DRAFT

SARS-COV-2 AND MOUNTAIN SPORTS

Baffled by the vastly different SARS-CoV-2 mountain restrictions around the world earlier this year, three members of Mountaineering Scotland - Henning Wackerhage, Roger Everett and Simon Richardson - worked together with an international team of researchers and mountaineers from Europe and North America to review the impact of the virus on outdoor mountain sports. Their paper entitled ***SARS-CoV-2, COVID-19 & mountain sports: specific risks, their mitigation and recommendations for policy makers*** *can be downloaded here.*

The paper is a draft and is being made available now because of the immediacy of the current COVID-19 situation in Scotland and the UK. Feedback is welcome - please send any comments to info@mountaineering.scot

The key conclusion is that there is no documented evidence of anyone becoming infected by SARS-CoV-2 whilst participating in outdoor mountain sports. The paper goes on to summarise measures that can be adopted to reduce the risk of SARS-CoV-2 infection during mountain sports and associated activities. To understand the conclusions and recommendations from the paper it is helpful to start by describing the virus and how it works:

SARS-CoV-2 and COVID-19 disease

Coronaviruses are widespread in nature, and they come in several distinct varieties. Four of them cause common colds, so what's so different and dangerous about SARS-CoV-2, the virus that causes COVID-19 disease? There are many reasons, all quite simple in themselves. The virus originated in bats, and when it jumped across into humans it found a new host with no pre-existing immunity – at that level we were defenceless until an immune response had been built from scratch. SARS-CoV-2 is stealthy too, a person can be infected for up to 14 days before they develop symptoms, during the first part of which it may be undetectable by

testing, but later an infected person may infect others before they become ill. Indeed, it's been estimated that up to 70% or even 80% of infected people remain without noticeable symptoms, or the signs are so mild as to be dismissed. It is very infectious, more so than the 'flu and some common cold viruses, so it can spread rapidly through the population. It can be transmitted in an airborne manner, via droplets and tiny aerosols that we emit while we breath and speak. Although most people suffer from only a mild disease (not forgetting or minimizing the phenomenon of 'long COVID' which can be very debilitating even in younger people), it is very dangerous for the elderly and people with underlying health conditions such as obesity, diabetes, heart disease, respiratory issues, dementia and so on. In the UK, 90% of deaths have occurred in the over 65 age group, 75% in the over 75s. The actual death rates are at least 10 times that of 'flu, which itself can cause up to 20,000 deaths in the UK in a bad year (the average is 12,000). While the overall death rate for COVID-19 is around 0.5 to 1%, for the over 85s it may be as high as 25%. Remember that as yet less than 10% of the UK population have been infected by SARS-CoV-2, so the potential final death toll could be ten times that at present. Put all this together and you have a highly infectious virus that can easily spread from people who are unaware that they are infected into a very susceptible age group who are at very high risk of serious disease and death.

The typical symptoms of COVID-19 are a dry cough, fever and/or loss of taste and smell. In more severe cases the infection extends from the upper respiratory tract down into the lungs, resulting in pneumonia, necessitating intensive care treatment with supplementary oxygen. In the most severe cases an over-active inflammatory response can lead to multiple organ failure and death. There have however been some rapid advances in treatment that are reducing the overall death rate. The most effective of these is dexamethasone which reduces the death rate in patients requiring oxygen. In the future we may have monoclonal antibody drugs that inactivate the virus, and of course a vaccine.

What weaknesses does the virus have, how does it spread?

Understanding the enemy is always a good maxim, so what weaknesses does the virus have that we can exploit? The virus particle is actually quite fragile, it can be inactivated by detergents, household cleaning agents, alcohols, drying out, heat and sunlight and is easily diluted beyond the point of danger by plenty of water. Any airborne transmission risk is rapidly whisked away by breezes outdoors, and if we keep our distance we're unlikely to be infected by others. In contrast it will remain infectious for longer in cool, damp, poorly ventilated indoor environments and can spread rapidly if people crowd into such high risk places. Analysis of 'superspreader' events tells us that the vast majority of these take place indoors, while the risk outdoors is several hundred-fold lower. If an infected person deposits respiratory droplets on a surface other people may become infected by later touching that surface and then their mouth or nose. That is where the hand hygiene and surface decontamination measures come in. How long any virus on a surface remains infectious has been a subject of debate. It has become commonplace to recommend leaving huts, for example, unoccupied for 72h between visits of different parties to allow time for the virus to inactivate. More active measures of wiping down common touch objects and surfaces may be preferable because in principle the virus could remain active on a surface in a cool, damp, dark environment for a lot longer than 72h.

What is the risk of COVID-19 infection while participating in outdoor mountain sports, and what measures did various governments bring in that affected mountain sports?

We searched the internet, the medical literature and asked mountaineering organisations in the UK, USA, Canada, Germany, Austria and Switzerland whether there were any examples of people known to have become infected during mountain sports. Apart from one example where a long distance walker probably became infected while staying in mountain accommodation, we could find no such evidence. This makes sense given the routes of transmission and sensitivities of the virus outlined above. In contrast, infections occurring during indoor evening activities were common, a famous example being superspreader events in bars in the Austrian ski resort of Ischgl which seeded the infection into several other countries.

Nonetheless, participation in mountain sports was severely curtailed during the first wave of the pandemic by government restrictions. Comparing different countries, it is noticeable that in Switzerland mountain sports were never specifically prohibited although people were asked to limit their ambitions. Mountain sports remained possible in Germany, although there was guidance to avoid unnecessary travel. Restrictions that limited mountain sports began to be lifted as early as mid-April in Austria without any evidence for a detrimental effect. Indeed, when travel restrictions were lifted in England in May there was no resurgence in infection, all the key indicators continued to decrease as if nothing had changed. The likely reason for this is that transmission is low risk in outdoor environments, it's any associated indoor activities that provide the risk.

How can we assess and mitigate the risk of SARS-CoV-2 infection during mountain sports?

Given the accumulated evidence outlined above, it is possible to make rational risk assessments and provide mitigation guidance to make our sports safer from the COVID-19 point of view. Obviously it is essential for everyone to self-isolate and book a test if they have symptoms and/or have tested positive, or have been identified as a close contact of someone who's tested positive. It is also essential to comply with local and government guidance and restrictions, and to take into account the views of the local population where one's activity is planned.

	High	**Medium**	**Low**

General risk	* New case rates >50/100,000 per week in your local area * Test positivity >5% * Cases increasing exponentially * Health system nearing capacity	* New case rates 10-49/100,000 per week in your local area * Test positivity 1%-5% * Cases doubling time >3 weeks	* New case rates <10/100,000 per week in your local area * Test positivity <1% * Localised contained outbreaks only * Case numbers decreasing * Hospital cases <10/million population
Individual risk of infection	* Lives in a city or crowded accommodation * Frequent social contacts * Poor adherence to social distancing * Travel to high risk countries or regions	* Lives in uncrowded town or accommodation * Good adherence to social distancing * No or few high risk activities in previous 14 days	* Lives in a village * Works from home * High adherence to social distancing * No visits to high risk situations in last 14 days
Risk of severe consequences	* >70 years old * Has one or more underlying health issues	* Between 50 and 70 years old * Only moderate other health issues	* <50 years old * Fit, healthy, no underlying health conditions
Risk during outdoor mountain sport	* If general risk is high, shared or public transport, crowded indoor poorly ventilated locations, very crowded climbs and poor adherence to social distancing during a mountain sport day should be avoided.	* Crowded venues, activities during which social distancing is difficult (multi-pitch climbing, spotting during bouldering)	* Whatever the general and individual risk level, day trips involving travel and climbing in a household group or social bubble, solo or household group hill walking are likely to be COVID-safe

The Table illustrates some simple guidance that one can apply at a personal level to choose an activity suitable for the state of the pandemic at the time. If the general, individual and consequences risks are in the low category, one can safely participate in mountain sports subject to common sense measures such as social distancing wherever possible and avoiding close contact. If two or more of the medium risk categories most closely describe the situation at the time, one should still be able to climb safely but preferably day trips only while avoiding group or shared travel. Many of the high individual risk factors come from personal life style choices, but if the situation is such that two or more of general, individual or consequences risks are high one should seriously consider taking careful precautions to keep yourself and others safe. Climbing, bouldering or hill walking in household or social bubble groups (without pushing your grade) should always be COVID-safe whatever the risk level. If the general and/or

individual risk factors are high it is important to maintain rigorous social distancing with the local community at the chosen venue to lessen the risk of spreading the virus into areas with lower levels of the virus.

What can we do at a practical level to reduce the risk of the virus while participating in mountain sports?

We know that the virus can be transmitted via respiratory droplets, aerosols and contaminated surfaces. During most mountain sport situations, airborne transmission routes can be minimised easily by social distancing. One exception may be sharing a cramped stance on a multi-pitch route while others climb. In this case a face mask may be helpful, providing it is a multi-layered type (improvised coverings fashioned from a bandana or buff are not very effective) and one avoids touching the parts that cover the nose and mouth while taking it on or off (pocket hand sanitiser would be helpful here). Not sharing a confined space, a vehicle or a tent for example, is also a good idea. If you have to share a car, limit occupancy to two people, both in the front wearing masks, have the fan on and rear windows open a little so the airflow goes past your face to exit at the rear. Another simple trick is to avoid face-to-face orientation while talking, and avoid shouting when standing close together as this greatly increases droplet and aerosol production.

Infection via contaminated surfaces presents a potential problem when climbing equipment is shared. A simple but important mitigation is to avoid putting gear or the rope in your mouth while climbing (using a bandolier makes it easier to do this). In principle rock holds could be contaminated with virus. The use of alcohol-based liquid chalk will be an effective method of inactivating the virus on your hands, but having a small bottle of hand sanitizer readily available would also be good. Avoid touching your face, particularly your nose and mouth, if you've handled a potentially contaminated piece of gear - good hand hygiene habits are simple and effective. There has been much discussion about ways of decontaminating potentially infectious climbing gear. Many cleaning agents are incompatible with ropes and other soft

items of equipment but there are simpler but effective alternative methods. Simply washing and rinsing the gear with plenty of water will dilute the virus beyond the point of danger. Drying it thoroughly (for example in a hut drying room with a dehumidifier) will also work, or leaving it out in the sun until thoroughly dry. These active methods are preferable to simply bagging it and leaving it for 72h (the virus likes cool, damp, dark environments).

Conclusions

Our research has found that the risk of contracting or transmitting SARS-CoV-2 appears to be very low while participating in outdoor mountain sports. Given our ever-increasing knowledge and understanding of the virus and its modes of transmission, we can identify high and low risk situations, and apply simple procedures to minimize the risk even when virus prevalence in the community as a whole may be high. Given the value of mountain sports to the general physical and mental health of large numbers of people, these principles may allow a less restrictive approach to mountain sports as we face further waves of the virus in the future.

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