Interim Guidance on the Preparticipation Physical Exam for Athletes During the SARS-CoV-2 Pandemic

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ABSTRACT

The American Medical Society for Sports Medicine (AMSSM) convened a writing group to address the current evidence and knowledge gaps regarding preparticipation evaluation of athletes during the SARS-CoV2 pandemic. The writing group held a series of meetings beginning in April 2020. The task force reviewed the available literature and used an iterative process and expert consensus to finalize this Guidance Statement that is intended to provide clinicians with a clinical framework to return athletes of all levels to training and competition during the pandemic. The Statement is not intended to address treatment, infection control principles, or public health issues related to SARS-CoV2. The AMSSM task force acknowledges the clinical uncertainty, evolving public health objectives, and the limited data currently available to create this Guidance Statement.

[WORD COUNTS Abstract 125, Manuscript 3123 with 30 References and two supplementary tables]

INTRODUCTION

As sports return to our landscape, an important step in "reopening the country" will be evaluating the health of each athlete and mitigating risk prior to participation. The number of confirmed severe acute respiratory syndrome corona virus 2 (SARS-CoV2) disease (COVID-19) cases and deaths continue to rise in the United States. While new information is published daily, much remains unknown about this virus and post infection risks to athletes. The potential effect of COVID-19 on an exposed or previously infected athlete is a major concern in sports medicine. There is, however, little data available on the young, fit, healthy, athletic population and much of these concerns are secondary to extrapolation of data from, hospitalized, older patients with comorbid conditions. This statement provides a framework and tools for evaluating athletes prior to sport participation in the setting of COVID-19 based on the best currently available evidence (as of July 2020) and expert opinion. The AMSSM Board of Directors appointed co-chairs (ABD, DMN) and task force members based on content expertise and the organization's diverse membership demographics and practice settings. The co-chairs generated the outline and the writing group subsequently conducted an in-depth literature review. The writing group developed the manuscript based on exchanges from several virtual meetings, conference calls, and written communications.

THE ROLE AND OBJECTIVES OF THE PREPARTICIPATION PHYSICAL EXAM

The utility of preventive medicine visits in improving the health and outcomes of our patients is controversial among providers and national organizations. The preparticipation physical evaluation (PPE) is no different, especially when one considers the lack of standardization and

outcomes data related to the visits. The goals of the PPE are no different during the COVID-19 pandemic from those published in the 2019 Preparticipation Physical Evaluation Monograph 5th edition (PPE5) [1]:

1. Determine the general physical and psychological health of the athlete.
2. Evaluate the athlete for conditions that may be life-threatening or disabling.
3. Evaluate for conditions that may predispose the athlete to injury or illness.
4. Serve as an entry point into the healthcare system for student athletes without an established medical home.

During the COVID-19 pandemic, an additional goal is to provide advice for student athletes and parents regarding exercise volume and intensity, participation in sport, and minimizing the risk of contracting the disease. In all patient encounters, healthcare providers should emphasize the importance of exercise to both physical and mental health during a time when we are supposed to be physical distancing.

Exercising outdoors with physical distancing is relatively safe, especially if there is no sharing of athletic equipment (i.e., towels, clothing, shoes, balls, or sports specific equipment) and there is no body contact. An important and challenging task within the PPE is to accurately educate athletes about the increased risk of contracting the disease while participating in a team sport, especially sports involving contact or collision. Sports organizations and professional teams can control factors like disease testing, contact tracing, and quarantine of the athletes. Teams at the high school level and most colleges will not have these resources available to help decrease the risk of transmission. The potential risks need to be discussed in detail with the patient and family at the time of the PPE. When determining medical eligibility and restarting

sport practice and competition, other factors should be considered, such as the disease burden in the community, the overall health of the athlete, the living environment, each athlete's network of friends and family members who may have comorbid conditions.

Finally, a currently infected or recovered athlete may have silent clinical pathology in any organ, including the heart. [2] The cardiac complications may increase the risk of sudden death associated with exercise. COVID-19 related damage to the kidney, lungs, and vascular system have implications for fluid balance, coagulopathy, and heat stroke during exercise. The healthcare provider needs to consider these implications for the recovering athlete and may need additional diagnostic studies to determine medical eligibility.

General Considerations

- The PPE can be a part of the Health Supervision Visit (Well Child, Preventive, or Wellness Exam) in the medical home but is not a substitute for the Health Supervision Visit.
- A PPE determines medical eligibility for sports, but often does not address long-term health concerns, immunizations, and healthy lifestyle when done outside the medical home.
- If access to the medical home for a full PPE is not possible, at a minimum, the athlete and parent should complete an interval history questionnaire that includes additional questions about COVID-19 exposure, symptoms, or both. This will allow the PCP to evaluate for recent COVID exposure or infection that may warrant further work-up or a period of isolation before resuming sports.

- Health Supervision Visits are reimbursed by insurance and often require no copay while Sports Physicals are typically an out of pocket expense. Billing for a health supervision visit might preclude additional preventive visits for the calendar year.
- The ICD-10-CM code for sport related participation evaluation is Z02.5. Using the code in the primary or secondary position may allow tracking of sports physicals within the electronic medical record and also has the potential to allow research into the PPE visit for short- and long-term outcomes.
- Integrating the return to sport across different ages and level of competition (e.g. youth, secondary school, college, and professional) will vary and will be determined by individual organizations and institutions according to local regulations and public health considerations.

Timing, Setting, and Structure of the PPE

Timing

- PPE5 recommends a full evaluation every 2-3 years for athletes in grade school and high school. The PPE should be performed at least six weeks before the start of practice with annual updates of the history questionnaire and a limited exam for any problem areas identified.
- Most states require a full PPE every 12-13 months, which is more frequent than recommended. [1]
    - The National Federation of State High School Associations (NFHS) released a recommendation in April 2020 that recommends a one-year extension for PPEs expiring during the 2020-21 academic year. This was recommended in the event

that limited access due to COVID-19 might result in significant delays in obtaining an annual evaluation. [3]

- The American Academy of Pediatrics (AAP) recommends that there should be no delay in either the PPE or well child checkups. [1] The AAP has guidance on access to care during pandemic and on telehealth, recommending telehealth or in-person as medically indicated. [4]

- Providers must be aware of their state laws regarding the PPE. Sport association requirements may have changed due to COVID-19. Sport associations continue to face specific recommendations and providers need to keep abreast of policies that change almost daily.

Setting and Structure

- PPE5 recommends the evaluation be completed in the medical home with access to the full medical record for all youth and high school athletes. [1]
- Group physicals are not recommended
    - Group physicals may not even be possible due to physical distancing guidelines.
- Providing PPEs in the medical home will improve continuity of care and confidentiality. [1]
- The authors recognize that performing PPEs in the medical home as well as recommending no group PPEs may impose scheduling challenges for both health care providers and families. We appreciate that these recommendations may limit access for athletes who rely on mass physicals for their screening exam.
- The athlete and accompanying parent or guardian should be screened for COVID-19 symptoms upon arrival to minimize risk of viral transmission during the PPE.

- An athlete who reports any recent symptoms should be evaluated and treated based on clinical or laboratory diagnosis of COVID-19. The PPE should be postponed until the athlete is well or symptom-free for at least two weeks. [5]
- During the PPE, all parties (providers, patients, and family members) should wear masks and stay six feet apart whenever possible.
- Virtual care visits may provide an alternative to in-person evaluation during the pandemic [6-8] and can serve as an opportunity for athletes from underserved communities to access care. [9] Health care providers will need to be flexible with patients that have internet, language, or other barriers that might make virtual care difficult.
- Virtual care can potentially detect an athlete who is ill or was exposed to SARS-CoV2 and assist in directing timely care.
- Review the payment rules for the commercial plan(s) in which you participate,
    - Virtual care visits for sports pre-participation evaluations are often not covered or reimbursed
    - Many commercial health insurance plans only allow virtual care encounters for evaluation and management (E&M) codes.
- Given the potential health impacts of COVID-19 infection, affected athletes should be evaluated in their medical home prior to resuming physical activity and organized sports. [2,10]
    - Athletes with sequalae related to COVID infection may require specialized evaluation and care (cardiac, pulmonary, renal). [2,10-12]

Organ Systems Evaluation

COVID-19 can have wide-ranging effects on the body both physically and mentally. Therefore, the athlete will require individualized assessment of all body systems prior to resuming physical activity and sports participation. Although COVID-19's effects have been found in most all systems, the cardiovascular and pulmonary systems seem to be most concerning. The supplemental questionnaire addressing medical issues specific to COVID-19 may be useful for athlete screening (See Supplementary Table 1). [2,10-12]

Cardiovascular

- Cardiac involvement is a recognized complication of COVID-19 with the potential for myocarditis and rapid-onset heart failure. [2,10-12]
- Myocarditis can lead to tissue scarring and fatal arrhythmias during and away from exercise. [10,12]
- The evaluation and management of athletes with prior infection regardless of symptomatology is evolving (see Supplementary Table 2). [13,14]

Pulmonary

- Lung tissue is directly affected by virus damage to the blood vessels.
- Athletes with pulmonary involvement may require additional testing during a potentially long period of convalescence prior to returning to physical activity.

Vulnerable Populations and Those with Prexisting Medical Conditions

As of July 2020, the CDC established that individuals of any age with the following underlying medical conditions are at increased risk: chronic kidney disease, chronic obstructive pulmonary disease, immunocompromised state (from solid organ transplant), obesity (BMI>30), serious heart conditions (such as heart failure, coronary artery disease, or cardiomyopathies), sickle cell disease, type 2 diabetes mellitus. [15]

While data is still fairly limited, the CDC has said people with the following conditions might also be at an increased risk for severe illness from COVID-19: asthma (moderate to severe), cerebrovascular disease, cystic fibrosis, hypertension, immunocompromised state (from bone marrow transplant), immune deficiencies, HIV, use of corticosteroids or use of other immune weakening medicines, neurologic conditions, liver disease, pregnancy, pulmonary fibrosis, smoking, thalassemia, and type 1 diabetes mellitus. [15] Athletes with preexisting cardiac or pulmonary conditions should consult with their specialist prior to athletic participation.

A few of these select issues are addressed further below:

The Pregnant Athlete

- Physical activity and exercise during pregnancy are associated with minimal risks and have known benefits for most women. [15]
- Pregnancy is on the list of conditions that may pose increased risk for severe COVID-19 illness. [16] Complications and adverse outcomes related to COVID-19 have been reported among pregnant women. [16]

- Pregnant athletes should take precautions to protect themselves against the virus and immediately report any possible signs and symptoms to their primary obstetrics provider. [16]

The Diabetic Athlete

- Diabetic athletes may present with abnormal blood glucose responses to otherwise normal dietary intake and exercise instead of the usual initial symptoms associated with the disease. [17,18]
- Diabetic athletes should be instructed to watch for subtle manifestations of disease such as elevated blood glucose, fatigue, polyuria, and polydipsia. [17,18]

The Hypertensive Athlete

- Because of the interaction between SARS-COV-2 and ACE2 and the role of ACE2 in the pathogenesis of hypertension, it has been speculated that hypertension may be involved in the pathogenesis of COVID-19. [19] Early reports, however, have not revealed the extent of the relationship between hypertension and disease severity. [20-22]
- Hypertensive athletes with COVID-19 should continue ACE-I, angiotensin receptor blockers (ARBs), or other medication unless they have hypotension or hypokalemia. [5,23]
- Use of these medications by hypertensive patients is not associated with worse outcomes. [22,24]

The Asthmatic Athlete

- Chronic pulmonary conditions and moderate-severe asthma are correlated with poor COVID-19 outcomes. [15]
- Athletes with asthma should use their usual medications, including inhaled steroids.

- Worsening asthma symptoms in a well-controlled athlete may be an early sign of COVID infection. This should prompt daily use of a peak flow meter and COVID-19 antigen testing.

Athletes with Severe Obesity

- Evidence suggests obese and excessively overweight weight people are at a higher risk of death or serious outcome. Weight does not, however, appear to affect a person's chances of contracting COVID-19. [25]
- The CDC defines severe obesity as BMI $\geq$40 kg/m^2 and a potential risk for severe illness. However, the literature associated with COVID-19 employs variable definitions of obesity including BMI $\geq$25 kg/m^2. [17]
- Lifestyle modifications are generally recommended. The potential complications from COVID-19 associated with obesity should be emphasized. [17,18]
- Athletic participation should not be dependent exclusively on BMI. Participation should take into account an athlete's overall risk-to-benefit ratio in engaging in physical activity.

Athletes with Sickle Cell Trait

- Although sickle cell disease is considered a higher risk condition for adverse outcomes from COVID-19 infection by the CDC, sickle cell trait (SCT) is not. [17]
- No additional precautions are recommended for returning athletes with SCT; however, if an athlete with SCT contracts COVID-19, team physicians should be vigilant for issues related to hypercoagulability for several months into recovery. [17]

Medical Eligibility Considerations & Return to Sport Participation

During the COVID-19 Era or Pandemic

After the evaluation, the primary care provider's decision about medical clearance remains consistent with PPE5 [1]:

- medically eligible for sports without restrictions
- medically eligible for sports without restriction, but further evaluation needed
- medically eligible for certain sports listed on the form
- not medically eligible for any sports, pending further evaluation
- not medically eligible for any sports

COVID-19 negative and asymptomatic athletes can participate based on their medical eligibility while following physical distancing guidelines and monitoring for symptom development on a daily basis. [12] Individuals with comorbidities placing them at increased risk should be withheld from group training and competition with other athletes until participation is determined to be safe or a vaccine is available.

For athletes who have fully recovered from COVID-19, the medical eligibility criteria are rapidly evolving, and it will be essential for providers to stay abreast of the current recommendations.

- COVID-19 positive without symptoms should not exercise for a determined period of time and remain in self-quarantine while monitoring for symptoms. [12,13,26-28]
    - If the athlete is asymptomatic after a given period of time, exercise may be gradually resumed with medical supervision [12,13,26-28]
    - A 12-lead EKG should be considered in asymptomatic athletes.

- COVID-19 positive athletes with mild symptoms and no hospitalization should be symptom-free for a determined period of time before beginning a gradual return to activity and stop activity if symptoms return. [12,13,26-29]
    - If symptoms return, an evaluation by a sports medicine physician or primary care provider who is well versed in physical activity and COVID-19 is recommended. [11,12]
    - To determine medical eligibility for physical activity, an electrocardiogram (ECG), echocardiogram (ECHO), and other evaluation may be required (See Table 1). [12,13,26-28]
- COVID-19 positive athletes with symptoms that require hospitalization should have a cardiac evaluation prior to discharge. [11,12]
    - After discharge, the athlete will need to continue seeing the sports medicine physician or primary care provider while they gradually return to sport. [12]
- Various organizations provide recommendations regarding minimum resting period without physical activity following exposure or infection. There is also similar debate on the timing and processes regarding return to play. [12,26,27,29]
- Referral to a subspecialiast may be necessary

ANTICIPATORY GUIDANCE

In the world of sport, the challenges of returning to training and competition must be met with the reality that things have changed, and will continue to change, so our athletes will need to

adapt. The athlete must be an active participant in maintaining their own health and safety, and the health and safety of others.

Expanding sport opportunities and returning to play will depend on many factors including:

- Athlete health
- Athlete exposure to COVID-19
- Geographic location and local prevalence of COVID-19
- Local and state pandemic guidelines
- Type of sport
- Acceptance of risk by student-athletes and parents and willingness on the part of members of the team to cooperatively participate in risk-reducing behaviors.

Epidemiologic and clinical data regarding return to play guidelines for athletes are limited. All health care providers should use their best judgement along coupled with community recommendations in their geographic location. [12]

ADVOCACY, LEGAL CONCERNS, AND FINANCIAL ISSUES

The Health Insurance Portability and Accountability Act (HIPAA) and the Family Educational Rights and Privacy Act (FERPA) continue during the pandemic, so private information in updated medical histories and other materials should not be shared with school or athletic administration.

PPE5 suggests rescinding medical eligibility, either temporarily or permanently, when medical conditions are discovered after eligibility has been established and COVID-19 infection is such a condition.

Who actually performs the PPE is determined by states and sport governing bodies. For athletes with a prior COVID-19 infection, we recommend that a sports medicine physician or primary care provider with expertise in the care of athletes should determine medical eligibility.

Performing out-of-state or international virtual care visits may have legal and malpractice liability issues. Several states have granted temporary licensure or medical privileges to providers in bordering states during the pandemic. Several state boards also issued a special purpose license, telemedicine license or certificate, or a license to practice medicine across state lines. Prior to providing out-of-state PPEs, it is essential for physicians to know the regulations of both their home state as well as neighboring states that grant temporary privileges, which are accessible at the Federation of State Medical Boards. [30]

PPEs are often not covered or reimbursed for virtual care visits and coding. Commercial health insurance plans vary in allowable codes for telemedicine encounters. We recommended ongoing monitoring and reviewing payment rules for the commercial plan(s) in which you participate.

FUTURE DIRECTIONS

Evidence-based data specifically addressing the athlete during the COVID-19 pandemic continues to evolve and AMSSM supports research in this area to validate the evaluation and activity recommendations provided in this statement. AMSSM is committed to developing a

longitudinal framework with all stakeholders for improving recommendations for medical eligibility and return to sport for athletes at all levels during the pandemic.

CONCLUSION

The PPE monograph 5th edition is the most comprehensive and appropriate guide for performing the PPE. [1] The purpose of this document is to address the unique issues associated with the COVID-19 pandemic. Providers must remain alert for the ever-changing nature of this pandemic and seek additional data to drive our medical decision making.

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LIST OF SUPPLEMENTARY TABLE CAPTIONS

Table 1: Supplemental COVID-19 Questions

Table 2. Cardiac Evaluation in Athletes with Prior COVID-19 Infection

Table 1: Supplemental COVID-19 questions

1) Have you had any of the following symptoms in the past 14 days?
   a) Fever or chills Y/N
   b) Cough Y/N
   c) Shortness of breath or difficulty breathing Y/N
   d) Fatigue Y/N
   e) Muscle or body aches Y/N
   f) Headache Y/N
   g) New loss of taste or smell Y/N
   h) Sore throat Y/N
   i) Congestion or runny nose Y/N
   j) Nausea or vomiting Y/N
   k) Diarrhea Y/N
   l) date symptoms started _____
   m) date symptoms resolved _____

2) Have you ever had a positive test for COVID-19? Y/N
   a) If yes:
      i) Date of test _____
      ii) Were you tested because you had symptoms? Y/N
         (1) If yes:
            (a) Date symptoms started _____
            (b) Date symptoms resolved _____
            (c) Were you hospitalized? Y/N
      iii) Were you tested because you were exposed to someone with COVID-19, but you did not have any symptoms? Y/N

3) Have you ever had a positive test for COVID-19 antibodies Y/N
   a) If yes: Date of test _____

4) Has anyone living in your household had any of the following symptoms or tested positive for COVID-19 in the past 14 days? Y/N

   i) If Yes, circle the applicable symptoms.
   - Fever or chills
   - Cough
   - Shortness of breath or difficulty breathing

- Fatigue
- Muscle or body aches
- Headache
- New loss of taste or smell
- Sore throat
- Congestion or runny nose
- Nausea or vomiting
- Diarrhea

5) Have you been within 6 feet for more than 15 minutes of someone with COVID-19 in the past 14 days? Y/N
    i) If yes: date(s) of exposure _____

Table 2. Cardiopulmonary Evaluation in Athletes with Prior COVID-19 Infection[1]

Clinical Scenario	Recommended Assessment	Comments
Athletes with prior asymptomatic infection as confirmed antibody to SARS-Coronavirus-2	**Focused Medical History and Physical Examination** to screen for findings newly emergent in the COVID-19 era. Consider 12-lead ECG[2]	· Myopericarditis related to COVID-19 should be considered in patients with a history of new onset chest pain, pressure, or both (even in the absence of fever and respiratory symptoms), palpitations, or exercise intolerance. · Comprehensive clinical evaluation, regardless of ECG findings, is indicated in athletes with new onset cardiovascular symptoms or exercise intolerance. · If ECG is abnormal or shows new repolarization changes compared to a prior ECG, then additional evaluation with at minimum an echocardiogram and exercise test is warranted in conjunction with a sports cardiologist.
Athletes with a history of mild illness (**non-hospitalized**) related to confirmed or suspected COVID-19	**Focused Medical History and Physical Examination** to screen for persistent or new post-infectious findings following COVID-19 infection. Perform 12-lead ECG[2]	· ECG findings that may indicate viral-induced myocardial injury include pathological Q waves, ST segment depression, (new) diffuse ST segment elevation, and T-wave inversion. · Comprehensive clinical evaluation, regardless of ECG findings, is indicated in athletes with new onset cardiovascular symptoms or exercise intolerance. **· If ECG is abnormal or shows new repolarization changes compared to a prior ECG**, then additional individualized evaluation is warranted, including at minimum echocardiography and exercise testing, in conjunction with a cardiologist.

Athletes with a history of moderate to severe illness (**hospitalized**) related to confirmed or suspected COVID-19	Comprehensive evaluation prior to return to sport, in conjunction with a cardiologist, to include blood biomarker assessment (i.e. Tn, NP), 12-lead ECG, echocardiography, exercise testing, and ambulatory rhythm monitoring. Additional recommendations include chest radiograph, spirometry, pulmonary function testing, chest CT.	· Myocardial injury is more likely in patients with a more severe disease course, and normal cardiac function and exercise tolerance should be established prior to a return to exercise. · Cardiac MRI may be considered based on clinical suspicion of myocardial injury.[3]
Athletes with a history of COVID-19 infection (regardless of severity) AND documented myocardial injury as indicated by one or more of the following: in-hospital ECG changes, HS-Tn or NP elevation, arrhythmia, or impaired cardiac function.	Comprehensive evaluation prior to return to sport, in conjunction with a sports cardiologist, to include blood biomarker assessment (i.e. Tn, NP), 12-lead ECG, echocardiography, exercise testing, ambulatory rhythm monitoring, and cardiac MRI.[2]	· Return to training should be gradual and under the supervision of a cardiologist. · Longitudinal follow-up including serial cardiac imaging may be required in athletes with initially abnormal cardiac function.

Tn = cardiac troponin, NP = natriuretic peptide; ECG = electrocardiogram; MRI = magnetic resonance imaging

[1]Table modified from Drezner, et al.[26]

[2]ECG as a screening test to exclude myocarditis is limited. ECG in patients with myocarditis may be normal or show nonspecific abnormalities. Additional evaluation may be warranted based on clinical suspicion.

[3]Cardiac MRI should be performed with gadolinium to assess for myocardial scar and late gadolinium enhancement (LGE). The presence of LGE is associated with a higher risk of major adverse cardiovascular events.