



# Sports Health During the SARS-Cov-2 Pandemic

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## Key Points

Sports organisations must adopt pandemic strategies that are unmistakably communicated to their memberships.

Temporary frameworks for sports practices should be developed that harmonise with prevailing social distancing and quarantine regulations.

Sports medical researchers and practitioners should cooperate with sports organisations and public health agencies to build trust and resilience and safeguard sports participation at all levels.

## 1 Introduction

In December 2019, the Chinese city of Wuhan reported an outbreak of SARS-Cov-2 (severe acute respiratory syndrome coronavirus-2) infection that causes the Covid-19 disease, an atypical pneumonia [1]. Modelling analyses per late January 2020 showed that the outbreak was no longer contained within Wuhan, and that other major Chinese cities sustained localised outbreaks [2]. Cases were thereafter exported across China, as well as internationally. In early March 2020, the World Health Organisation proclaimed that the outbreak had developed to a pandemic. The pandemic caused by SARS-cov-2 has had a major impact on sports, from the cancellation of major events and championships [3] to small sports clubs being forced into bankruptcy [4].

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The aim of this commentary is to examine the consequences of the SARS-Cov-2 pandemic for sports and provide recommendations for response measures from the sports community.

### 1.1 SARS-Cov-2 and Covid-19

The SARS-Cov-2 is not the first coronavirus to generate concern [5]. Healthcare systems across the world have had to manage SARS in 2003–2004 and MERS (Middle Eastern Respiratory Syndrome), which has been ongoing since 2012. Infection with SARS-Cov-2 is established in the upper airways which at times can lead to very high virus production. The body responds first via the innate immune system and subsequently via the adaptive immune system, whereby the virus is eliminated from the body. However, SARS-Cov-2 may enter the lower respiratory tract, reach the furthest alveoli, damage the alveolar epithelial barrier, and allow fluid flow across the interstitial barrier, thus decreasing oxygenation [6]. When the immune system responds, there is a risk of a cytokine storm syndrome that may cause acute respiratory distress, systemic inflammation, multi-organ failure, and sometimes death [7, 8].

The median incubation time for Covid-19 is 4–6 days (2–14 days) [9]. The main symptoms among adults are fever, a new persistent dry cough, shortness of breath, and occasionally loss of sense of smell. No specific symptoms can distinguish Covid-19 from other common respiratory tract infections, e.g. influenza. Asymptomatic cases or cases with only mild symptoms, e.g. slight cough and sense of illness, may also occur [10]. From early Chinese cohorts of symptomatic patients, the majority have been reported to suffer mild progression of the disease (> 80%), 14% severe (dyspnea, decreased oxygen saturation), and 5% a life-threatening condition [11].

Diagnosis of Covid-19 has thus far (early April 2020) been confirmed by polymerase chain reaction (PCR) analysis of secretions from the nasopharynx (or pharynx) [5]. Reliable serological tests are expected to soon be ready for

widespread use [12]. These tests will be able to detect past SARS-Cov-2 infection, which will be important for identifying individuals who have been infected, and to follow the evolution of the pandemic. The impact on the lungs can in most cases be demonstrated by computerised tomography. There are currently only experimental pharmacological treatments available for Covid-19. Remdesivir is a nucleotide analogue inhibitor of the virus's RNA-dependent RNA polymerases. It has a wide spectrum of antiviral activity against RNA viruses, including SARS-Cov and MERS-Cov [13, 14]. The malaria and rheumatism drug, chloroquine phosphate, demonstrates in vitro activity against SARS-Cov-2, and unverified reports from China also indicate in vivo efficacy in humans [15].

## 1.2 Public Health Response

It is predominantly people greater than 70 years of age and individuals with chronic conditions who are at risk of developing severe Covid-19 disease [11]. Children and young people are reported to contract SARS-Cov-2 infections and transmit the virus, but they seldom suffer a serious course of illness [16]. The progress of a pandemic is essentially hard to forecast due to lack of knowledge about the infectious agent and population response behaviours [17, 18]. This implies that the planning of response measures must be dynamically adapted to surveillance reports on the disease and immunity status in the population that the measures are intended for [19, 20]. SARS-Cov-2 is transmitted through droplets from coughs and sneezing and contact with infectious secretions [9]. The most important measure to prevent virus transmission is, therefore, thoroughness with personal hygiene, i.e. washing hands frequently and carefully, coughing and sneezing in the arm-fold, use of hand sanitizer, and, in certain contexts, use of face masks [21]. The second main preventive measure is social distancing, which ranges from keeping at least a 2-m person-to-person distance to cancellations of sports events, school closures, and household quarantine [22]. The national public health agencies choose social distancing regulations based on an overall assessment of how critical certain activities are for society as a whole and whether motivation to comply with the rules can be assumed. The concept of 'proportionate universalism' is generally applied [23], i.e. that population health interventions are seen as universal, not targeted, with a scale and intensity that is proportionate to the level of collateral disadvantage caused in the community. During the SARS-Cov-2 pandemic, effectively all population-level interventions include the recommendation that social contacts with the elderly, and especially the senior elderly, are to be reduced to an absolute minimum. Domestic and international travel are also generally discouraged, especially to and from metropolitan areas with ongoing disease transmission.

## 2 Recommendations for Sports Health During the SARS-Cov-2 Pandemic

Sports organisations should develop a pandemic response strategy that addresses the needs of its athletes and coaches, while complying with the regulations and recommendations issued by the government and national public health agency. For a society to function during a pandemic, its members need to trust their fellow citizens as well as the government institutions that are issuing regulations [24]. If sportspeople do not believe that most others are going to play by the temporary restrictive rules, they are unlikely to adhere to them. The pandemic strategy of a sports organisation must therefore be unmistakably communicated to its memberships. Swedish Athletic's Covid-19 website [25] is an example of a platform used to communicate a temporary framework for sports practice and competitions to a sports community. The website presents links to national government and public health agency regulations, contact information to managers at the federation office, and recommendations specific for athletics. It is updated hourly by the chief information officer, and its contents are discussed every second day within a multi-disciplinary pandemic task force at the federation.

The temporary frameworks for organised sports practice and competitions must be developed based on the social distancing and quarantine protocols activated during the pandemic. Furthermore, novel arrangements of informal physical exercise for children which conform to prevailing social distancing regulations need to be created. The main principles for the temporary frameworks are that activities should be performed outdoors in small groups and that physical contact is avoided as far as possible. The regulations for football (soccer) practice issued by the Norwegian Football Association demonstrate these principles [26]: maximum 5-person groups, an adult to be present in each group, 2-m person-to-person distance, no physical contact, and balls should not be handled or headed and should be washed after each session. At sports facilities, the sharing of locker rooms by large groups should be avoided and easy access to handwashing facilities provided. In individual sports, virtual competitions can be arranged using Internet resources [27], with athletes participating at the same time and different locations, or at the same location and different times.

Regarding individual athletes, the risk of developing Covid-19 can be reduced by regular sleep, eating a well-balanced diet, and staying well hydrated, to maintain the capacity of the immune system [28]. A proper intake of fruit and vegetables (7–8 portions per day) is beneficial, since these foods contain polyphenols and flavonoids that support immune function [29]. Athletes with asthma

should use their prescribed medications meticulously to reduce the risk for a more serious course of illness. There are as yet no clinical studies of Covid-19 among athletes. In most cases, young people appear to cope well with Covid-19, and the symptoms improve over the course of a week [16]. However, if return-to-sports is made too soon, there is a risk of heart and lung complications [11, 30]. Taking at least 10 days of complete rest from exercise is required, or rest for a minimum of 7 days from when symptoms stop [31]. The period of rest should be followed by stepwise return-to-play with careful evaluation before proceeding to the next level.

The SARS-Cov-2 pandemic is challenging for the elite athlete, considering both the risk of infection and the fact that season's goals and aims must be abandoned. The rules-of-play may also have changed, e.g. with regard to how final league tables are determined and qualifying for major championships, such as the Olympic Games, is decided. Individual-level health monitoring can, therefore, be considered among elite athletes during the pandemic period. High levels of stress have a negative effect on mood and can also reduce the capacity of the body to resist infection [32]. Continuing training can help to relieve some pressures. Season targets should be re-evaluated and new realistic goals determined as soon as possible. Sponsorship and other financial support contracts should then be re-negotiated accordingly. In Swedish Athletics, weekly surveillance of athletes listed for the national team ( $n = 190$ ) was initiated in March 2020. The monitoring uses web-based self-reports of Covid-19 symptoms, if any individuals in the athlete's household or training group have symptoms, and a mood assessment. During the first weeks of monitoring, participation has been satisfactory (about 75%). The collected data are used by the national team coach and medical team for planning of supportive interventions in different areas and at individual and group levels.

### 3 Conclusions

In societies world-wide, the SARS-Cov-2 pandemic has serious effects on morbidity and mortality. In response, societies have restricted social contacts and redirected health service resources to Covid-19 patients. Sports communities are not excluded from the negative consequences of the pandemic. In athletes, Covid-19 can not only cause disruption of training and competition programmes, but also can cause more significant health issues [6, 7, 30]. Athletes not contracting the disease are impacted by the pandemic through cancellation of competitions and loss of incomes. In April 2020, most professional sports have been locked down and thousands of community sports clubs need immediate support to avoid bankruptcy. These collateral consequences of

the pandemic will influence sports participation for a long period of time and require effective countermeasures. To withstand the pandemic, sports organisations should cooperate with national public health agencies, epidemiologists, and sports medical researchers and practitioners to build trust and resilience, protect the elderly and other vulnerable groups, and safeguard sports participation at all levels.

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### Compliance with Ethical Standards

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