



## Covid-19: What is the evidence for cloth masks?

As the US Centers for Disease Control and Prevention has advised all Americans to wear cloth masks in public to prevent the spread of covid-19, *The BMJ* examines the evidence

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The BMJ

### What has the CDC recommended?

People should wear cloth face coverings in public places where social distancing measures are “difficult to maintain,” such as supermarkets and pharmacies, the CDC advises. It said the masks can be “fashioned from household items or made at home from common materials at low cost.” It also warned that surgical masks and N-95 respirators should not be used by the public, as these were “critical supplies that must continue to be reserved for healthcare workers and other medical first responders.”

### How do you make a homemade cloth mask?

The CDC recommends using tightly woven cotton fabric, such as quilting fabric, cotton sheets, or T shirt fabric. It provided instructions on how to make masks with or without sewing, including using a bandana and coffee filter to create a face covering.<sup>1</sup>

### But are they effective?

Very little good quality research exists on the use of cloth masks, especially in non-medical settings. One randomised controlled clinical trial of cloth masks, published in *BMJ Open* in 2015, compared their effectiveness with that of medical masks worn by hospital healthcare workers.<sup>2</sup> The study, involving the industry partner 3M (which makes medical masks), reported that healthcare workers “should not use cloth masks as protection against respiratory infection. Cloth masks resulted in significantly higher rates of infection than medical masks, and also performed worse than the control arm.”

In an updated comment on the study (30 March),<sup>3</sup> the authors said, “There have been a number of laboratory studies looking at the effectiveness of different types of cloth materials, single versus multiple layers and about the role that filters can play. However, none have been tested in a clinical trial for efficacy.”

They also advised healthcare workers who choose to wear cloth masks to “have at least two and cycle them, so that each one can be washed and dried after daily use. Sanitizer spray or UV disinfection boxes can be used to clean them during breaks in a single day. These are pragmatic, rather than evidence-based suggestions, given the situation.”

A preprint of a rapid systematic review has assessed the current evidence on respiratory illnesses and the use of face masks

(mainly surgical paper masks) in community settings.<sup>4</sup> The paper, yet to be peer reviewed, included 31 studies, of which 12 were randomised controlled trials. The researchers reported that “wearing facemasks can be very slightly protective against primary infection from casual community contact, and modestly protective against household infections when both infected and uninfected members wear facemasks.” However, they said that many of the studies “suffered from poor compliance and controls.”

They concluded, “The evidence is not sufficiently strong to support widespread use of facemasks as a protective measure against covid-19. However, there is enough evidence to support the use of facemasks for short periods of time by particularly vulnerable individuals when in transient higher risk situations.”

Commenting on these findings, Simon Clarke, associate professor in cellular microbiology at the University of Reading, said, “There is only very limited evidence of the benefits of wearing face masks by the general public, no evidence that wearing them in crowded places helps at all, and no evidence at all yet related to covid-19 . . . The authors also acknowledge that mass face mask wearing by the public would likely cause shortages among people who genuinely need protective equipment—healthcare workers on the front line in our hospitals.”

But Ian Jones, professor of virology at the University of Reading, said, “If an aerosol droplet hits the weave of the mask fabric rather than the hole it is clearly arrested. And lessening the aerosol dose chips away at the R0 [reproduction number] and helps to slow the epidemic . . . They are not a cure but they address the longer flatter epidemic curve everyone is trying to achieve.”

### Have other countries recommended masks for the public?

Israel, Austria, the Czech Republic, Hong Kong, and Mongolia are among the countries that have implemented or recommended mask wearing in the community.

### Could it have negative effects?

Experts have warned that recommending that members of the public wear masks can lead to shortages for those who are more

in need: health and care workers and immunocompromised people, for example. It can also lead to complacency.

Susan Michie, director of University College London's Centre for Behaviour Change and a fellow of the Academy of Medical Sciences, said, "There are several explanations as to why face masks have not generally been found to be effective if worn by the general population: they do not protect against the virus getting into the eyes (only close fitting goggles do this); people may not fit the masks properly or take them on and off; and people may have a false sense of reassurance and thus pay less attention to other behaviours key to reducing transmission, such as social distancing and handwashing."

This was echoed by the infectious disease physician Ben Killingley. He said there were several reasons why masks were not seen as being as effective in the community. These included that people "find it difficult to be compliant with mask use all of the time and that people may start wearing the masks too late." The other problem, he said, was that the public did not have the resources to ensure safe mask use: changing them often, frequent hand hygiene, and removing and disposing of them safely.

Killingley added, "Face masks are not an infinite resource and should be reserved for when they are most effective. It would not be good if we were not able to provide masks to healthcare workers because the public had consumed supplies."

## What does WHO say?

In guidance issued on 6 April,<sup>5</sup> WHO said that medical masks should be reserved for health workers. Most spread of the covid-19 virus is from known cases and requires contact with droplets from a cough or sneeze or infected surfaces. It said that "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." Wearing masks in the community can also give people a false sense of security, it said, and lead to them neglecting other measures, such as hand hygiene and physical distancing.

- 1 Centers for Disease Control and Prevention. Use of cloth face coverings to help slow the spread of COVID-19. <https://www.cdc.gov/coronavirus/2019-ncov/prevent-getting-sick/diy-cloth-face-coverings.html>.
- 2 MacIntyre CR, Seale H, Dung TC, et al. A cluster randomised trial of cloth masks compared with medical masks in healthcare workers. *BMJ Open* 2015;5:e006577. 10.1136/bmjopen-2014-006577. 25903751
- 3 MacIntyre CR. A cluster randomised trial of cloth masks compared with medical masks in healthcare workers[response]. *BMJ Open* 2020;30. <https://bmjopen.bmj.com/content/30/5/4/e006577.responses#COVID-19-shortages-of-masks-and-the-use-of-cloth-masks-as-a-last-resort.25903751>
- 4 Brainard JS, Jones N, et al. Facemasks and similar barriers to prevent respiratory illness such as COVID-19: a rapid systematic review. medRxiv 2020.04.01.20049528; 10.1101/2020.04.01.20049528.
- 5 World Health Organization. Advice on the use of masks in the context of COVID-19. 6 Apr 2020. [https://www.who.int/publications-detail/advice-on-the-use-of-masks-in-the-community-during-home-care-and-in-healthcare-settings-in-the-context-of-the-novel-coronavirus-\(2019-ncov\)-outbreak](https://www.who.int/publications-detail/advice-on-the-use-of-masks-in-the-community-during-home-care-and-in-healthcare-settings-in-the-context-of-the-novel-coronavirus-(2019-ncov)-outbreak).

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