-athlete at unreasonable risk of death or catastrophic injury, with the potential to modify and reduce risk through individualised management. In addition, the preparticipation evaluation provides the following opportunities:
   - A. to ensure that current health problems are managed appropriately;
   - B. to identify conditions that serve as barriers to performance;
   - C. to allow the student-athlete an opportunity to establish a relationship with the team physician, athletic trainer and other members of the medical team who may be involved in providing continuing medical care;
   - D. to assess for characteristics that may place the student-athlete at risk for future injury or disease;
   - E. to review medications and/or supplements, including addressing possible requests for therapeutic use exemption; and

cian) and one clinician provider at the athletic trainer level (most likely the head athletic trainer) who will be charged with the responsibility for ensuring that the preparticipation cardiac screening is conducted with the necessary components, as documented in the following text. Medical records of the examination should be kept in an accessible, secure file for at least the duration of the student-athlete's college career, and should accompany the athlete during any school transfers.

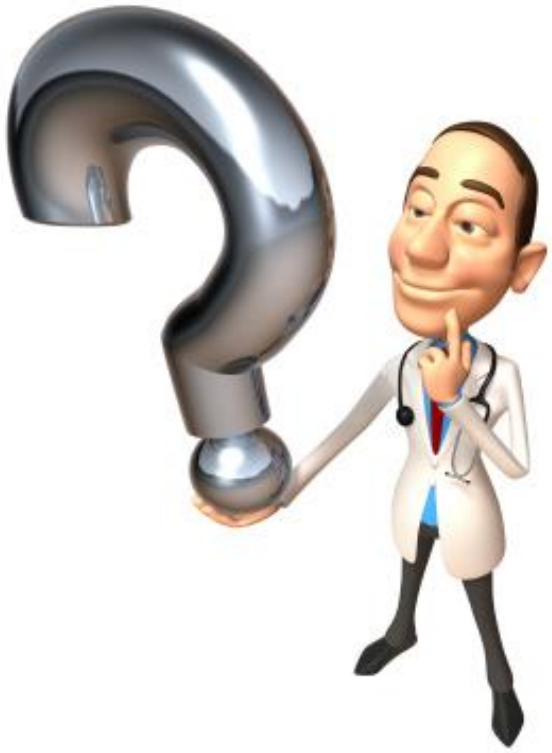
4. As afforded by local resources, cardiac screening on campus is encouraged in an effort to maintain a consistent and high-quality level of care.
   - A. For member institutions that choose to rely on external care providers to provide preparticipation evaluations, an on-campus mechanism should be established to confirm that the preparticipation evaluations are thoroughly reviewed. The goal of the review is to ensure follow-up and completion of any potential abnormal finding (either confirmed or dismissed) prior to organised athletic participation.



Special Tests to Include Echocardiography and Electrocardiography are not Mandated

Final Assessment

- **You've completed the PPE on John, and it's time for the final assessment.**
- **Jason noted his BP was slightly high; how do you proceed with final clearance?**
- **He is also found to be SCT positive; can he play?**



Athletic Clearance Decision

PREPARTICIPATION PHYSICAL EVALUATION 159

PHYSICAL EXAMINATION FORM

Name _____ Date of birth _____

PHYSICIAN REMINDERS

1. Consider additional questions on more sensitive issues:
   - Do you feel stressed out or under a lot of pressure?
   - Do you ever feel sad, hopeless, depressed, or anxious?
   - Do you feel safe at your home or residence?
   - Have you ever tried cigarettes, chewing tobacco, snuff, or dip?
   - During the past 30 days, did you use chewing tobacco, snuff, or dip?
   - Do you drink alcohol or use any other drugs?

2. Consider additional questions on more sensitive issues:
   - Do you feel stressed out or under a lot of pressure?
   - Do you ever feel sad, hopeless, depressed, or anxious?
   - Do you feel safe at your home or residence?
   - Have you ever tried cigarettes, chewing tobacco, snuff, or dip?
   - During the past 30 days, did you use chewing tobacco, snuff, or dip?
   - Do you drink alcohol or use any other drugs?

I certify that the above student has been medically evaluated for participation in athletics and deemed:

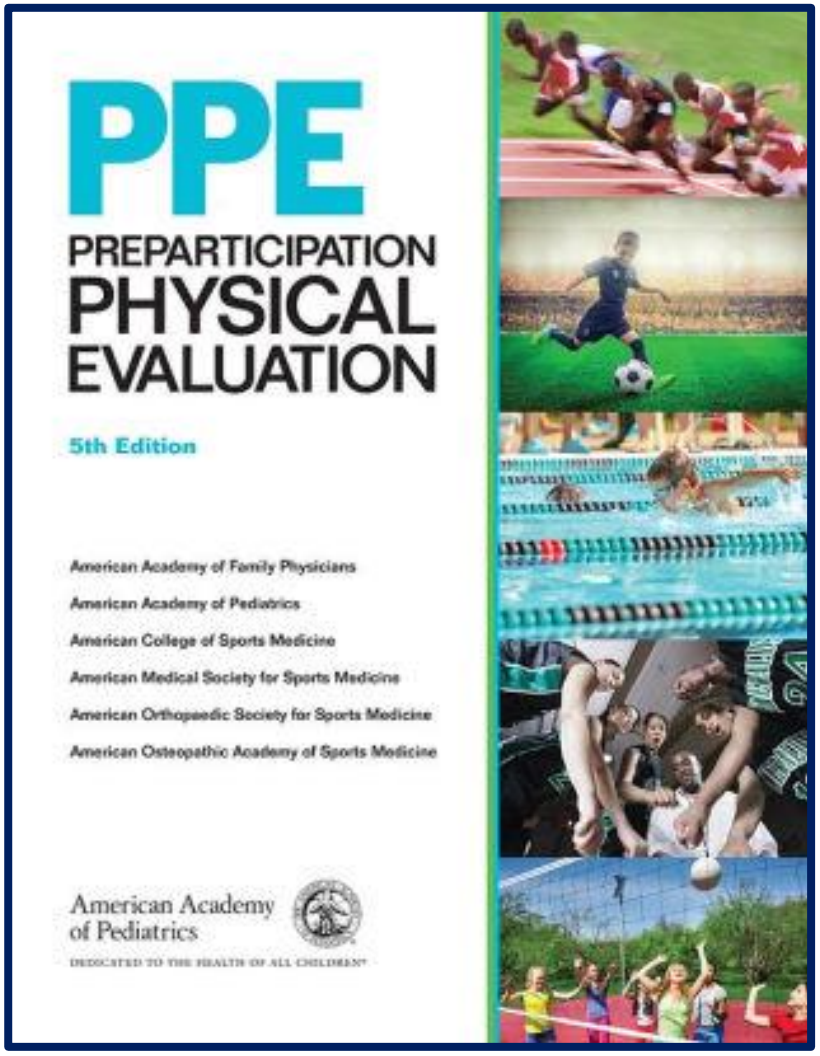
1. ☐ CLEARED WITHOUT RESTRICTIONS
2. ☐ Cleared for LIMITED PARTICIPATION
   - ☐ Not cleared for (specific sports) _____
   - ☐ Cleared only for (specific sports) _____
3. Requires further evaluation before a final recommendation
4. Not cleared for participation
   - ☐ Reasons: _____
5. Other recommendations: _____

Name of physician (printed/typed): _____ Date of Examination: _____

Signature of physician: _____

I certify that the above student has been medically evaluated for participation in athletics and deemed:
1. ☐ CLEARED WITHOUT RESTRICTIONS
2. ☐ Cleared for LIMITED PARTICIPATION
☐ Not cleared for (specific sports)
☐ Cleared only for (specific sports)
3. Requires further evaluation before a final recommendation
4. Not cleared for participation
☐ Reasons:
5. Other recommendations:
Name of physician (printed/typed): Date of Examination:
Signature of physician:

Resource Documents



AHA/ACC Scientific Statement

Eligibility and Disqualification Recommendations for Competitive Athletes With Cardiovascular Abnormalities: Task Force 2: Preparticipation Screening for Cardiovascular Disease in Competitive Athletes

A Scientific Statement From the American Heart Association and American College of Cardiology

Barry J. Maron, MD, FACC, Chair; Benjamin D. Levine, MD, FAHA, FACC; Reginald L. Washington, MD, FAHA; Aaron L. Baggish, MD, FACC; Richard J. Kovacs, MD, FAHA, FACC; Martin S. Maron, MD, FACC; on behalf of the American Heart Association Electrocardiography and Arrhythmias Committee of the Council on Clinical Cardiology, Council on Cardiovascular Disease in the Young, Council on Cardiovascular and Stroke Nursing, Council on Functional Genomics and Translational Biology, and the American College of Cardiology

The central purpose of preparticipation screening of trained competitive athletes is to identify or raise suspicion of those cardiovascular abnormalities and diseases that are potentially responsible for sudden unexpected death on the athletic field.[1–14] When such athletes are recognized, they are exposed to eligibility and disqualification decisions that become the responsibility of the practicing physician[4,15–17] and are a subject of this document. There is general (although not universal)[12] agreement with the principle that screening to detect important diseases and potentially prevent sudden death is justified and potentially beneficial.[1–3,5–9,18]

There are many pathways and strategies by which competitive athletes with cardiovascular disease may be recognized: (1) comprehensive evaluation by a primary care physician; (2) systematic screening of families with known genetic diseases after diagnosis in a relative; (3) incidental and fortuitous findings on clinical examination or imaging, detected during evaluation for another medical problem; (4) systematic screening of large populations, such as high school and college-aged athletes, for the purpose of determining eligibility for competitive sports, with or without diagnostic testing; and (5) symptoms associated or unassociated with sports. It is likely that a large number (or even most) athletes with cardiovascular disease come to clinical attention based on the circumstances described in items 1 through 3, rather than with formal preparticipation screening.

General Considerations

Currently, broad-based cardiovascular screening is practiced systematically in athletes at all levels of performance (not confined to the elite) in only 3 countries: in the United States, with personal/family history and physical examination (but without

The American Heart Association and the American College of Cardiology make every effort to avoid any actual or potential conflicts of interest that may arise as a result of an outside relationship or a personal, professional, or business interest of a member of the writing panel. Specifically, all members of the writing group are required to complete and submit a Disclosure Questionnaire showing all such relationships that might be perceived as real or potential conflicts of interest.

The Preamble and other Task Force reports for these proceedings are available online at http://circ.ahajournals.org (*Circulation*. 2015;132:e256–e261; e262–e266; e273–e280; e281–e291; e292–e297; e298–e302; e303–e309; e310–e314; e315–e325; e326–e329; e330–e333; e334–e338; e339–e342; e343–e345; and e346–e349).

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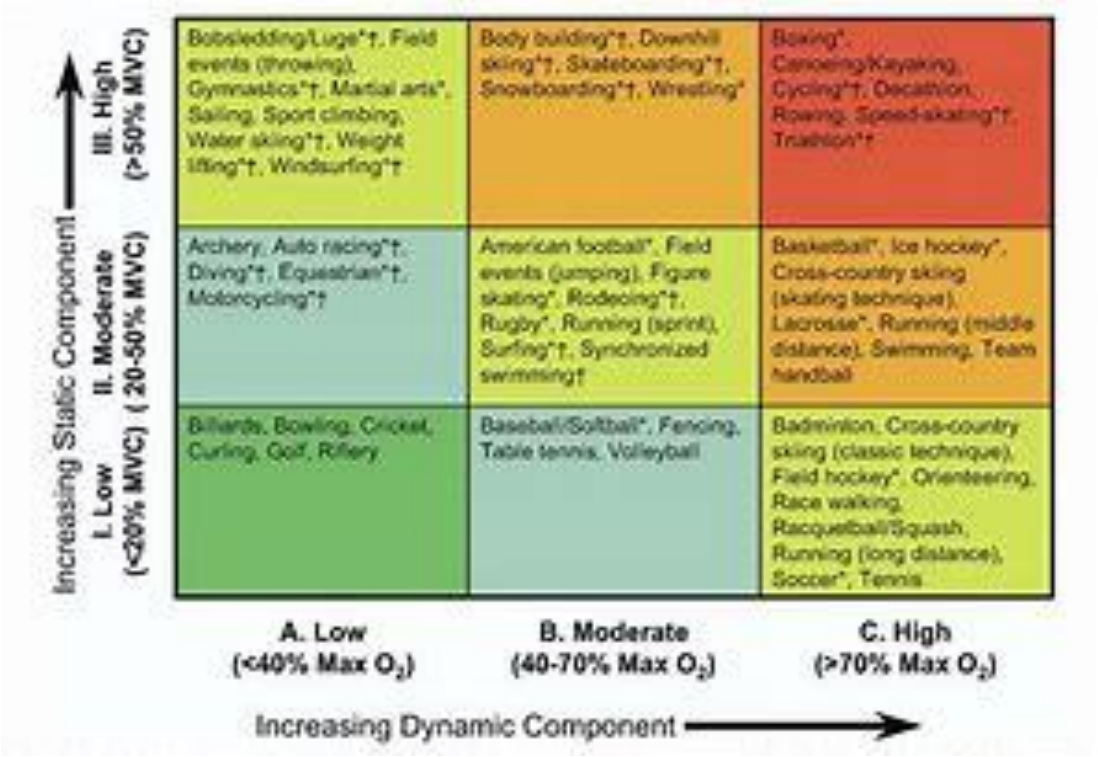
Sports Classification



Zips DP, Link MS, Ackerman MJ, Kovacs RJ, Myerburg RJ, Estes NA 3rd. Eligibility and Disqualification Recommendations for Competitive Athletes With Cardiovascular Abnormalities: Task Force 9: Arrhythmias and Conduction Defects: A Scientific Statement From the American Heart Association and American College of Cardiology. J Am Coll Cardiol. 2015 Dec 1;66(21):2412-23.

Contraindicated Sports

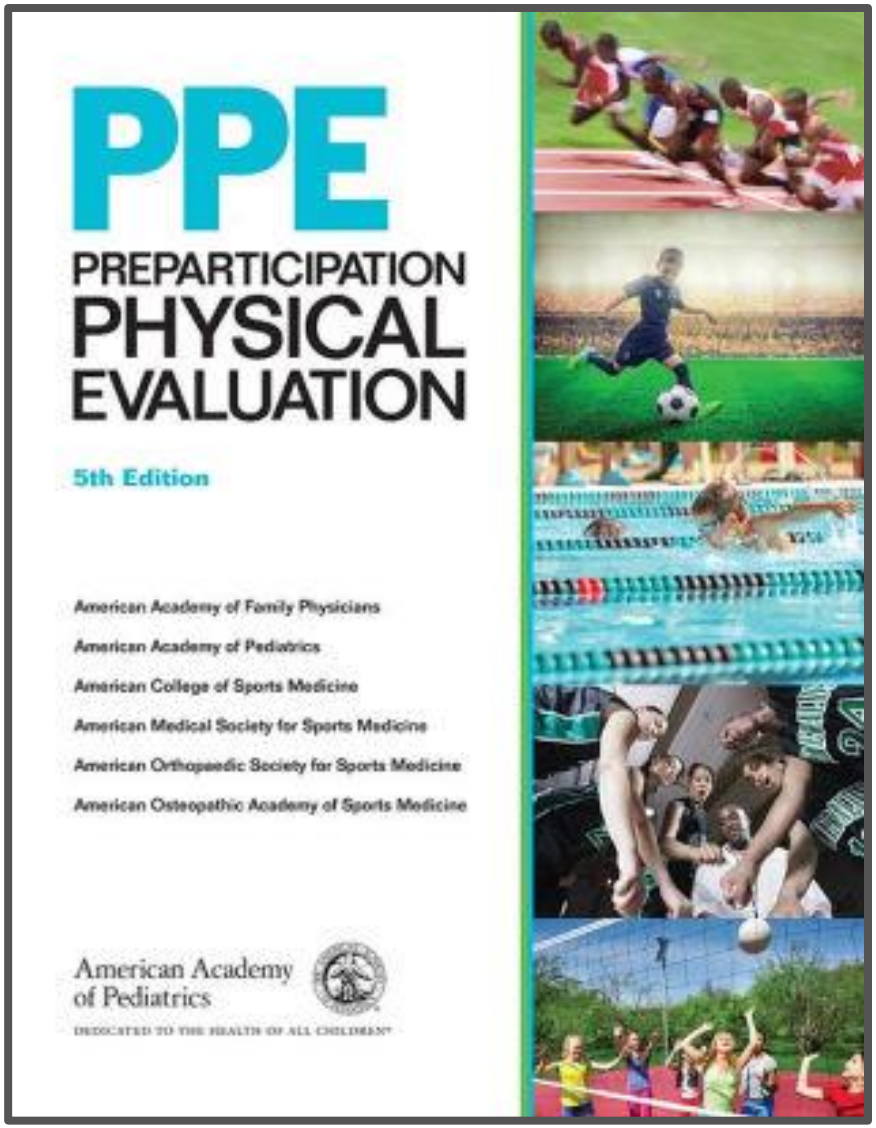


Table 1. Contraindications for Sports Participation

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)
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)

Adapted with permission from Kurowski K, Chandran S. The preparticipation athletic evaluation. Am Fam Physician. *2000;61(9):2688.*

Prudent Recommendations

- **Task Force 9 Arrhythmias**

Recommendations

1. Athletes with exercise-induced syncope should be restricted from all competitive athletics until evaluated by a qualified medical professional *(Class I; Level of Evidence B)*.
2. Athletes with syncope should be evaluated with a history, physical examination, ECG, and selective use of other diagnostic tests when there is suspicion of structural heart disease or primary electrical abnormalities that may predispose to recurrent syncope or sudden death *(Class I; Level of Evidence C)*.
3. Athletes with syncope caused by structural heart disease or primary electrical disorders should be restricted from athletic activities according to the recommendations for their specific underlying cardiovascular condition *(Class I; Level of Evidence C)*.
4. Athletes with neurally mediated syncope can resume all athletic activities once measures are demonstrated to prevent recurrent syncope *(Class I; Level of Evidence C)*.

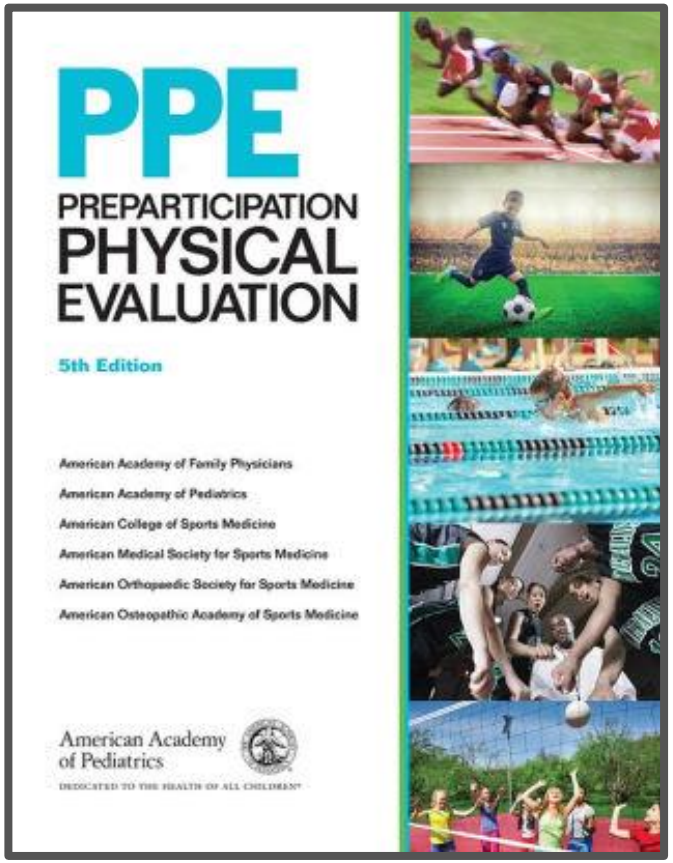
Zips DP, Link MS, Ackerman MJ, Kovacs RJ, Myerburg RJ, Estes NA 3rd. Eligibility and Disqualification Recommendations for Competitive Athletes With Cardiovascular Abnormalities: Task Force 9: Arrhythmias and Conduction Defects: A Scientific Statement From the American Heart Association and American College of Cardiology. J Am Coll Cardiol. 2015 Dec 1;66(21):2412-23.

Hypertension in the Athlete

- Hypertension is the **most common** cardiovascular disorder detected during PPE screening.
- BP readings are altered by various factors that influence the patient, the techniques used and the accuracy of the sphygmomanometer.
- Clinical Observations:
  - Blood pressure during the PPE process is often completed by someone who does not regularly perform BPs.
  - False positive blood pressure readings are not uncommon.

Implications for the Family Physician

- **Treatment/Clearance**:
  - Similar to adults, any child athlete with **Stage 2 hypertension** should be restricted from participation until adequate control is obtained.
  - Children with identified **target organ disease** should have participation recommendations based upon the nature of their target organ disease.

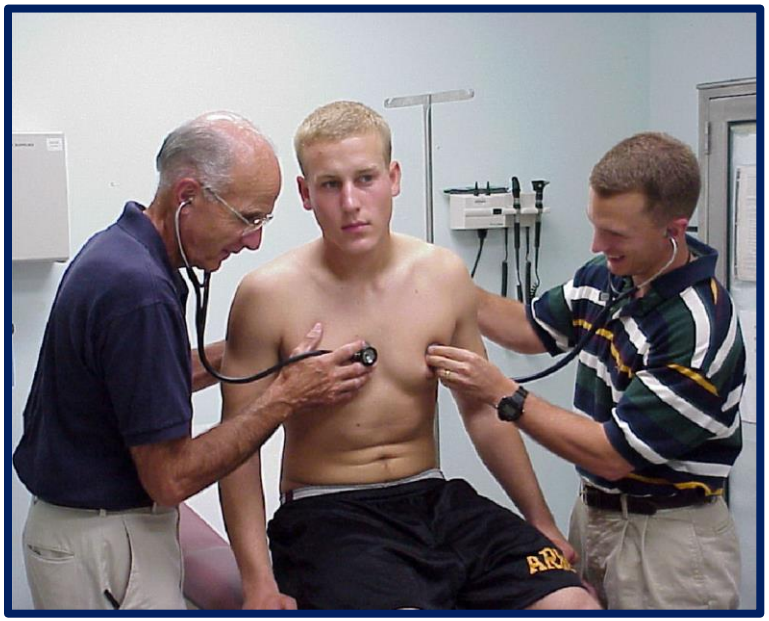


SCT Guidance from ASH

- **Q: Can an individual with sickle cell trait participate in athletics/exercise?**
  - **A:** *Sickle cell trait should not be an impediment for participation in athletics or physical exercise. Maintaining good hydration and understanding how to avoid injuries can make exercise safer for ALL individuals, including those with sickle cell trait.*

Conclusion

- The Preparticipation Examination (PPE) **has yet to be validated** as decreasing morbidity and mortality.
- At present, however, **the standard of care** in the United States is a carefully performed **history and physical** examination.
- The conscientious examination requires a trained provider, an appropriate setting, and **sincere communication**.



Core Recommendations: American Family Physician Article

SORT: KEY RECOMMENDATIONS FOR PRACTICE

Clinical recommendation	*Evidence rating*	*References*
Preparticipation physical evaluations should occur approximately six weeks before activity to allow for further evaluation, treatment, or rehabilitation as needed.	C	4
All persons undergoing preparticipation physical evaluations should be questioned about exertional symptoms, the presence of a heart murmur, symptoms of Marfan syndrome, and family history of premature serious cardiac conditions or sudden death.	C	13, 16
Athletes with sustained systolic blood pressure of less than 160 mm Hg and diastolic blood pressure of less than 100 mm Hg should not be restricted from playing sports.	C	25
Athletes with well-controlled asthma who are asymptomatic at rest and with exertion can be safely cleared to play sports.	C	26
Screening blood and urine tests are not recommended for asymptomatic athletes.	C	37

A = consistent, good-quality patient-oriented evidence; B = inconsistent or limited-quality patient-oriented evidence; C = consensus, disease-oriented evidence, usual practice, expert opinion, or case series. For information about the SORT evidence rating system, go to http://www.aafp.org/afpsort.

Mirabelli MH, Devine MJ, Singh J, Mendoza M:The Preparticipation Sports Evaluation. Am Fam Physician. 2015 Sep 1;92(5):371-6.

Core Recommendations: American Family Physician Article

BEST PRACTICES IN PREVENTIVE MEDICINE

Recommendations from the Choosing Wisely Campaign

Recommendation	Sponsoring organization
Do not order annual electrocardiography or any other cardiac screening for asymptomatic, low-risk patients.	American Academy of Family Physicians and American College of Physicians

Source: For more information on the Choosing Wisely Campaign, see https://www.choosingwisely.org. For supporting citations and to search Choosing Wisely recommendations relevant to primary care, see https://www.aafp.org/afp/recommendations/search.htm.

SORT: KEY RECOMMENDATIONS FOR PRACTICE

Clinical recommendation	Evidence rating	Comments
The preparticipation physical evaluation should take place in the athlete's primary care medical home, during an office visit and not in a group setting.[4,12]	C	Expert opinion
The cardiovascular portion of the preparticipation physical evaluation should focus on identifying concerning findings such as pathologic heart murmurs or the stigmata of Marfan syndrome.[19]	C	Expert opinion and consensus guidelines
If a condition is identified that may restrict an athlete's medical eligibility for participating in a certain sport, shared decision-making should occur, including discussion among the athlete, the athlete's family, and an interdisciplinary health care team about the risks and benefits of participation. It may be appropriate to consider an alternative activity in which the athlete could participate.[19]	C	Expert opinion and consensus guidelines

A = consistent, good-quality patient-oriented evidence; B = inconsistent or limited-quality patient-oriented evidence; C = consensus, disease-oriented evidence, usual practice, expert opinion, or case series. For information about the SORT evidence rating system, go to https://www.aafp.org/afpsort.

MacDonald J, Schaefer M, Stumph J. The Preparticipation Physical Evaluation. Am Fam Physician. 2021 May 1;103(9):539-546.

Dr. Bernhardt Final Thoughts!

- The PPE is **only as good as the practitioner** who takes the time to review the questionnaire, ask follow-up questions, and try to determine the risks and benefits of participation in sport or exercise for the athlete.
- Consider **every patient who comes to clinic an athlete and our goal as providers it to promote exercise**. Therefore PPE should be performed on every patient in hopes of preventing any catastrophic event and guiding the patient/athlete in making exercise/sport a positive experience.
- **Final Comment**: would **focus on mental health screening** as main new portion of the PPE.

Dr. Roberts Final Thoughts!

- The PPE is **not an evidence based** exam
- Incorporating the PPE **into health prevention visits within the health care home** is best practice
- **History & PE 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**

For Further Information

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