

Interassociation consensus recommendations for pitch-side emergency care and personal protective equipment for elite sport during the COVID-19 pandemic

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ABSTRACT

The COVID-19 pandemic has necessitated many novel responses in healthcare including sport and exercise medicine. The cessation of elite sport almost globally has had significant economic implications and resulted in pressure to resume sport in very controlled conditions. This includes protecting pitch-side medical staff and players from infection. The ongoing prevalence of SARS-CoV-2 and the desire to resume professional sport required urgent best practice guidelines to be developed so that sport could be resumed as safely as possible. This set of best practice recommendations assembles early evidence for managing SARS-CoV-2 and integrates expert opinion to provide a uniform and pragmatic approach to enhance on-field and pitch-side safety for the clinician and player. The nature of SARS-CoV-2 transmission creates new hazards during resuscitation and emergency care and procedures. Recommendations for the use and type of personal protective equipment during on-field or pitch-side emergency medical care is provided based on the clinical scenario and projected risk of viral transmission.

BACKGROUND

COVID-19 is the clinical illness caused by the virus SARS-CoV-2, first identified in humans in December 2019 and declared a global pandemic by the WHO in March 2020.¹ Transmission is by aerosol and droplet, via surface contact (fomite spread) and directly through aerosol-generating procedures (AGPs).^{2,3} Therefore, physical distancing and strict personal and environmental hygiene measures are paramount in reducing infection rates, transmission and disease prevalence.^{2,4} An iterative consensus process was conducted working with high profile sport and exercise medicine organisations to establish best practice recommendations to maintain safety for both clinicians and athletes during pitch-side medical management.

OBJECTIVE

As elite sport returns in an environment in which SARS-CoV-2 infection is still prevalent, strategies

need to be developed to mitigate the risk of transmission for healthcare providers and players. This is especially important in on-field and pitch-side settings where care is often urgent and preparation time limited. Our objective is to define a standard of care that protects medical professionals rendering on-field and pitch-side assistance without compromising player care. In particular, the appropriate use of personal protective equipment (PPE) in specific situations is described.

STAKEHOLDER INVOLVEMENT

High profile UK sports associations and Sport and Exercise Medicine (SEM) bodies, supported by international SEM institutes, were involved in devising recommendations for pitch-side emergency care based on published data specific to SARS-CoV-2 virus and COVID-19 infection. Where evidence was not available, expert opinion was sought. An expert was defined as a medical specialist in SEM, cardiology, respiratory medicine or epidemiology who works with elite sportspersons and has at least 10 years experience in their field.

Public Health England policy and the staged framework issued by the United Kingdom (UK) Government on Return To Training¹⁵ were used as templates.

The process was facilitated by the medical education lead of the Football Association (FA) using an iterative process, conducted over several months in spring 2020, building off consecutive contributions by each participant, submitted in writing via email. The following UK sporting associations were represented: The Football Association UK, The English Rugby Football League, The Scottish Football Association, The English Rugby Football Union, The Lawn Tennis Association, The British Horse Racing Association, The Welsh Rugby Union, English Premiership Rugby and Scottish Rugby, and supported by UK and international SEM bodies including The English Institute of Sport, The Scottish Institute of Sport and WiTS Sport and Health, South Africa.



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The target users of this guidance are medical support teams operating field-side in elite sport across sporting codes and their educating bodies. Many of the guidelines can be applied to non-elite sport, although differences in facilities and human resources require additional consideration that will be addressed in a separate paper.

DEVELOPMENT AND METHODS

Guidance documents from Public Health England, The Health and Safety Executive (UK) and the UK Government were collated along with those published from other international sporting bodies and those from relevant Royal Colleges updated to reflect COVID-19 changes. A comprehensive search of peer-reviewed papers was conducted during the periods May–July 2020, using the MEDLINE database and using the search terms ‘COVID-19’ OR ‘SARS-CoV-2’ OR ‘Coronavirus’, AND ‘sport, emergency’, OR ‘personal protective equipment’, OR ‘sport’, OR ‘athlete’ OR ‘sport and recreation’ OR ‘return to training’ OR ‘exercise’ OR ‘trauma care’, OR ‘resuscitation’, ‘cardiovascular’, OR ‘respiratory’, OR ‘first aid’, OR ‘sanitisation’ and ‘decontamination’. The references of each paper were reviewed for additional related articles.

Evidence was sought to provide insight into the transmission of SARS-CoV-2, the protective effects of a range of Personal Protective Equipment (PPE) practices, incubation periods postinfection, potential systemic effects of COVID-19 (especially respiratory and cardiac) and return-to-training guidelines.

Published evidence was strongest for the cardiovascular and respiratory implications of COVID-19^{6,7} where research is more extensive although in non-sporting populations. The novelty of both the COVID-19 and sport in the context of the pandemic has meant that little research exists regarding best practice, so expert opinion from experienced field-side clinicians was sought. Peer review of the recommendations was provided by UK-based experts as above as well as an experienced SEM physician from outside of the UK. Reviewers were asked to critically assess the guidelines, provide further recommendations and suggest additional references and sources. The suggested revisions were then conveyed to the rest of the author group who considered the recommendations in the next revised version. The final guidance was agreed on by all coauthors. The reliance on expert opinion is a necessary limitation of this guidance document and as such will necessitate regular updates as evidence becomes

available. However, the high infectivity of SARS-CoV-2, the exponential surge in cases globally and the resumption of sport necessitated urgent guidance and a multisport clinical consensus to be developed. Despite the lack of robust evidence, the main principle was to protect the healthcare provider while enabling their ability to provide care for those in professional sport. Rapid dissemination and implementation of these recommendations will hopefully avoid unnecessary disease transmission.

EMERGENCY CARE REQUIREMENTS FOR ELITE SPORTING ORGANISATIONS

Regional or national-specific Public Health and government authority guidance on COVID-19 case management supercedes any other guidelines, and it remains the responsibility of all healthcare providers to remain up to date with local or national PPE recommendations for healthcare professionals (HCPs).

Specific and key recommendations

Governance

- ▶ Ensure a COVID-19 officer/manager is appointed and is responsible for an emergency care risk assessment and updating Emergency Action Plans (EAPs).
- ▶ All HCPs who have ‘opted in’ to return to work in the sporting environment (training and match venues) must review all EAPs before entering the environment for the first time. HCPs with vulnerable conditions at risk of adverse COVID-19 outcomes⁸ should carefully consider their involvement in potentially high-risk situations.
- ▶ Optimal personal and environmental hygiene must be practised at all times by all individuals within the sporting environment, together with regular reminders and education.
- ▶ Adherence to government social distancing restrictions must be maintained at all times aside from technical training⁵ and with appropriately certified PPE appropriate for the specific risk assessment.
- ▶ Individual sport-specific biosafety screening measures must be upheld for all staff involved in the elite sporting environment. At the present time, this may include symptom questionnaires, temperature testing, SARS-CoV-2 diagnostic testing and relevant spacing and zoning.
- ▶ Appropriate type and quantities of PPE must be available at all times including, as part of the mandatory emergency medical equipment, COVID-19 specific safety amendments (table 1) that may arise in sport.

Table 1 Definition of situational Personal Protective Equipment level requirements

Situation	Gloves	Apron	Fluid-resistant long armed gown/coveralls	Fabric/cloth mask*	Fluid-resistant surgical face mask Type IIR	Filtering Face Piece (FFP) respirator mask†	Eye protection goggles/full face visor in addition to personal spectacles
Non-medical scenario Where social distancing may be breached ³² including at training ³³	X	X	X	✓	X	X	X
Level 1 Where government advised distancing may not be maintained at all times (currently 2 m)	X	X	X	X	✓	X	X
Level 2 Within 2 m of player, which may include face-to-face contact for assessment and management of all individuals including those who are positive or symptomatic	✓	✓	X	X	✓	X	✓
Level 3/AGP Aerosol-generating procedure (AGP or high potential for aerosol)	✓	X	✓	X	X	✓	✓

*Three layers; ater absorbent cotton, : filter and water resistant layer.³²

†Please be aware the World Health Organisation³² does recommend FFP2 mask as an alternative to FFP3. However, FFP3 is included in this framework consistent with Public Health England advice. FFP, filtering face piece.

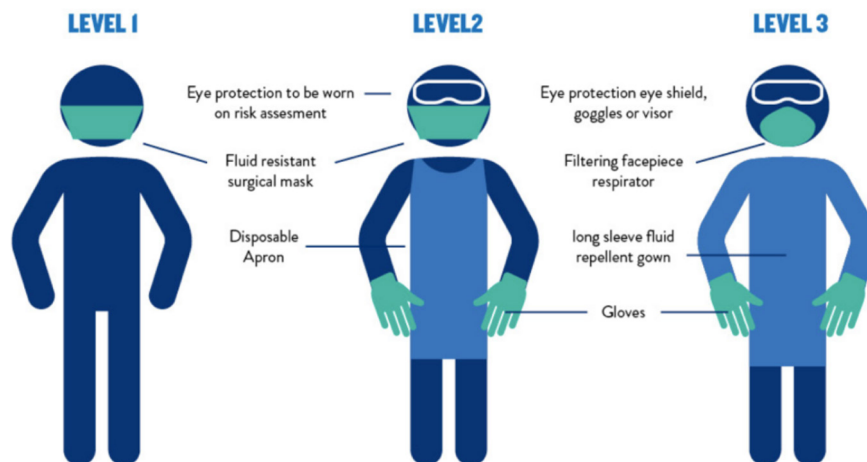


Figure 1 Pitch-side personal protective equipment.

- ▶ All staff need to be appropriately trained in the correct use and application of PPE.⁹ The safe and efficient donning¹⁰ and doffing¹¹ of PPE should be addressed as part of normal emergency medical protocol briefings and training episodes, including qualitative fit testing where appropriate.⁹
- ▶ Appropriate cleaning products and systematic cleaning protocols should be implemented after each use of equipment in line with public health standards¹² where this is not practical duplicate medical equipment available to prevent delay in case of subsequent need.⁴
- ▶ Correct disposal of all PPE and contaminated equipment, as per national clinical waste policy.^{4,9}

Healthcare provider pitch-side support

Optimised pitch-side medical coverage at all training and matches should consist of:

- ▶ One appropriately trained responder* in level 2 PPE with the ability to don level 3 with minimal delay, if required. For example, having additional PPE on person or in the emergency pitch-side bag.
- ▶ One appropriately trained responder* who is either already wearing or has immediate access to level 3 PPE and can respond immediately.
- ▶ Additional personnel that can don the appropriate level of PPE to assist in a medical emergency with minimal delay, when required.
- ▶ Additional (support) personnel that can don the appropriate level of PPE to assist with extrication.

*Appropriately trained responders are those with a current ATMMiF/IMMOFP/ICIR/ITMMiF/PHICIS/ UEFA FDEP or an equivalent qualification.

Table 2 PPE guidance for specific clinical situations that may be encountered in the sporting environment

Clinical situation	PPE level required
Maintaining social distancing as advised No face to face contact risk	1
Not maintaining 2 m distance, with face-to-face contact risk	2
Wound care, excluding oral/dental/nasal injuries	2
Uncomplicated head injury assessment	2
Managing complex injuries, with no C-spine involvement, that is, limb and joint injuries	2
Medical emergency without potential for airway compromise	2
Cardiac arrest with face covered (towel or non-rebreather mask acceptable) continuous compressions, AED without airway interventions	2
Performing a nasopharyngeal swab	2
Procedures such as managing epistaxis or oral injuries	3
Aerosol-generating procedures	3
Medical emergency with potential for airway compromise, that is, complicated head injury and choking*	3
Cardiac arrest – with airway intervention/that is, without covered compressions (30:2), AED	3

*Cardiac arrest has the level 2 option of face covering chest compressions in the absence of level 3 PPE. Thus, in cases of suspected choking, although level 3 PPE provides the most appropriate protection, it is appreciated that a life-saving intervention may be needed and that a shortage of time may preclude donning the extra garments. In these cases, level 2 protection should be a minimum. AED, automatic external defibrillator; PPE, personal protective equipment.

Medical areas

Each training and playing facility should have two designated medical areas coded as either non-AGP or AGP zones (see further). Preferably, these should be well-ventilated individual rooms; however, if this is not achievable, they need to be clearly demarcated at least 2 m apart.

Non-AGP area

This is the general medical room and is to be used for:

- ▶ All non-aerosol generating procedures, assessment or examination of players who have passed biosafety procedures

AGP area

This is to be used for:

- ▶ AGPs.
- ▶ Urgent assessment or management of a suspected or confirmed COVID-19 infected player.

Considerations for both areas

- ▶ Appropriate PPE (table 1) must be worn once entering the area, and it should be adequately disinfected/disposed of following use.^{4,9}
- ▶ If an AGP occurs in an enclosed area, everyone not wearing level 3 PPE must leave and not return until the area has been ventilated and cleaned.¹²
- ▶ Emergency medical equipment should be situated immediately outside the AGP area, and taken in as needed, to avoid unnecessary contamination.

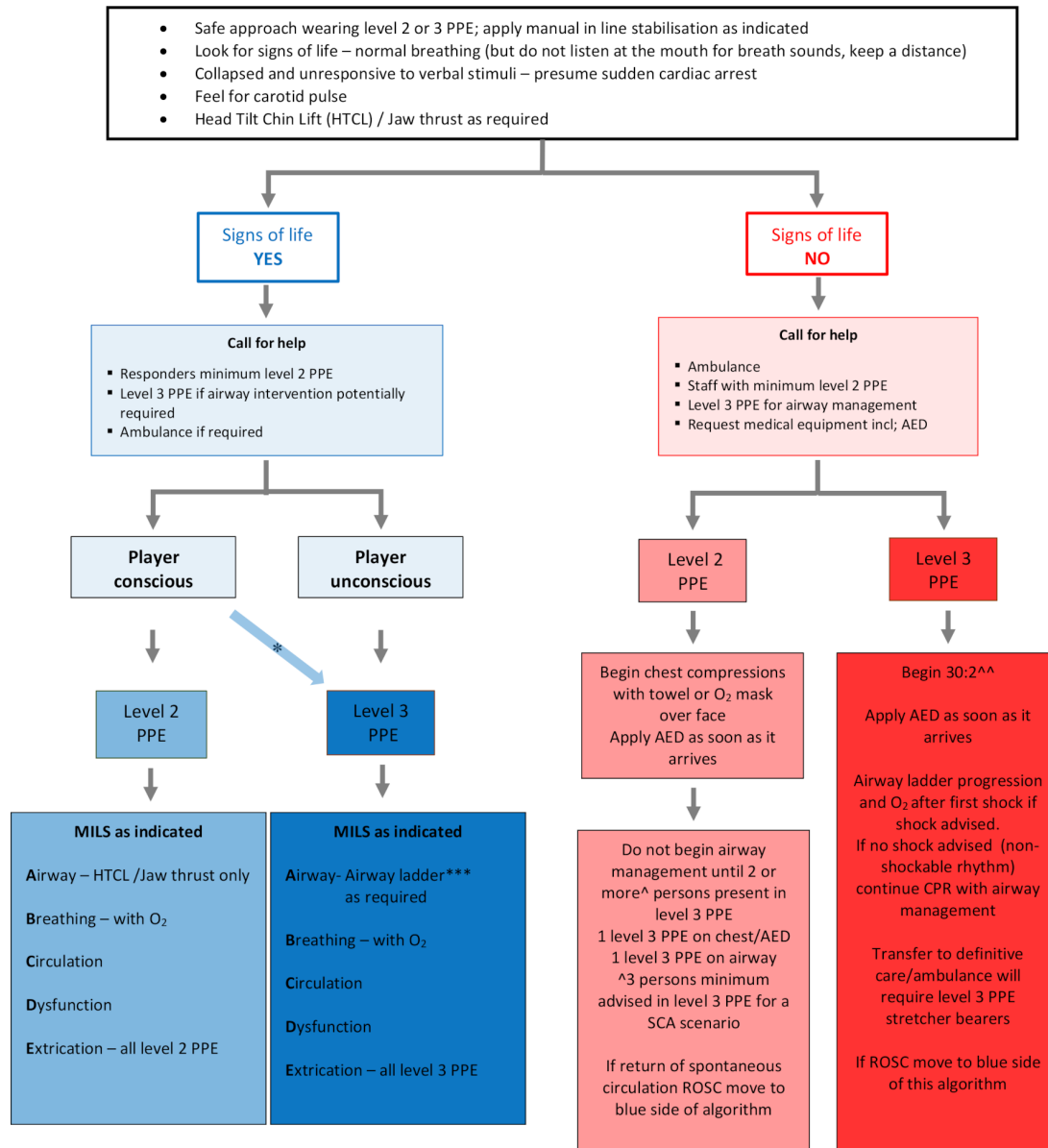


Figure 2 Emergency care algorithm in elite sport. *Not all conscious players have secure airways. **MILS with airway will require minimum of two persons in level 3 PPE: one level 3 PPE with cervical spine and level 3 PPE on airway. ^Once airway intervention has occurred all staff in level 2 PPE must move 2 m away if pitch side (or out of the room indoors) or don level 3 PPE to assist. ***Airway ladder includes: suction, adjuncts, BVM and iGel. ~In the current COVID-19 situation, a pocket mask is not advisable; ventilations should be via a two-person BVM with viral filter; consider early use of prefiltered supraglottic airway device once personnel permits. AED, automatic external defibrillator; BVM, bag-mask-valve; MILS, manual in-line stabilisation; PPE, personal protective equipment; ROSC, return of spontaneous circulation; SCA, sudden cardiac arrest.

PERSONAL PROTECTIVE EQUIPMENT

Definitions

Single-use items

Equipment that must be changed after each contact.

Includes gloves and aprons (figure 1).

Sessional-use items

Clothing and equipment worn for a period of time when undertaking duties in a specific clinical care setting or exposure environment; a session ends when the HCP leaves this defined remit; however, equipment should be disposed of and replaced if it becomes moist, damaged or visibly soiled, which includes fabric/cloth masks, fluid-resistant surgical face masks, filtering face piece (FFP) respirator masks, eye protection (shield, goggles and

visor) and fluid repellent long armed gowns/coveralls. In cases of severe global PPE shortages, there may be exceptions to facilitate sessional use of equipment.¹³

Reusable item

Equipment appropriately decontaminated to public health standards that can be reused.¹⁴ Includes certain coveralls and eye protection.

Fit-tested item

FFP masks filter airborne particles and are dependent on the user creating an air tight seal between their skin and the face seal of the mask.¹⁵ The face fit of each FFP mask will vary according to individual manufacturing. Each type, or brand, of mask requires

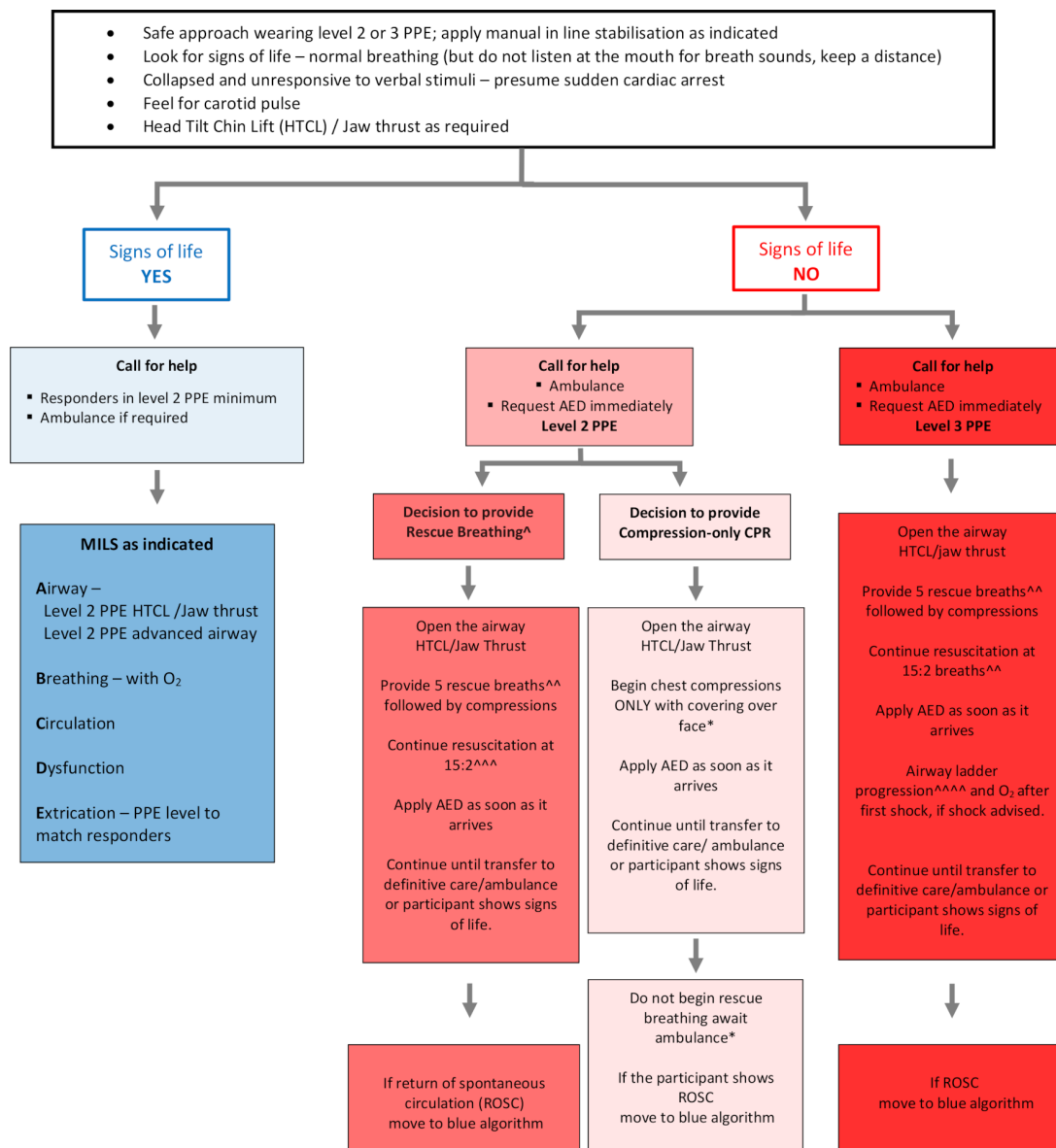


Figure 3 Paediatric emergency care algorithm elite sport. *A face covering can be a non-rebreather mask, which can be attached to oxygen at 15 L/min. ^An individual decision to perform rescue breathing due to compression-only CPR likely to be less effective if a respiratory problem is the cause in a child. ^Ideally use a bag-valve-mask with a viral filter to assist ventilations. ^The paediatric ratio of 15:2 (15 compressions to 2 rescue breaths) can be provided, or if more familiar with the adult provision of 30:2, this can be equally applied. The emphasis is on the speedy provision of resuscitation. Breath provision is 1 s as per an adult and depress the chest 1/3 of chest depth in a younger child/adolescent. ^If level 3 PPE available rescue breathing with airway adjuncts can be commenced before ambulance arrives. Once airway intervention has occurred all staff in level 2 PPE must move away 2 m pitch side (or out of the room indoors), leaving only responders wearing level 3 PPE. AED, automatic external defibrillator; CPR, cardiopulmonary resuscitation; FRSM, fluid resistant surgical mask; PPE, personal protective equipment.

a qualitative ‘fit-testing’ process to be conducted to ensure that it is compatible with face shape and that no aerosol leakage occurs through the seal. Facial hair does impact the efficacy of the masks, and alternative arrangements may be needed in these circumstances. Following each subsequent mask application, the seal should be checked by the wearer to determine seal integrity.

RETURN TO PARTICIPATION

The short-term and long-term effects of suspected or confirmed COVID-19 infection are not yet fully understood. Therefore, rightful concern is raised when returning players to training and competition in the context of suspected or confirmed COVID-19 infection. Adverse cardiac and respiratory outcomes

have been acknowledged in COVID-19 infection.^{6,7} The prevalence of cardiac and respiratory injury in community managed infection is unknown. However, myocardial injury was reported in 7.2% of hospitalised and 22% of those requiring intensive care, compared with 1% for other viral illnesses.⁶ Exercise in the context of a current or recent COVID-19 infection poses the risk of viral myocarditis, with the potential for associated cardiac dysfunction and fatal arrhythmia.¹⁶ This is mitigated by cardiac investigations and detailed return-to-play protocol in clinical relevant presentations.¹⁶⁻¹⁸ Despite strict screening and biosafety measures implemented by various sports, as based on Return to Training Elite Sports guidance Stage 2,⁵ it must be acknowledged this will act only as a risk mitigation measure for COVID-19

transmission; a zero risk environment cannot be achieved, even in the presence of frequent diagnostic testing for asymptomatic individuals.¹⁹

For most sports, a return to sporting activity requires a temporary breach of social distancing measures during training, match play and essential medical care (table 2). Consequently, appropriate PPE for HCPs should be used in these scenarios. AGPs are recognised to be a common source of SARS-CoV-2 transmission, particularly where there is the possibility of sneezing or inducing a cough. Within sport, there are many scenarios that are or have the potential to become AGPs;

- ▶ Cardiopulmonary resuscitation (CPR).²⁰⁻²²
- ▶ Airway management: any suction of upper airway, use of airway adjuncts and emergency surgical airway procedures.²⁰⁻²²
- ▶ Breathing management: any form of manual ventilation; bag-valve-mask ventilation using a viral filter is ideal, whereas mouth-to-mouth ventilation is not recommended.²⁰
- ▶ Medical emergencies with altered levels of consciousness and a risk of airway compromise are potentially AGPs.
- ▶ Nose and throat procedures such as managing nasal epistaxis or oral lacerations.²³⁻²⁵
- ▶ Note: Nebulising, high flow oxygen administration via facemask and nasopharyngeal swabbing are not considered AGPs.

CARDIOPULMONARY RESUSCITATION AND APPROPRIATE USE OF PPE

The UK government guidance published by the New and Emerging Respiratory Virus Threats Advisory Group²⁵ do not consider chest compressions or the use of an automatic external defibrillator (AED) as AGPs. However, limited data and uncertainty regarding the risk of AGPs from CPR is recognised by the Resuscitation Council UK,²¹ the European Resuscitation Council,²⁰ the International Liaison Committee on Resuscitation,²² the World Health Organisation²⁶ and the British Medical Association.²⁷

An effective response to sudden cardiac arrest requires rapid recognition, prompt CPR and early defibrillation. Provided the pitch-side medical team is wearing at least level 2 PPE, hands-only CPR (chest compressions) with a face covering and AED application and use can be performed with a reasonable level of safety for responding medical personnel. Rescue breathing via bag-valve-mask (with viral filter preferably) or advanced airways should be reserved for rescuers donning level 3 PPE. While the safety of both clinician and player must be balanced, sports and exercise clinicians also have an ethical and professional responsibility to be prepared and respond to on-field life-threatening emergencies. Precompetition COVID-19 testing should further lower any potential risk to responding HCPs.

In summary:

- ▶ AED use is not considered an AGP and should not be delayed regardless of PPE type.
- ▶ Chest compressions may be aerosol generating and should be commenced with at least level 2 PPE, with a cover over the player's face (eg, a non-rebreather mask with oxygen attached or a towel) to minimise delay in commencing chest compressions.
- ▶ Medical responders are ideally already in level 2 PPE.
- ▶ The recommended algorithm to facilitate rapid recognition of sudden cardiac arrest (SCA) on the field of play is: collapsed and unresponsive to verbal stimuli and begin the emergency response for SCA. Notably, SCA may be

accompanied by rapid or agonal gasping, eye opening and rolled back, unresponsive to commands and brief seizure like activity.^{28 29} Signs of life include normal breathing (ie, rhythmic and even), eye opening and tracking to command and response to verbal stimuli.

- ▶ Airway management and rescue breathing should be provided by rescuers in level 3 PPE.

It is important that all medical teams amend their EAP to reflect these changes (figure 2).

The response time for a medical emergency in individual sports needs to be appropriately risk assessed to include the time taken to don appropriate PPE; this is imperative when considering airway interventions, chest compressions and all clinically relevant scenarios. As time is critical, it is recommended that during both training and matchday activities trained staff should either be wearing level 2 PPE and have immediate access to level 3 PPE in a time frame that will not detrimentally affect the outcome of the clinical situation. Individual donning times will vary according to experience and the availability of 'donning buddies'.

It must be remembered that once any AGP is commenced, all providers that are not in level 3 PPE must step back 2m when outdoors and vacate the room if indoors.

SPECIAL CONSIDERATIONS FOR YOUTH SPORT

SCA can occur in any age, and in the majority of youth participants, the adult algorithm can be used, especially postpuberty or from age 12 years and upwards. However, ventilation is often considered crucial to a child's chance of survival due to some paediatric arrests being triggered by a respiratory cause. If the decision is made to perform rescue breathing out of suspicion of a respiratory cause of arrest (ie, drowning) despite the risk to the responder, a bag-valve-mask with viral filter is preferable (figure 3).^{21 30 31}

IMPLEMENTATION AND RESOURCES

In a clinical sporting environment, donning appropriate PPE can be practically challenging; therefore, it is recommended to conduct a thorough risk assessment and consider appropriate sport and scenario-specific changes. However, risk of transmission from patient to responder and responder to patient, in addition to PPE donning times, must be carefully considered in refining the emergency plan. No decision to reduce PPE should adversely impact the care provided or ability to deliver timely and safe care in an emergency situation.

Importantly, no one is expected to provide care that jeopardises their own personal health or safety. In an emergency situation, where suitable PPE is not available, the responder must consider the potential risks to both themselves and the player and decide what level of care they feel is reasonable or what level of care they are able to provide in the absence of PPE. In rare circumstances, this may include providing no assistance at all until the ambulance arrives or until appropriate PPE is made available.

The availability and use of PPE, as well as the additional training in its use, comes at a cost. These additional expenses should be built into team medical budgets. The facilitation, use, disposal and replacement of PPE should be built into the EAP, audited and taken responsibility by the designated COVID-19 officer.

CONCLUSIONS

As elite sports teams return to training and competition during the COVID-19 pandemic, this interassociation collaboration seeks to establish best practices in limiting the risk of viral transmission

between clinicians and players. Guidance regarding the safest pitch-side practice for HCPs and players should be re-evaluated as new evidence emerges. Certain sports may require risk assessed modifications, while regional variations in regulations from government authorities should be acknowledged and adhered to.

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Contributors LH and GP initiated the consensus process, drew up the first draft of the guidance document and convened and led the consensus group. The following coauthors were involved in the submitting of data and protocols, writing of the manuscript and editing each version of both the guidance document and the paper in every round of communication: JG, JoH, JM, PM, AS, MW, CMC, SK, MP, JL, Jeh, MR, NE, PB, JP, AP, HS, CS, MH, PR, AB, SC, RT, RH, RW, RJ, SS, MRC and JP. JP served as an external expert opinion, reviewing and editing each draft of the guidance document and the paper, communicating with the lead authors through each iteration, reformatting the guidance document according to the AGREE criteria and drafting the consensus paper. JP initiated the revision of the manuscript with LH and GP with all authors providing additional input with MRC providing the final proof read and expert input.

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