



## COVID-19: MASKS (PPE) AND NON-PPE FACE COVERINGS FOR MEMBERS OF THE PUBLIC

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**Question:** What is the best available evidence regarding members of the public wearing masks (PPE) and face coverings (non-PPE masks) in the context of COVID-19?

**\*ALERT\* Evidence regarding COVID-19 is continually evolving. This Evidence Brief will be updated regularly to reflect new emerging evidence but may not always include the very latest evidence in real-time.**

### Key messages:

- The primary modes of COVID-19 transmission appear to be via saliva and mucous droplets (e.g. from coughing and sneezing) and environmental surface contamination via such droplets.
- Smaller aerosolised particles may play a role in virus transmission particularly in the context of aerosol generating procedures in clinical settings and in crowded, indoor conditions with poor ventilation.
- Asymptomatic/pre-symptomatic transmission may occur through droplet, contact, and smaller airborne particle routes.
- Non-PPE face coverings (e.g. cloth masks) are not a suitable or effective substitute for proper PPE and should not be used or recommended for use by health and aged care staff unless in the context of crisis-level shortages.
- Members of the public should not wear PPE (i.e. surgical/medical masks) unless experiencing respiratory symptoms and/or are suspected of potential COVID-19 infection.
- Cloth face coverings, if correctly and consistently used, may contribute to broader infection control interventions in public/community settings especially in areas with higher risk of community transmission.
- Cloth face coverings may pose an infection risk if used incorrectly or without adherence to other infection control approaches (e.g. hand hygiene, physical distance, cough/sneeze etiquette).
- Wearing a cloth face covering in public places should not replace correct and regular handwashing, cough/sneeze etiquette, and adequate physical distance (one-and-a half to two metres) from other people.

## Summary

**Background:** COVID-19 (from ‘severe acute respiratory syndrome coronavirus 2’ (or ‘SARS-CoV-2’) is a newly discovered (novel) coronavirus first identified in Wuhan, Hubei province, China in 2019 as the cause of a cluster of pneumonia cases.<sup>1</sup> Coronaviruses are similar to a number of human and animal pathogens including some of those which cause the common cold as well as more serious illnesses including severe acute respiratory syndrome (SARS/ SARS-CoV-1) and Middle East respiratory syndrome (MERS). Since discovery, COVID-19 has spread to many countries and was declared a global emergency by the World Health Organization (WHO) on 30 January 2020,<sup>2</sup> and a pandemic on March 11.<sup>3</sup> The most at-risk individuals of infection are those in close contact with people with COVID-19 which includes health and aged care workers and others living and/or working in especially crowded/busy indoor environments with poor ventilation. While members of the public should not wear PPE unless suspected of COVID-19 infection or in direct contact with someone who is, there is emerging evidence supporting non-PPE face coverings as part of broader infection control interventions to reduce transmission.<sup>4</sup>

### **COVID-19 transmission: droplets, surfaces, and aerosols**

Based on currently available evidence, COVID-19 is transmitted when the virus enters the body via the mucosae (mouth and nose) or conjunctiva (eyes) which can occur through;<sup>5</sup>

- direct person-to-person contact,
- respiratory droplets >5-10 µm in diameter (e.g. from coughing and sneezing), and;
- indirect contact from touching infected environmental surfaces/formites and transferring viral particles to the mucosae or conjunctiva.

There is ongoing inquiry regarding the potential for smaller viral particles/aerosols (<5µm) to remain in the air and upon different environmental surfaces. Specific evidence for COVID-19 transmission is emerging, particularly around the potential for ‘airborne’ transmission.<sup>6</sup> It is important to recognise that both large and smaller droplets travel through the air and may be considered ‘airborne’, however smaller droplets behave differently to larger droplets as they are lighter, more buoyant, and evaporate more quickly. The science regarding the airborne transmission of disease is itself complex and equivocal.<sup>7</sup> Questions remain regarding virology (i.e. what amount of a virus is enough to cause an infection?) and biophysics (i.e. how do particles move in the air under different conditions?).<sup>8</sup> The SARS-CoV-2 may be found in small, aerosolised particles,<sup>9</sup> but the extent to which these smaller particles pose an infection risk or how they move in the air under different conditions is currently unconfirmed.<sup>8</sup> Some authors have indicated that combined with previous and developing understandings regarding the behaviour of aerosolised particles from coughs, sneezes and aerosol generating procedures, as well as evidence concerning other respiratory viruses (e.g. SARS-CoV-1), the emerging evidence regarding the potential for COVID-19 to be a transmission risk via aerosols suggests that additional precautions beyond usual droplet and contact contamination should be considered in some contexts such as crowded, poorly ventilated, and indoor environments.<sup>6,10-16</sup>

**For further summarised information regarding COVID-19 please see:**

[\*\*Evidence Brief: COVID-19 Modes of Transmission and Infection\*\*](#)

[\*\*Evidence Brief: COVID-19 Personal Protective Equipment\*\*](#)

Because so little is known regarding the infectious potential and behaviour of aerosolised droplets, the level of infection risk that actions such as singing and as speaking, which can generate smaller particles, pose is still uncertain.<sup>8,17</sup> Uncovered, droplets and aerosols from coughs, sneezes, and talking can travel and/or remain in the air for prolonged periods up to several metres under certain conditions, such as in indoor environments with poor ventilation.<sup>9,18</sup> This is why cough/sneeze etiquette and careful adherence to protective measures and infection control (e.g. physical distance, hand hygiene) is vital.

Evidence regarding the potential risks for aerosol transmission and contamination is emerging and currently inconclusive, however some authors do suggest that PPE precautions and guidance regarding transmission of COVID-19 could be revised to account for potential airborne risks.<sup>10,13,14,19,20</sup>

### ***Personal protective equipment for members of the public***

The WHO recommends rational use of PPE and urges precautions for droplet and contact transmission in the setting of caring for people with COVID-19 and airborne precautions in settings when aerosols may be generated.<sup>21</sup> The WHO has highlighted that the increasing number of COVID-19 cases, misinformation, panic buying, and stock-piling has disrupted supply of many PPE items including medical masks and respirators.<sup>1</sup> Widespread crisis-point shortages such as those occurring in the United States have not occurred as yet in Australia, and due to the initial success of infection control and containment strategies, jurisdictions have largely been able to prepare for further outbreaks in most areas.

Because of the potential for supply problems which limits the ability for health and aged care workers to access sufficient appropriate PPE for providing safe care to people with suspected and confirmed COVID-19, it is not recommended that members of the public wear PPE (i.e. medical masks) unless experiencing respiratory symptoms and/or suspected of potential COVID-19 infection. Medical masks may be recommended for use by members of the public who:

- Have respiratory symptoms that suggest possible COVID-19 infection.
- Are in close contact with or caring for people with suspected or confirmed COVID-19.
- Are asymptomatic but deemed at risk of potential COVID-19 infection.

Correct size, fit, and use (donning, doffing, disposal) of all PPE must occur for effective and efficient use.<sup>22,23</sup> Users of PPE including healthcare and auxiliary staff and members of the public including patients must be provided with clear, understandable, and consistent information and training on correct use. Correct PPE use must also occur together with proper hand hygiene and personal infection control measures (e.g. cough/sneeze etiquette, physical distancing).<sup>21</sup>

Due to ongoing and intensifying shortages, special crisis-capacity strategies and considerations are being recommended by the CDC regarding PPE.<sup>24</sup> In the United States, guidance has included mention of the use of homemade masks for healthcare professional use in crisis circumstances, but highlights that homemade masks are not substitutable for PPE. The CDC notes that the effectiveness of crisis strategies is uncertain and could pose transmission risks between healthcare staff and patients and that standard PPE practices must be reinstated as soon as PPE supplies return.

In light of increasing rates of community transmission, community outbreaks, difficulty assessing infection risk prior to engaging new patients, and heightened risk to health and aged care staff and community members, some jurisdictions have updated their guidance for the use of PPE and non-PPE face coverings in the context of COVID-19. Newer guidance is consistent with emerging evidence that indicates that aerosolised particles may travel up to around four metres and may remain in the air for prolonged periods.<sup>9,16</sup> While the degree of risk posed by aerosol particles is not known, engineering controls in built environments have been proposed to reduce the risk of potential aerosol transmission.<sup>20</sup>

Limiting crowds, avoiding air recirculation, and effective ventilation may be improved further by particle filtration and air disinfection and have been suggested as worthwhile approaches to combine with including isolation, quarantine, distancing and hand hygiene.<sup>14,20</sup>

### ***Non-PPE face coverings for members of the public***

There is emerging evidence that members of the public wearing non-PPE masks facial coverings may contribute to broader infection control measures to reduce COVID-19 transmission rates.<sup>4,25-28</sup>

Recommendations to the public highlight that if a mask or face covering is worn, correct fitting, use, and disposal is essential to safe, effective infection prevention and control activities in the context of responding to COVID-19.<sup>21</sup> Incorrect use of face coverings may increase risk due to the potential for the mask itself to become contaminated. A recent small laboratory study with four participants with confirmed COVID-19 infection found that neither surgical nor cotton masks effectively filtered COVID-19 particles if the patients coughed into the masks.<sup>29</sup> The authors noted that contamination of the outer surface of the masks was greater than the inner surface, highlighting the importance of hand hygiene, correct mask removal and disposal. Together with the assumption that the virus particles of COVID-19 and SARS/ SARS-CoV-1 are similarly sized, this could indicate that both surgical and cotton masks may be ineffective in preventing the dissemination of COVID-19 from the coughs of patients with COVID-19 to the environment and external mask surface.<sup>29</sup> Another laboratory study found a detectable level of infectious virus (~0.1% of the original inoculum) could still be present on the outer layer of a surgical mask seven days after inoculation at a temperature of 22°C and a relative humidity of around 65%.<sup>30</sup>

The WHO guidance regarding rational use of personal protective equipment (PPE) by healthcare workers is also relevant to non-PPE face covering wearing by members of the public.<sup>21</sup> This guidance highlights that masks are only effective when adopted within the setting of a range of other key infection control measures. The use of face coverings does not offer adequate protection on its own. Relevant measures include widespread, efficient, and effective testing to identify those who are infected as well as important environmental and behavioural considerations such as;<sup>21</sup>

- high degree of compliance with non-PPE mask/face covering use,
- correct and frequent handwashing,
- use of effective hand sanitisers when hand washing is unfeasible,
- ensuring that potentially contaminated surfaces and objects (including face coverings) do not pose an infection risk,
- non-reuse of non-recyclable face coverings and correct washing of recyclable face coverings,
- ensuring adequate space/distance between people in shared spaces,
- adequate ventilation of indoor environments, and;
- isolation of patients with suspected or confirmed infection.

Many jurisdictions around the world have varying recommendations regarding the use of masks (PPE) and non-PPE face coverings.<sup>31,32</sup> With recent community transmission risks increasing in some places in Victoria, Australia the Chief Health Officer has recommended that adults living in areas under Stage 3 restrictions wear a face mask (surgical PPE mask or non-PPE face covering) when outside your home if it is difficult to keep 1.5 metres apart from other people.<sup>33</sup>

In many East Asian countries, mask wearing/face coverings is a common practice among both ill and well individuals and there has been ongoing discussion regarding whether higher levels of mask wearing/face covering may be partly responsible for lower transmission rates in some locations. Authors have pointed out that there is a difference between an absence of evidence and evidence of absence; there is a lack of evidence that wearing a face mask or covering in the community reduces infection risk – however wearing PPE in clinical contexts is a precaution against droplet spread and contamination.<sup>31</sup> The CDC has more recently recommended that the public wear cloth face coverings (not PPE surgical masks or ventilators) in public settings, especially in areas of significant community-based transmission, where other social distancing measures like ensuring two metres between individuals are difficult to maintain.<sup>34</sup> This recommendation has come about due to high levels of community transmission in many parts of the United States and the knowledge that individuals may be infectious both prior to developing respiratory symptoms or may not develop symptoms at all.<sup>35,36</sup>

The CDC states that the face coverings should be made at home with low-cost materials and should not lead to the use of actual PPE or masks which should be reserved for healthcare professional use.<sup>34</sup> The recommendation also includes clear guidance for removing the face covering, noting the risk of infection without careful removal, as well as the importance of properly cleaning/disinfecting the covering.<sup>34</sup>

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