

## Health & Physiology

# The Face Mask Dilemma: to wear or not to wear, that is the question

by **Reinier Prose**<sup>1</sup> | PhD student

<sup>1</sup>: Department of Molecular Biology, Faculty of Science, University of Geneva, Geneva, Switzerland

This Break was edited by Max Caine, *Editor-in-chief* - TheScienceBreaker

### ABSTRACT

*COVID-19 is raging across the world. Lacking available treatments, policymakers are looking for efficient public health measures that could turn the tide. The general use of face masks in public spaces is one proposed strategy that is, however, widely disputed. Here, we zoom in on the most recent study investigating the effect of surgical face masks in halting the spread of coronavirus particles.*



Image credits: Pixabay

The world has come to a standstill as COVID-19 hits us like a wave. A wave that has been steadily growing ever since the first case was reported in Wuhan, China, at the end of last year. Since there are currently no efficient treatment options for COVID-19 – and the vaccine is still months away (if not longer) – we now resort to more classic preventive strategies: isolating symptomatic individuals, physical distancing, contact tracing, and hygienic measures such as thorough washing of the hands. Across the world, these preventive measures have been put into place. However, each country decides individually which strategies to implement. This adds to the general confusion about what measures are strictly necessary to limit the spread of the novel virus and which ones are not.

One such measure involves the wearing of (surgical) face masks. In South-East Asia the use of such masks has been more common in daily life, already before the COVID-19 pandemic hit. From the very beginning, China enforced the wearing of face masks in many places, regardless of showing symptoms. The same is true for South Korea, Taiwan, and Hong Kong, which have all managed to more successfully slow the spread of COVID-19 compared to the rest of the world.

The correlation between imposing the use of face masks and slowing the spread of COVID-19 at the population level is, however, just that: a correlation. It is still impossible to tell a causal relationship

between the two, and so it is difficult for other countries to make up their minds. This leads to contradicting policies, exemplified by the necessity to wear face masks in Austria, but not across the border in Germany. Some countries may yet adjust their recommendations during the coming period, as has been the case in the United States of America. Whereas face masks were initially only advised for use by the sick and their immediate caregivers, they are now advised to be worn by the larger public.

The publication of a very recently published study in the journal *Nature Medicine* greatly influences the current debate regarding the use of face masks in battling COVID-19. The authors of this study recruited 246 patients who were treated in a private hospital in Hong Kong. All participants exhibited at least two symptoms of acute respiratory infection, were recruited within three days of illness onset and were above the age of 11. The researchers first determined the exact virological cause of illness for all participants. Then they randomly assigned them to two groups, before providing an exhaled breath sample: one group was given a surgical face mask; the other was not. To collect the breath sample – with or without mask – normal breathing sufficed, but a (natural) cough or series of coughs was also allowed.

About half of the participants, 123 out of 246, were indeed diagnosed with an acute respiratory viral infection. From these, 114 were infected, of which 17 by a human coronavirus, 43 by the influenza virus, and 54 by the rhinovirus. Note that the study participants were recruited between 2013 and 2016, and so the coronavirus infections detected were not caused by the recent SARS-CoV-2, but by closely related strains (NL63, OC43, 229E, and HKU1). Respiratory droplets and aerosols collected during the breathing test were examined for viral RNA. The difference between respiratory droplets and

aerosols depended on the size of the particles: above 5  $\mu\text{m}$  in size were counted as respiratory droplets and below 5  $\mu\text{m}$  as aerosols. For the Corona patients, 30% of droplets and 40% of aerosols acquired from participants who had not worn a surgical face mask contained viral RNA. These numbers dropped to 0% for those that did. It clearly shows that the face mask drastically reduced the spread of viral particles.

The absolute drop in coronavirus particles when wearing a surgical face mask is what now drives policymakers to take them more seriously in battling COVID-19. It is nevertheless important to realize that the present study is rather limited in its sample size. Also, this study included patients infected by different Corona strains, not the novel SARS-CoV-2 strain. Nonetheless, it strongly implies that diagnosed COVID-19 patients could indeed limit the further spread of the disease by wearing surgical face masks.

Importantly, the current study does not speculate on whether face masks can also protect people from acquiring the virus. It remains difficult for policymakers to decide what approach is best regarding the use of face masks. An important consideration is that many people have been shown to be infectious while being either a- or pre-symptomatic. As such, the general use of face masks could prevent unexpected infection. However, to complicate the matter further, not enough surgical face masks are available for everyone. This means that enforcing the use of face masks for the general public could limit the supply to places where they are most needed, such as hospitals. In any case, during these difficult times, most governments have shown to tailor their policies with careful regard to the latest research. The study detailed here will hopefully allow more unified decision-making and less confusion in these already disturbing times.