

Scientific Information on Masks Against COVID-19

David Crowe
May 20, 2020
Version 2

Masks are being widely recommended as protection against the COVID-19 virus, both to protect the wearer from infection, and to protect others from wearers who do not know that they are infected. Trouble is, most of the scientific evidence and recommendations are against the use of masks by the general public. Despite this they are increasingly mandated. In some places you cannot walk around outside without a mask, in others you cannot go inside a public space without a mask. Workers are often mandated to wear them. And now airline passengers, no matter the length of their flight.

Evidence for the use of Masks

The strongest evidence for the use of masks is a Cochrane Collaboration review “Physical interventions to interrupt or reduce the spread of respiratory viruses”. Seven studies from the era of SARS found that mask-wearing was highly effective in case-control studies, although this type of study is subject to bias because the control arm is simply a representative group, unlike in a placebo controlled trial (very difficult with masks). For example, if the cases are sicker than the controls, they may behave differently, including in wearing a mask.

Of the seven papers, five studied only health-care workers, and this article does not question whether health care workers should wear masks. This leaves only two papers. One provided no socio-economic or health data on the case versus control groups, leaving open the possibility that there were differences. The last study confirmed this, the cases (who had been diagnosed with ‘probable’ SARS, i.e. without a SARS test) were significantly sicker than the controls, which makes sense because people who were diagnosed with SARS tended to have pre-existing health conditions, just as is found with COVID-19. Mask wearing and hand washing were more common in controls, resulting in the conclusion that they were protective. But attending farmer’s markets was also ‘protective’, but in reality probably just reflects the better health of the control group. Really sick people may avoid the use of masks because it interferes with their breathing when they already have problems. This possibility was not considered by either paper.

So, in conclusion there are two papers that claim that wearing masks was protective against SARS, but one admits that the control group was significantly healthier than the case group, and the other paper is silent on this important source of bias.

There are also the hamsters, however. No, Hong Kong University did not find a source of hamster sized surgical masks, but in an unpublished paper, they describe putting a surgical mask over the air flow between a cage of RNA positive hamsters and a cage of RNA negative hamsters, and documenting that a higher proportion of the RNA-negative hamsters became RNA-positive when there was no mask over the airflow. It is not clear why the researchers believe their studies can be extrapolated directly to people. Although newspaper articles claim that the paper has been released, not even the Hong Kong University press release, the institution where the work was performed, provided any details about its location.

Evidence against the use of Masks

1. A very recent review of the literature that was published in the CDC journal, “Emerging Infectious Diseases” did not find evidence that handwashing or masks were protective against influenza. Masks did not help infected people reduce their risk of infecting others, nor reduce the risk of uninfected people contracting influenza.

“In this review, we did not find evidence to support a protective effect of personal protective measures or environmental measures in reducing influenza transmission...Hand hygiene is a widely used intervention and has been shown to effectively reduce the transmission of gastrointestinal infections and respiratory infections. However, in our systematic review, updating the findings of Wong et al., we did not find evidence of a major effect of hand hygiene on laboratory-confirmed influenza virus transmission...We did not find evidence that surgical-type face masks are effective in reducing laboratory-confirmed influenza transmission, either when worn by infected persons (source control) or by persons in the general community to reduce their susceptibility...It is essential to note that the mechanisms of person-to-person transmission in the community have not been fully determined. Controversy remains over the role of transmission through fine-particle aerosols.”

[Xiao J et al. Nonpharmaceutical Measures for Pandemic Influenza in Nonhealthcare Settings—Personal Protective and Environmental Measures. Emerg Infect Dis. 2020 May 17; 26\(5\).](#)

2. A Korean study put masks on COVID-19 infected people and did not reduce the transmission of droplets when patients coughed with a mask on.

“Neither surgical nor cotton masks effectively filtered SARS–CoV-2 during coughs by infected patients.”

[Bae S et al. Effectiveness of Surgical and Cotton Masks in Blocking SARS-CoV-2: A Controlled Comparison in 4 Patients. Ann Intern Med. 2020 Apr 6.](#)

Adverse Consequences of Masks

Adverse consequences of masks are most obvious among health-care workers, where use is more controlled, but members of the general public who voluntarily wear masks for extended periods of time may experience similar problems.

1. A study in BMJ showed that people who were told to wear cloth masks for extended period of time (for purposes of this study) had higher rates of influenza-like illness than other health care workers but could decide if and when to wear masks, and higher rates than those wearing surgical masks. Even among health care workers, mask wearing could be counter-productive.

“The rates of all infection outcomes were highest in the cloth mask arm, with the rate of ILI [influenza-like illness] statistically significantly higher in the cloth mask arm (relative risk (RR)=13.00, 95% CI 1.69 to 100.07) compared with the medical mask arm. Cloth masks also had significantly higher rates of ILI compared with the control arm [workers who followed standard practice, which could sometimes include mask wearing]. An analysis by mask use showed ILI (RR=6.64, 95% CI 1.45 to 28.65) and laboratory-confirmed virus (RR=1.72, 95% CI 1.01 to 2.94) were significantly higher in the cloth masks group compared with the medical masks group. Penetration of cloth masks by particles

was almost 97% and medical masks 44%.”

[MacIntyre CR et al. A cluster randomised trial of cloth masks compared with medical masks in healthcare workers. *BMJ Open*. 2015 Apr 22; 5\(4\): e006577.](#)

2. A study from Singapore found an increased risk of headaches, indicative of oxygen deprivation, among health care workers. This may or may not apply to the general public who generally wear masks that are less tight fitting (and therefore less effective).

“A total of 158 healthcare workers participated in the study. Majority [126/158 (77.8%)] were aged 21-35 years. Participants included nurses [102/158 (64.6%)], doctors [51/158 (32.3%)], and paramedical staff [5/158 (3.2%)]. Pre-existing primary headache diagnosis was present in about a third [46/158 (29.1%)] of respondents. Those based at the emergency department had higher average daily duration of combined PPE exposure compared to those working in isolation wards [7.0 vs 5.2 hours] or medical ICU [7.0 vs 2.2 hours]. Out of 158 respondents, 128 (81.0%) respondents developed de novo PPE-associated headaches. A pre-existing primary headache diagnosis (OR = 4.20 and combined PPE usage for >4 hours per day (OR 3.91) were independently associated with de novo PPE-associated headaches. Since COVID-19 outbreak, 42/46 (91.3%) of respondents with pre-existing headache diagnosis either “agreed” or “strongly agreed” that the increased PPE usage had affected the control of their background headaches, which affected their level of work performance.”

[Ong JJY et al. Headaches Associated With Personal Protective Equipment - A Cross-Sectional Study Among Frontline Healthcare Workers During COVID-19. *Headache*. 2020 05; 60\(5\): 864-877.](#)

Opinions against the use of Masks

1. WHO has stated that is no benefit to healthy people wearing masks in public, and there is only limited evidence that masks help when in contact with a sick person.

“There is limited evidence that wearing a medical mask by healthy individuals in the households or among contacts of a sick patient, or among attendees of mass gatherings may be beneficial as a preventive measure. However, there is currently no evidence that wearing a mask (whether medical or other types) by healthy persons in the wider community setting, including universal community masking, can prevent them from infection with respiratory viruses, including COVID-19.”

[Advice on the use of masks in the context of COVID-19. WHO. 2020 Apr 6.](#)

2. The University of Minnesota Center for Infectious Disease Research and Policy (CIDRAP) does not recommend that the public wears masks, because they do not work, they may reduce other preventive measures, and they risk the supply of masks for healthcare workers.

“We do not recommend requiring the general public who do not have symptoms of COVID-19-like illness to routinely wear cloth or surgical masks because: There is no scientific evidence they are effective in reducing the risk of SARS-CoV-2 transmission Their use may result in those wearing the masks to relax other distancing efforts because they have a sense of protection We need to preserve the supply of surgical masks for at-risk healthcare workers.”

[Brousseau LM et al. COMMENTARY: Masks-for-all for COVID-19 not based on sound data. *CIDRAP*. 2020 Apr 1.](#)

3. Experts from the Chicago School of Public Health do not recommend that the general public wear masks, for similar reasons to CIDRAP. “We do not recommend requiring the general public who do not have symptoms of COVID-19-like illness to routinely wear cloth or surgical masks because: (1) There is no scientific evidence they are effective in reducing the risk of SARS-CoV-2 transmission. (2) Their use may result in those wearing the masks to relax other distancing efforts because they have a sense of protection. (3) We need to preserve the supply of surgical masks for at-risk healthcare workers.”
[Brosseau L et al. Commentary: Masks-for-all for COVID-19 Not Based on Sound Data. University of Illinois at Chicago School of Public Health. 2020 Apr 2.](#)
4. An experienced ER nurse (RN, MSN) examined the data when her grandchild’s pre-school decided that even toddlers need to wear masks, and her literature review produced a lot of information against mask wearing, and she showed that the seven papers by the CDC in support of mask wearing are irrelevant to the subject.

[Neuenschwander P. Healthy People Wearing Masks to Stop Corona Not Supported by Science. Jennifer Margulis. 2020 May 13.](#)

Conclusions

Evidence is largely against mask-wearing by the general public. It is generally seen as ineffective, may take attention away from other protective measures, will reduce the supply of masks for healthcare workers, and may cause harm when worn for extended periods of time.

© Copyright May 22, 2020. [David Crowe](#)