


# Wearing a Mask During Indoor Exercise Can Be Fatal

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By [Carla Peeters](#) June 10, 2022 June 10, 2022 [Masks](#) 11 minute read

A recent article from the Technical University of Munich published in [PNAS](#) reached national [newspapers](#) in [several countries](#) worldwide. The team showed that aerosol emissions increase exponentially with intense physical exertion, indicating that indoor sporting activities result in higher risk of infectious diseases as COVID. The authors suggested the use of face masks, social distancing and ventilation to prevent viral infections during (vigorous) indoor exercise.

However, the study as presented in the newspaper article does not yet prove a higher risk for viral infections by aerosols emitted by healthy persons during indoor sports. The recommendation wearing face masks during vigorous exercise has not been argued to be safe and effective.

Current available information supports a potential risk of long-term from frequent wearing face masks while there is very low to no beneficial effect in preventing the transmission of a virus. Moreover, based on historical information, the transmission of a respiratory virus by persons without symptoms is questioned.

The way the article is presented in the newspapers may result in even stricter protocols during indoor sports while a possible increased risk for death wearing masks during vigorous exercise cannot be ruled out.

## **Vigorous indoor exercise: larger and more aerosols emitted**

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In the study well-trained athletes show significantly higher aerosol emissions than untrained persons due to their higher minute ventilation which indirectly means a higher risk for infection. The authors state that SARS-CoV-2 virus and other respiratory viruses are transmitted via respiratory particles while breathing or speaking. Transmission of these viruses will depend in part on the rate with which these particles are emitted.

Based on their results and gyms being a potential risk for super-spreading events, the authors recommend special protective measures in indoor sports. In cases of high community infection rates with a low vaccination rate testing, using plastic shields, proper distance, high-quality ventilation systems and wearing masks by fit and young athletes during high-impact training in indoor gyms is recommended. At low workloads only distancing and ventilation systems would be needed.

Another study that was recently published in Communication Medicine found that aerosol mass emission during vigorous exercise is not different from speaking at a conversational level. Though speaking generates larger particles and exercise generates smaller particles. Face masks could be used with very vigorous exercise as larger particles are produced with increasing intensity of training. Social distancing is suggested as a preventative measure for COVID-19 for non-exercise-based social interaction and most low-impact exercises as the aerosol particles emitted are too small and could penetrate through the mask. During the experiment five healthy and fit young people of the 25 participants (both sexes) could not complete the very vigorous exercise testing period due to exhaustion.

## **How super-spreading events were defined**

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Using cell phone data of 98 million US people, researchers found the indoor public places most responsible for the spread of COVID-19, showing that restaurants and gyms were the places at most risk for super-spreading events. In Chicago, 10% of the places people visited accounted for 85% of the infections, with higher infections in lower income neighborhoods.

Super-spreading events are characterized by venues when one positive-tested person is traced to many other people testing positive. Several super-spreading events have been in the news where a group of people were tested positive for the SARS-CoV-2 virus after indoor exercising. Remarkably, in most cases the identified index person was either mildly symptomatic or had not yet developed symptoms.

A potential role of airborne transmission of the virus by aerosols (droplets < 5 um) in indoor venues is now broadly acknowledged. The smaller lighter aerosols can linger and accumulate in the air and travel long distances on air currents. Previously the dominant view was that respiratory viruses are transmitted by larger droplets that fall on surfaces within about 2 meters or are transferred by people's hands. Catching the virus from surfaces – although plausible – seems to be rare.

Researchers presume super-spreading events might become larger and more frequent as more transmissible SARS-CoV-2 variants are becoming more prevalent. Smaller, more densely occupied venues could be at greater risk when visited for longer periods and being poorly ventilated.

## **Testing and infection transmission of asymptomatic people questioned**

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More than two years into the pandemic, there are many questions about an asymptomatic SARS-CoV-2 infection left. Interesting to notice is that in China, at the start of the pandemic, infected individuals weren't immediately causing exponential local outbreaks. Similarly, many health care workers treating patients at a time that personal equipment was not routinely used remained seronegative. Also living closely together in one house will not assure one will get a positive PCR test and/or symptoms.

It became complex when doctors found disease symptoms in asymptomatic people. One example is from Wuhan early in the pandemic, which showed that about one-third of persons with asymptomatic infections had lung changes that were visible on computed tomography scans indicating end organ damage. Another example is the US FAIR Health study that found 19% of cases of Long COVID have resulted from asymptomatic infections. However, symptoms like Long Covid or a loss of smell could have other origins as well.

To determine the extent to which people without symptoms testing positive with either the PCR test, rapid antigen test or antibody test contribute to the COVID-19 pandemic remains a challenge. Especially since the term asymptomatic can be used in various ways. Strictly the definition would be a laboratory confirmed SARS-CoV-2 infection as determined by PCR or serology but with no symptoms related to COVID-19 for the duration of the infection.

The highly sensitive PCR test may result in high numbers of false positives and false negatives when asymptomatic people are tested. The PCR test can detect the presence of a piece of RNA of the SARS-CoV-2 virus. However, the RNA alone may remain detectable for months after a previous infection resulting in a positive test. Unfortunately, materials and methods of published articles and reports do not always present the number and type of gene probes and Ct values used in PCR tests and could therefore lead to different data among various studies.

Furthermore, it is unknown whether tests used are correctly validated against viral infectivity in culture; e.g. detecting a virus that might be able to transmit to another person and cause infection. In many countries a variety of PCR tests have been used with Ct values > 30 with a risk for high percentages of false positives. Depending on the gene probes used, cross-reactivity with other (corona)viruses may occur. Rapid antigen tests have been validated across PCR tests and are therefore prone to high numbers of false positives and false negatives for people without symptoms as well.

Other problems have been in the news, like contamination at sampling and laboratory sites where large quantities of tests were handled, shortness in materials using only one gene probe for PCR testing, inexperienced personnel and unreliable tests adding up to a possible low quality of diagnosis used, based on which data have been analyzed and presented.

Researchers propose that 20-40% of global infections are asymptomatic. These data are mostly based on diagnostic tests without analysis of symptoms by a medical doctor. A qualification between symptomatic or asymptomatic can be questioned and is in many cases not notified.

The discussion continues, as it is very hard to detect aerosols outside the laboratory and show that they contain and transmit the virus to another person and cause COVID-19 symptoms.

SARS-CoV-2 virus is one of the most extensively studied immune targets that led to reappraisal of former textbooks. Up to now, a possible cause of symptoms by long-term wearing of masks, frequent use of disinfectant and testing which has never been seen in history before, has not been evaluated.

## **Wearing of masks during exercise can be fatal**

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Harvard Medical School, the Mayo Clinic, the Cleveland Clinic, Bangkok hospital and several medical doctors and researchers in the UK recommend wearing masks during sports. While face masks may not be comfortable, they can protect against COVID-19 and won't interfere with your efforts to stay fit during the pandemic, so they say.

The CDC urges gym goers to wear masks while working out at fitness centers even during high-intensity exercise, but it's okay for people who are fully vaccinated to exercise indoors without a mask. However, the WHO does not recommend wearing a mask during sports. A serious warning was given by Cambridge news and other news outlets when two Chinese children died while running while wearing a mask.

Results of the poorly studied impact of covering mouth and nose with face masks or other respiratory devices on the physiological and perceptual responses during exercise have been controversial. The small cohorts of participants of those studies were mostly selected persons with athletic abilities, as those with cardio-pulmonary and other disorders were not included.

As a 25% rise in emergency cardiovascular events among under 40 population in Israel during vaccine rollout and the third COVID-19 wave is noticed, safety and effectiveness for wearing masks (during sports) is an important topic.

Up to now more than 150 studies do not allow the conclusion that without any doubt the wearing of masks can protect against infection and prevent transmission of a virus. A report of the ECDC concludes there is no real evidence in favor of face masks. Furthermore, the number of peer-reviewed publications suggesting the potential harms by frequent and long-term wearing masks, which have been neglected earlier, are piling up.

A recent study (not peer-reviewed yet) showed the increase of CO<sub>2</sub> while wearing a mask. The CO<sub>2</sub> content reached levels above the set risk level of 5,000 ppm (acceptable threshold for workers) for 40.2% of the people wearing medical masks and for 99.0% of the people wearing a FFP2 mask. A special article COVID-19 and masks in sports also found an enhancing effect on pCO<sub>2</sub> in case of intense physical exercise.

The use of masks in athletes causes hypoxic and hypercapnic breathing as evidenced by increased effort during exercise. Another study found that wearing a face mask during exercise intensity mostly affects perceptual responses, causing an increase in the rate of perceived breathlessness and overall exertion with limited influence on pulse oxygen, blood lactate, and heart rate responses.

Participants wearing masks reported marked discomfort, such as feeling hot, humid, and breathing resistance and claustrophobia with higher exercise intensity. While other researchers could not measure significant detectable differences, these signs need to be taken seriously.

Both oxygen and carbon dioxide are the primary gaseous substrate and product respectively, of oxidative metabolism. Variations in the levels of these gases outside the physiological range can lead to pathological conditions including respiratory and heart problems, permanent injury, immune suppression, increased aging, and altered gene expression for fertility and death. Carbon dioxide poisoning is recognized as an often-forgotten cause of intoxication in the emergency department.

A change in these gases, albeit small, may influence a disbalance in the microbial flora, resulting in a weakened immune system that may be noticed by mask acne and mask mouth with an increased risk for infectious diseases and chronic diseases.

Authors from a study published in *Frontiers in Physiology* raised particular concern for individuals exercising in a hot and humid environment, which can break down the mask and lose the ability to block outgoing viruses and germs, and experience a hot facial temperature and difficulties with breathing.

The results from an observational study published in Medicine strongly suggest that mask mandates caused 50% more deaths compared to no mask mandates. It is theorized that hyper-condensed droplets caught by masks are reinhaled and introduced deeper into the respiratory tract could be responsible for the increased mortality rate (The Foegen effect).

Also, a peer-reviewed study published in April 2022 on mask usage across Europe noted a moderate positive correlation between mask usage and deaths in Western Europe.

A recent review concluded a potential risk for developing MIES (Mask Induced Exhaustion Syndrome) by long-term wearing of masks.

The safety of masks used by the general public cannot be guaranteed. Toxic compounds like nanoparticles (graphene oxide, titanium dioxide, Silver, Zinc oxide) and microplastics have been found. Masks delivered by governments have been retracted from the market in The Netherlands, Canada, Germany and Belgium. Recent studies demonstrated the presence of microplastics and nanoparticles in blood, deep lung tissue and the liver. Microplastics and nanoparticles deplete the body, by forming bio corona, from essential nutrients, proteins and cells which the body needs to function properly. A recent review assessed the potential carcinogenicity of increased exposure to microplastics and nanoparticles in humans.

At this moment there is no proof that long-term wearing of masks during normal life is safe and effective. With a lack of evidence of the transmission of an infectious virus by an asymptomatic person and the effectiveness of wearing masks, mask mandates should be banned immediately. There is a serious indication for irreversible harm which might increase when people have been vaccinated and might be more sensitive to oxidative stress.

## **Exercise Can Prevent Infectious Disease**

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For many years it is known that individuals with a regular exercise habit report fewer symptoms associated with upper respiratory illnesses. Data from epidemiological studies suggest that regular exercise can protect the host organism from infections like COVID-19 such as influenza virus, rhinovirus, varicella zoster and herpes simplex virus. The remarkable low prevalence of COVID-19 in a Sub-Saharan Africa region is thought to be related to moving more and sitting less

Instead of focusing on the level of aerosol production and arguing for mask wearing, testing without symptoms, and social distancing, it would be much more beneficial to support exercise in a ventilated environment (with the right humidity and temperature) and healthy living. This would be a better way to manage successfully the next seasonal outbreak of respiratory diseases and prevent a tsunami of chronic diseases and suicides.

Journalists of prominent newspapers/channels could play a supportive role in rebuilding trust in health by delivering honest and balanced science-based information to the public based on critical analyses.

## Author

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Carla Peeters is founder and managing director of COBALA Good Care Feels Better. She obtained a PhD in Immunology from the Medical Faculty of Utrecht, studied Molecular Sciences at Wageningen University and Research, and followed a four-year course in Higher Nature Scientific Education with a specialization in medical laboratory diagnostics and research. She studied at various business schools including London Business School, INSEAD and Nyenrode Business School.