In brief

Face masks and COVID-19 transmission in the community – evidence and international policy during the COVID-19 pandemic

16 December 2021

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Summary

- The World Health Organization recommends the use of masks as part of a comprehensive package of prevention and control measures to limit the spread of SARS-CoV-2.[1]
- There have been over 20 systematic reviews on face masks published since the beginning of the COVID-19 pandemic. There are an increasing number of studies reporting benefits in terms of reductions in incidence, hospitalisation, mortality, or a combination of these outcomes as the pandemic evolves.[2] However, the evidence is mixed, with some reviews concluding there are no significant benefits of masks or low certainty about the protective effects of masks.[3-9]
- Masks have the greatest benefit when used in indoor settings, particularly where ventilation is poor and where physical distancing of at least one metre cannot be maintained. This is because aerosol transmission can occur, although it is not the primary route of transmission.[1, 10]
- Face masks are often implemented with other protective measures such as hand hygiene and physical distancing. It can be challenging to attribute effect to individual interventions[3, 4, 7]; however, there is some evidence for the effectiveness of both individual or combinations of public health measures on transmission of SARS-CoV-2.[2]
- Jurisdictions have used different combinations of public health measures at various stages of their local outbreaks (Figure 1).[11] As they move towards an endemic stage, jurisdictions are reassessing the requirements for masks.

Background

- SARS-CoV-2 is primarily transmitted between people through respiratory droplets and contact routes.[12]
- Short-range aerosol transmission can occur within poorly ventilated and crowded indoor spaces. This is because aerosols remain suspended in the air and can travel more than one metre (long-range).[10]
- Containment and non-pharmaceutical measures are known to be important for limiting the spread of COVID-19.
- Our World in Data reports on a COVID-19 containment and health index composite measure which includes face coverings, alongside 12 other policy response indicators. These indicators include school closures, travel bans and a vaccine policy (Figure 1, where 100 is the strictest).[11]
- While overall this demonstrates changes in policies, attributing an association between a change in policy and outcome is difficult, particularly when looking at individual public health measures. Table 1 outlines policies for mask wearing internationally alongside current case numbers.

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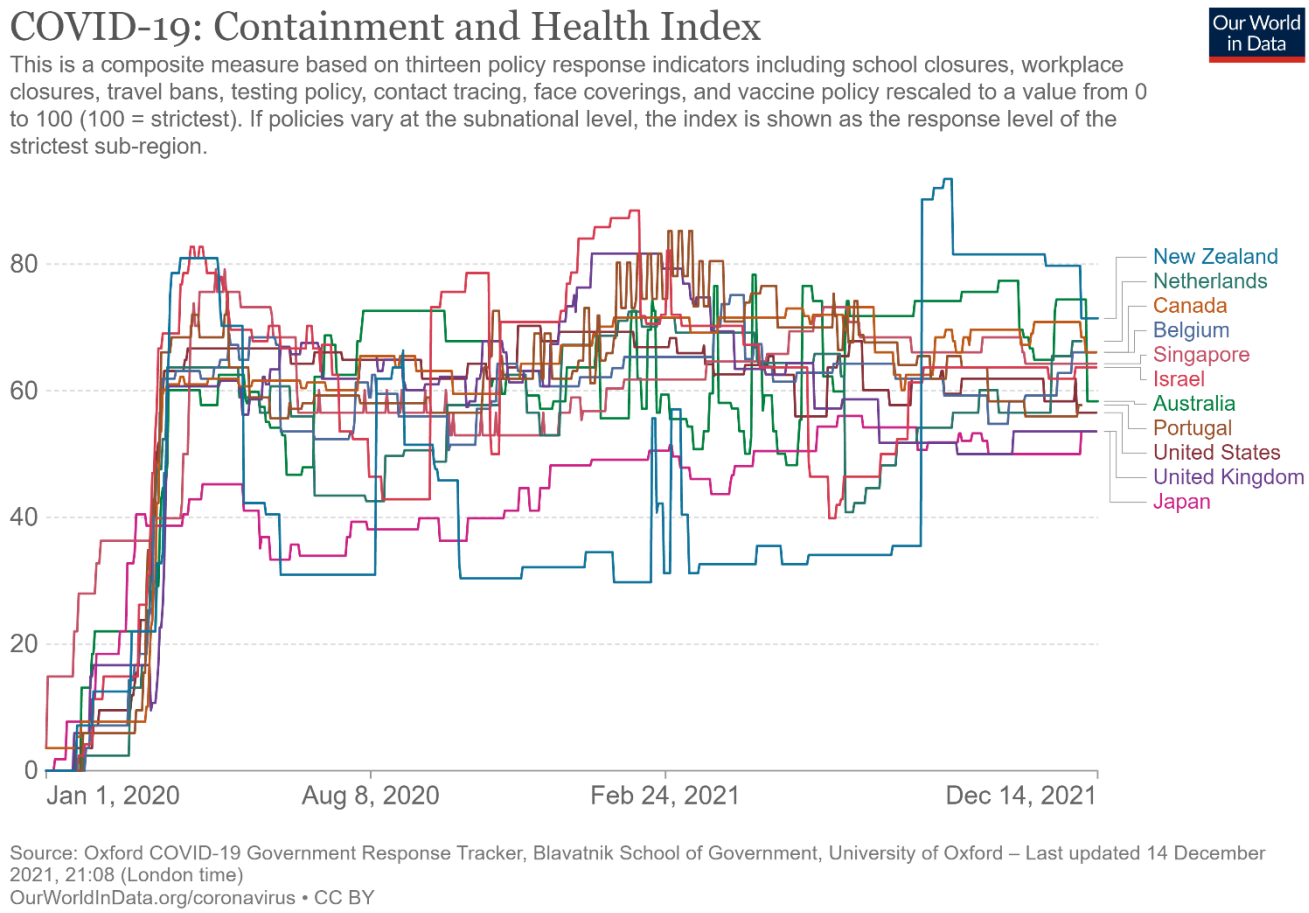
Figure 1: Our World in Data COVID-19 containment and health index



Source: Our World in Data[11]

Mask policies internationally

- The World Health Organization advises the use of masks as part of a comprehensive package of prevention and control measures to limit the spread of SARS-CoV-2. Masks alone are insufficient to provide adequate protection or source control.
- Decision makers should apply a risk-based approach when considering the use of masks for the public. In areas of known or suspected community or cluster SARS-CoV-2 transmission:
  - The WHO advises that the public should wear a non-medical mask in indoor settings such as shops, shared workplaces, schools, or outdoor settings where physical distancing of at least one metre cannot be maintained.
  - If indoors, a non-medical mask should be worn, regardless of whether physical distancing of at least one metre can be maintained; unless ventilation has been assessed to be adequate.
  - Individuals and people with higher risk of severe complications from COVID-19 should wear medical masks when physical distancing of, at least, one metre cannot be maintained.[1]
- A review by the European Centre for Disease Prevention and Control recommended that although the evidence for the use of medical face masks in the community is limited, face masks should be considered as a non-pharmaceutical intervention in combination with other measures. The use of masks should particularly be considered in confined public spaces in areas with community transmission. Mask use can also be considered in crowded outdoor settings.[13]

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Table 1: Mask policies by country

Country	Summary
Belgium	• Wearing a face mask remains mandatory on public transport and certain other indoor areas. Some regions require children to wear masks in schools. • Belgium reintroduced COVID-19 restrictions on 29 October 2021 including face masks in public places. This followed a rise in case numbers, hospitalisations and deaths. • Seven-day average daily confirmed cases per million (11 December 2021): 1,260.0
Canada	• Mask mandates vary by province but may be required in indoor public spaces, including workplaces and schools, and on public transport. • Mask mandates were eased or eliminated by mid-2021 but some were brought back in August 2021 due to rising cases caused by the Delta variant. • Seven-day average daily confirmed cases per million (11 December 2021): 99.32
Israel	• Face masks are mandatory in all indoor settings, apart from the home, as well as outdoor gatherings of at least 100 people. • Israel ended mask mandate on 15 June 2021 but reintroduced it 10 days later on 25 June 2021 due to an increase in cases. • It was reported on 9 November 2021 that with four million booster doses administered, the government is set to relax restrictions and no longer require masks in events over 100 people. • Seven-day average daily confirmed cases per million (11 December 2021): 66.1
Japan	• Japan has no legal mask requirement, but voluntary near-universal mask usage has been observed across the country. • Seven-day average daily confirmed cases per million (11 December 2021): 0.91
Netherlands	• Face masks must be worn in many indoor public spaces including in shops, on public transport, in restaurants and bars, and in educational institutions. • In November 2021, the Dutch government reinstated mandatory mask-wearing following a surge in cases after curbs were lifted. • Seven-day average daily confirmed cases per million (11 December 2021): 1,130.0
New Zealand	• New Zealand operates a traffic light protection framework for COVID-19 including guidance and mandates for face coverings. • Masks are required in indoor settings at schools for staff and students from Years 4 to 13 at Red. • Seven-day average daily confirmed cases per million (11 December 2021): 19.21
Portugal	• Face masks are required in enclosed public spaces and outdoors where social distancing of 1.5 metres cannot be maintained. • Many restrictions were lifted from 1 October 2021, however face masks are mandatory on public transport. • Seven-day average daily confirmed cases per million (11 December 2021): 385.08
Singapore	• It is mandatory for all people who are six years and older to wear a mask when leaving their homes. This applies on public transport, taxis, private hire cars, walking to, or at, markets, and for permitted enterprise workers at all workplace premises. • Seven-day average daily confirmed cases per million (11 December 2021): 113.5
United Kingdom	• In England, Northern Ireland, Scotland and Wales, face coverings are required by law in most indoor public places and on public transport. • Masks may also be required for school staff and secondary school students. • Seven-day average daily confirmed cases per million (11 December 2021): 739.51
United States of America	• Many states eased or eliminated mask mandates by mid-2021 after the Centers for Disease Control and Prevention (CDC) released guidance that fully vaccinated people could safely go mask-free in most public settings. Indoor mandates remain in nine states.

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Country	Summary
	• The CDC issued revised guidance at the end of July recommending masks be reintroduced in indoor public settings, particularly for large public gatherings, in response to an increase in cases caused by the Delta variant. Mask requirements vary by state and may be required in public indoor settings, in schools and childcare, or on public transport. • Seven-day average daily confirmed cases per million (11 December 2021): 357.15
Australia	• NSW: From 11 October 2021, people in Greater Sydney are no longer required to carry or wear a mask outside. Masks are required indoors for all people 12 years and older across NSW, other than in the home. When NSW reaches 95% double vaccination or on 15 December 2021, whichever comes first, masks will only be required on public transport and planes, at airports, and for indoors front-of-house hospitality staff who are not fully vaccinated. • ACT: Masks are mandatory in certain settings. Children in Years 7 to 12 are required to wear a face mask in indoor spaces at school. Children in Years 3 to 6 are encouraged to wear masks. • NT: There are mask mandates in place for certain parts of the NT. • Queensland: Masks are recommended when physical distancing is not possible and mandatory in certain circumstances. • South Australia: Masks are mandatory in health care and personal care services, passenger transport services, high-risk settings, airports and flights, quarantine, and indoor public spaces. • Tasmania: Face masks are mandatory for everyone 12 years and older at airports and on domestic flights, at events for more than 1000 people, and in some healthcare settings. Face masks are recommended where physical distancing cannot be maintained. • Victoria: Face masks are recommended where physical distancing cannot be maintained and mandatory in key, high-risk settings. • WA: Face masks are mandatory for everyone 12 years and older at airports, on aircraft, or when transporting a person subject to a quarantine direction. Face masks are not recommended for infants or children less than 12 years of age.

Research evidence – face masks

- The efficacy of protection against respiratory viral infections may vary according to the type of facemask used.[6, 14]
- A Cochrane review on physical interventions to interrupt or reduce the spread of respiratory viruses found that there is uncertainty about the effects of face masks. The pooled results of randomised trials did not show a clear reduction in respiratory viral infection with the use of medical or surgical masks during seasonal influenza.[15]
- A systematic review of downsides of face masks reported on discomfort and irritation.[16]
- A review by the European Centre for Disease Prevention and Control recommended that although the evidence for the use of medical face masks in the community is limited, they should be considered as a non-pharmaceutical intervention in combination with other measures. Use should be considered particularly in areas with community transmission in confined public spaces, and can be considered in crowded outdoor settings.[13]
- The World Health Organization advises the use of masks as part of a comprehensive package of prevention and control measures to limit the spread of SARS-CoV-2. Face masks are recommended in areas of known or suspected community transmission indoors and outdoors, when physical distancing cannot be maintained.[1]
- Systematic reviews on the use of face masks in the community in the context of COVID-19 found:
  - November 2021: Six studies on the effect of mask wearing found a 53% reduction in COVID-19 incidence, although there was heterogeneity among studies. Additional studies showed a reduction in SARS-CoV-2 transmission and COVID-19 mortality with mandatory mask wearing.[2]

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- August 2021: All 21 included studies reporting SARS-CoV-2 benefits in terms of reductions in either the incidence, hospitalisation, or mortality, or a combination of these outcomes. Limitations included that few studies controlled for the possible influence of other preventive measures, such as hand hygiene and physical distancing. Few studies assessed compliance to mask-wearing policies.[3]
- April 2021: Universal wearing of facemasks may be simultaneously recommended with other protective measures. Nosocomial and community infections seem to be preventable.[4]
- February 2021: Eleven RCTs in a meta-analysis studying other respiratory illnesses found no significant benefit of masks (with or without hand hygiene) for influenza-like-illness symptoms nor laboratory confirmed viruses. One RCT found a significant benefit of surgical masks compared with cloth masks.[8]
- February 2021 (preprint): In community and clinical settings, the use of facemasks provides protection against respiratory viral infections in general; however, the efficacies may vary according to the type of facemask used.[6]
- January 2021: RCTs and observational studies found that for reducing infection rates, the estimates were in favour of wearing face masks versus no mask, but not at statistically significant levels. Mathematical models indicated an important decrease in mortality when the population mask coverage is near-universal, regardless of mask efficacy. Levels of mask filtration efficiency were heterogeneous, depending on the materials used. One laboratory study suggested a viral load reduction of 0.25 in favour of mask versus no mask.[5]
- December 2020 (preprint): RCTs on the effect of face coverings in the general population are few. The reported effect of masks used outside the home on transmission of droplet-mediated respiratory infections in the population is minimal or non-existent.[9]
- August 2020: Masks appeared to be effective with and without hand hygiene. Both together are more protective.[7]

- A systematic review on cloth face masks found that cloth masks have more limited efficacy in combating viral infection transmission than the medical grade mask. The efficacy of cloth face masks filtration varies and depends on the type of material used, number of layers, and degree of moisture in mask and fitting of mask on face.[14]
- A systematic review of downsides of face masks found that for mask wear adherence, 47% more people wore face masks in the face-mask group compared with control. The largest number of studies reported on the discomfort and irritation outcome. The fewest reported on the misuse of masks and none reported on mask contamination or risk compensation behaviour.[16]

To inform this brief, PubMed and Google searches were conducted using mask* AND communit* AND COVID-19 AND (systematicreview[Filter] OR "systematic review"[ti]) on 15 October 2021 and updated 19 November 2021. Mask use by individual countries was also searched. Systematic reviews were included if published from 8 July 2020 to 19 November 2021, to update the previous Critical Intelligence Unit Evidence Check on face masks in the community. Mask policies were included up to 11 December 2021. The Critical Intelligence Unit has also published an evidence check on extended of reuse of PPE in August 2021.[17, 18]

References

1. World Health Organization. Mask use in the context of COVID-19 [Internet]. Switzerland: WHO; 1 December 2020 [cited 15 October 2021]. Available from: https://www.who.int/publications/i/item/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
2. Talic S, Shah S, Wild H, et al. Effectiveness of public health measures in reducing the incidence of covid-19, SARS-CoV-2 transmission, and covid-19 mortality: systematic review and meta-analysis. BMJ. 2021;375:e068302. DOI: 10.1136/bmj-2021-068302
3. Ford N, Holmer HK, Chou R, et al. Mask use in community settings in the context of COVID-19: A systematic review of ecological data. EClinicalMedicine. 2021 Aug;38:101024. DOI: 10.1016/j.eclinm.2021.101024
4. Pires C. A pre-systematic review on the use of masks as a protection material for SARS-COV-2 during the COVID-19 pandemic. Int J Clin Pract. 2021 Sep;75(9):e14215. DOI: 10.1111/ijcp.14215
5. Coclite D, Napoletano A, Gianola S, et al. Face Mask Use in the Community for Reducing the Spread of COVID-19: A Systematic Review. Front Med (Lausanne). 2020;7:594269. DOI: 10.3389/fmed.2020.594269

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6. Kim M, Seong D, Li H, et al. Comparative Efficacy of N95, Surgical, Medical, and Non-Medical Facemasks in Protection of Respiratory Virus Infection: A Living Systematic Review and Network Meta-Analysis. Preprints with Lancet. 2021.
7. MacIntyre CR, Chughtai AA. A rapid systematic review of the efficacy of face masks and respirators against coronaviruses and other respiratory transmissible viruses for the community, healthcare workers and sick patients. Int J Nurs Stud. 2020 Aug;108:103629. DOI: 10.1016/j.ijnurstu.2020.103629
8. Nanda A, Hung I, Kwong A, et al. Efficacy of surgical masks or cloth masks in the prevention of viral transmission: Systematic review, meta-analysis, and proposal for future trial. J Evid Based Med. 2021 May;14(2):97-111. DOI: 10.1111/jebm.12424
9. Saijonkari M, Booth N, Isojärvi J, et al. Face masks for preventing respiratory infections in the community: A systematic review. medRxiv. 2020:2020.12.16.20248316. DOI: 10.1101/2020.12.16.20248316
10. World Health Organization. Coronavirus disease (COVID-19): How is it transmitted? [Internet]. Switzerland: WHO; 12 December 2020 [cited 15 October 2021]. Available from: https://www.who.int/news-room/q-a-detail/coronavirus-disease-covid-19-how-is-it-transmitted
11. Our World in Data. COVID-19: Containment and health index, Nov 18, 2021 [Internet]. 2021 Nov 18 [cited 2021 Nov 19]. Available from: https://ourworldindata.org/grapher/covid-containment-and-health-index
12. World Health Organization. Transmission of SARS-CoV-2: implications for infection prevention precautions [Internet]. Switzerland: WHO; 9 July 2020 [cited 15 October 2021]. Available from: https://www.who.int/news-room/commentaries/detail/transmission-of-sars-cov-2-implications-for-infection-prevention-precautions
13. European Centre for Disease Prevention and Control. Using face masks in the community: first update [Internet]. Europe: ECDC; 15 February 2021 [cited 15 October 2021]. Available from: https://www.ecdc.europa.eu/sites/default/files/documents/covid-19-face-masks-community-first-update.pdf
14. Sharma SK, Mishra M, Mudgal SK. Efficacy of cloth face mask in prevention of novel coronavirus infection transmission: A systematic review and meta-analysis. J Educ Health Promot. 2020;9:192. DOI: 10.4103/jehp.jehp_533_20
15. Jefferson T, Del Mar CB, Dooley L, et al. Physical interventions to interrupt or reduce the spread of respiratory viruses. Cochrane Database Syst Rev. 2020 Nov 20;11(11):Cd006207. DOI: 10.1002/14651858.CD006207.pub5
16. Bakhit M, Krzyzaniak N, Scott AM, et al. Downsides of face masks and possible mitigation strategies: a systematic review and meta-analysis. BMJ Open. 2021 Feb 22;11(2):e044364. DOI: 10.1136/bmjopen-2020-044364
17. Agency for Clinical Innovation. Face masks and COVID-19 transmission in the community [Internet]. Sydney, NSW: ACI; 2021 Oct 29 [cited 2021 Dec 02]. Available from: https://aci.health.nsw.gov.au/__data/assets/pdf_file/0009/689472/Evidence-Check-Face-masks-and-COVID-19-transmission-in-the-community.pdf
18. Agency for Clinical Innovation. Extended use or reuse of personal protective equipment [Internet]. Sydney, NSW: ACI; 2021 Aug 26 [cited 2021 Dec 02]. Available from: https://aci.health.nsw.gov.au/__data/assets/pdf_file/0005/591107/Evidence-Check-Extended-use-or-reuse-of-personal-protective-equipment.pdf

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