A Review of the Evidence Provided by the CDC

When researching a topic, it is always good practice to go to the source. The Centers for Disease Control have been advocating for the use of masks to prevent COVID-19 in community settings. What evidence is the CDC relying on to come to that decision?

Following is the list of *References* provided in the CDC's *Scientific Brief: Community Use of Cloth Masks to Control the Spread of SARS-CoV-2 | CDC* updated November 20, 2020. Each reference is color-coded to indicate the type(s) of evidence they are. None of them provide the real-world, direct evidence needed to conclude that mask wearing in the community is effective. These kinds of evidence can be used to support and explore the findings from real-world research, but are not a substitute for them. *Note: None demonstrate the safety of using masks in the community.*

A few quotes are also provided, in order to illuminate the fact that even these sources admit there is no conclusive evidence, and more research is needed.

Readers are encouraged to do their own research. Follow the links and read the resources themselves. Does the evidence provided support the conclusion?

Then, compare these references to the high-quality, real world evidence of the harms caused by wearing masks. Many examples of the decades of research on this topic can be found in the *References* section of the Vermont Mask Survey Fall Report: vtmasksurvey.com. Also, a video that explains the differences very well can be found here: **https://brandnewtube.com/watch/mask-facts-the-model-health-show_glwj66alnubEw1U.html**

Source Website:
https://www.cdc.gov/coronavirus/2019-ncov/more/masking-science-sars-cov2.html

Types of Evidence Color Chart:

Model: Mathematical models are unable to include the countless real-world factors involved. The reliability of the results depends on the reliability of the data being used.

Study of Entire Populations: Correlation does not equal causation; there are countless factors to consider in the real-world; and studies of other populations find different conclusions.

Lab Study of Droplets: droplets released by asymptomatic people in community settings have not been proven to cause infection in the real world: example- November China Study (https://pubmed.ncbi.nlm.nih.gov/33219229/)

Study of Symptomatic People: Not relevant to masking people who are asymptomatic (without symptoms).

Mask wearing in Combination with Other Strategies: Study includes other strategies (washing hands, distancing, etc…), therefore the effects of masks alone is unclear.

Prolonged Closed Space Contact: These are examples of transmission on a navy ship and airplanes, with confined spaces and limited airflow not relevant to community settings.

References:

1. Moghadas SM, Fitzpatrick MC, Sah P, et al. The implications of silent transmission for the control of COVID-19 outbreaks. Proc Natl Acad Sci U S A. 2020;117(30):17513-17515.10.1073/pnas.2008373117. https://www.ncbi.nlm.nih.gov/pubmed/32632012.

2. Johansson MA, Quandelacy TM, Kada S, et al. Controlling COVID-19 requires preventing SARS-CoV-2 transmission from people without symptoms. Submitted. 2020. *Data Brief published on CDC website.*

3. Lindsley WG, Blachere FM, Law BF, Beezhold DH, Noti JD. Efficacy of face masks, neck gaiters and face shields for reducing the expulsion of simulated cough-generated aerosols. medRxiv. 2020. https://doi.org/10.1101/2020.10.05.20207241.

4. Fischer EP, Fischer MC, Grass D, Henrion I, Warren WS, Westman E. Low-cost measurement of face mask efficacy for filtering expelled droplets during speech. Sci Adv. 2020;6(36).10.1126/sciadv.abd3083. https://www.ncbi.nlm.nih.gov/pubmed/32917603.

5. Verma S, Dhanak M, Frankenfield J. Visualizing the effectiveness of face masks in obstructing respiratory jets. Phys Fluids (1994). 2020;32(6):061708.10.1063/5.0016018. https://www.ncbi.nlm.nih.gov/pubmed/32624649.

6. Bahl P, Bhattacharjee S, de Silva C, Chughtai AA, Doolan C, MacIntyre CR. Face coverings and mask to minimise droplet dispersion and aerosolisation: a video case study. Thorax. 2020;75(11):1024-1025.10.1136/thoraxjnl-2020-215748. https://www.ncbi.nlm.nih.gov/pubmed/32709611.

7. Davies A, Thompson KA, Giri K, Kafatos G, Walker J, Bennett A. Testing the efficacy of homemade masks: would they protect in an influenza pandemic? Disaster Med Public Health Prep. 2013;7(4):413-418.10.1017/dmp.2013.43. https://www.ncbi.nlm.nih.gov/pubmed/24229526.

8. Leung NHL, Chu DKW, Shiu EYC, et al. Respiratory virus shedding in exhaled breath and efficacy of face masks. Nature Medicine. 2020;26(5):676-680.https://dx.doi.org/10.1038/s41591-020-0843-2.

9. Bandiera L., Pavar G., Pisetta G., et al. Face coverings and respiratory tract droplet dispersion. medRxiv. 2020.10.1101/2020.08.11.20145086. https://doi.org/10.1101/2020.08.11.20145086.

10. Alsved M, Matamis A, Bohlin R, et al. Exhaled respiratory particles during singing and talking. Aerosol Sci Technol. 2020.10.1080/02786826.2020.1812502.

11. Asadi S, Wexler AS, Cappa CD, Barreda S, Bouvier NM, Ristenpart WD. Aerosol emission and superemission during human speech increase with voice loudness. Sci Rep. 2019;9(1):2348.10.1038/s41598-019-38808-z. https://www.ncbi.nlm.nih.gov/pubmed/30787335.

12. Morawska L., Johnson GR, Ristovski ZD, et al. Size distribution and sites of origin of droplets expelled from the human respiratory tract during expiratory activities. Aerosol Sci. 2009;40(3):256-269. https://www.sciencedirect.com/science/article/pii/S0021850208002036.

13. Abkarian M, Mendez S, Xue N, Yang F, Stone HA. Speech can produce jet-like transport relevant to asymptomatic spreading of virus. Proc Natl Acad Sci U S A. 2020;117(41):25237-25245.10.1073/pnas.2012156117. https://www.ncbi.nlm.nih.gov/pubmed/32978297.

14. Ueki H, Furusawa Y, Iwatsuki-Horimoto K, et al. Effectiveness of Face Masks in Preventing Airborne Transmission of SARS-CoV-2. mSphere. 2020;5(5).10.1128/mSphere.00637-20. https://www.ncbi.nlm.nih.gov/pubmed/33087517.

Quote:

"Importantly, medical masks (surgical masks and even N95 masks) were not able to completely block the transmission of virus droplets/aerosols ***even when completely sealed****."*

15. Rodriguez-Palacios A, Cominelli F, Basson AR, Pizarro TT, Ilic S. Textile Masks and Surface Covers-A Spray Simulation Method and a "Universal Droplet Reduction Model" Against Respiratory Pandemics. Front Med (Lausanne). 2020;7:260.10.3389/fmed.2020.00260. https://www.ncbi.nlm.nih.gov/pubmed/32574342.

16. Viola I.M., Peterson B., Pisetta G., et al. Face coverings, aerosol dispersion and mitigation of virus transmission risk. 2020. https://arxiv.org/abs/2005.10720.

Quote:

"In some countries, the public has been asked to use face covers to mitigate the risk of virus transmission – yet, ***their outward effectiveness is not ascertained****."*

17. Rengasamy S, Eimer B, Shaffer RE. Simple respiratory protection–evaluation of the filtration performance of cloth masks and common fabric materials against 20-1000 nm

size particles. Ann Occup Hyg. 2010;54(7):789-798.10.1093/annhyg/meq044. https://www.ncbi.nlm.nih.gov/pubmed/20584862.

18. Konda A, Prakash A, Moss GA, Schmoldt M, Grant GD, Guha S. Aerosol Filtration Efficiency of Common Fabrics Used in Respiratory Cloth Masks. ACS Nano. 2020;14(5):6339-6347.10.1021/acsnano.0c03252. https://www.ncbi.nlm.nih.gov/pubmed/32329337.

Quote:

"Results obtained in the study show that common fabric materials may provide ***marginal protection*** *against nanoparticles including those in the size ranges of virus-containing particles in exhaled breath."*

19. Long KD, Woodburn EV, Berg IC, Chen V, Scott WS. Measurement of filtration efficiencies of healthcare and consumer materials using modified respirator fit tester setup. PLoS One. 2020;15(10):e0240499.10.1371/journal.pone.0240499. https://www.ncbi.nlm.nih.gov/pubmed/33048980.

20. O'Kelly E, Pirog S, Ward J, Clarkson PJ. Ability of fabric face mask materials to filter ultrafine particles at coughing velocity. BMJ Open. 2020;10(9):e039424.10.1136/bmjopen-2020-039424. https://www.ncbi.nlm.nih.gov/pubmed/32963071.

21. Aydin O, Emon B, Cheng S, Hong L, Chamorro LP, Saif MTA. Performance of fabrics for home-made masks against the spread of COVID-19 through droplets: A quantitative mechanistic study. Extreme Mech Lett. 2020;40:100924.10.1016/j.eml.2020.100924. https://www.ncbi.nlm.nih.gov/pubmed/32835043.

Quote:

"Although the mechanism of spread of the current novel coronavirus (SARS-CoV-2) is not clearly understood, ***it is thought that spread can occur through respiratory droplets containing virus particles that are released by infected persons when they sneeze, cough, or speak*** *[4,5]."*

Why do we "think" spread can occur when people sneeze, cough, or speak?

Here are quotes from reference #5, cited above:

How Coronavirus Spreads | CDC :

"Some infections can be spread by exposure to virus in small droplets and particles that can linger in the air for minutes to hours. These viruses may be able to infect people who are further than 6 feet away from the person who is infected or after that person has left the space."

"This kind of spread is referred to as airborne transmission and is an important way that infections like tuberculosis, measles, and chicken pox are spread."

"Thus, were SARS-CoV-2 spread primarily through airborne transmission like measles, experts would expect to have observed considerably more rapid global spread of infection in early 2020 and higher percentages of prior infection measured by serosurveys. ***Available data indicate that SARS-CoV-2 has spread more like most other common respiratory viruses****, primarily through respiratory droplet transmission within a short range (e.g., less than six feet).* ***There is no evidence of efficient spread*** *(i.e., routine, rapid spread) to people far away or who enter a space hours after an infectious person was there."*

"Available data indicate that it is much more common for the virus that causes COVID-19 to spread through close contact with a person who has COVID-19 than through airborne transmission."

22. Bhattacharjee S, Bahl P, Chughtai AA, MacIntyre CR. Last-resort strategies during mask shortages: optimal design features of cloth masks and decontamination of disposable masks during the COVID-19 pandemic. BMJ Open Respir Res. 2020;7(1).10.1136/bmjresp-2020-000698. https://www.ncbi.nlm.nih.gov/pubmed/32913005.

23. Maurer L, Peris D, Kerl J, Guenther F, Koehler D, Dellweg D. Community Masks During the SARS-CoV-2 Pandemic: Filtration Efficacy and Air Resistance. J Aerosol Med Pulm Drug Deliv. 2020.10.1089/jamp.2020.1635. https://www.ncbi.nlm.nih.gov/pubmed/32975460.

24. Hill WC, Hull MS, MacCuspie RI. Testing of Commercial Masks and Respirators and Cotton Mask Insert Materials using SARS-CoV-2 Virion-Sized Particulates: Comparison of Ideal Aerosol Filtration Efficiency versus Fitted Filtration Efficiency. Nano Lett. 2020;20(10):7642-7647.10.1021/acs.nanolett.0c03182. https://www.ncbi.nlm.nih.gov/pubmed/32986441.

25. Whiley H, Keerthirathne TP, Nisar MA, White MAF, Ross KE. Viral Filtration Efficiency of Fabric Masks Compared with Surgical and N95 Masks. Pathogens. 2020;9(9).10.3390/pathogens9090762. https://www.ncbi.nlm.nih.gov/pubmed/32957638.

26. Hao W, Parasch A, Williams S, et al. Filtration performances of non-medical materials as candidates for manufacturing facemasks and respirators. Int J Hyg Environ

Health. 2020;229:113582.10.1016/j.ijheh.2020.113582. https://www.ncbi.nlm.nih.gov/pubmed/32917368.

27.van der Sande M, Teunis P, Sabel R. Professional and home-made face masks reduce exposure to respiratory infections among the general population. PLoS One. 2008;3(7):e2618.10.1371/journal.pone.0002618. https://www.ncbi.nlm.nih.gov/pubmed/18612429.

2008 Study, Quotes:

"Regardless of mask type, children were less well protected."

"Masks worn by patients may not offer as great a degree of protection against aerosol transmission."

28.Chu DK, Akl EA, Duda S, et al. Physical distancing, face masks, and eye protection to prevent person-to-person transmission of SARS-CoV-2 and COVID-19: a systematic review and meta-analysis. Lancet. 2020.10.1016/S0140-6736(20)31142-9. https://doi.org/10.1016/S0140-6736(20)31142-9.

June 1, 2020, Quotes:

"challenges included frequent discomfort, high resource use linked with potentially decreased equity, less clear communication, and perceived reduced empathy of care providers by those they were caring for."

"However, none of these interventions afforded complete protection from infection, and their optimum role might need risk assessment and several contextual considerations."

"No randomised trials were identified for these interventions in COVID-19, SARS, or MERS."

"Robust randomised trials are needed to better inform the evidence for these interventions, but this systematic appraisal of currently best available evidence might inform interim guidance.

29.Clase CM, Fu EL, Ashur A, et al. Forgotten Technology in the COVID-19 Pandemic: Filtration Properties of Cloth and Cloth Masks-A Narrative Review. Mayo Clin Proc. 2020;95(10):2204-2224.10.1016/j.mayocp.2020.07.020. https://www.ncbi.nlm.nih.gov/pubmed/33012350.

October, 2020, Quote:

"The use of cloth masks for general public use is being debated, and is in flux."

30. Zhao M, Liao L, Xiao W, et al. Household Materials Selection for Homemade Cloth Face Coverings and Their Filtration Efficiency Enhancement with Triboelectric Charging. Nano Lett. 2020;20(7):5544-5552.10.1021/acs.nanolett.0c02211. https://www.ncbi.nlm.nih.gov/pubmed/32484683.

31. Parlin AF, Stratton SM, Culley TM, Guerra PA. A laboratory-based study examining the properties of silk fabric to evaluate its potential as a protective barrier for personal protective equipment and as a functional material for face coverings during the COVID-19 pandemic. PLoS One. 2020;15(9):e0239531.10.1371/journal.pone.0239531. https://www.ncbi.nlm.nih.gov/pubmed/32946526.

32. Hendrix MJ, Walde C, Findley K, Trotman R. Absence of Apparent Transmission of SARS-CoV-2 from Two Stylists After Exposure at a Hair Salon with a Universal Face Covering Policy – Springfield, Missouri, May 2020. MMWR Morb Mortal Wkly Rep. 2020;69(28):930-932.10.15585/mmwr.mm6928e2. https://www.ncbi.nlm.nih.gov/pubmed/32673300.

33. Wang Y, Tian H, Zhang L, et al. Reduction of secondary transmission of SARS-CoV-2 in households by face mask use, disinfection and social distancing: a cohort study in Beijing, China. BMJ Glob Health. 2020;5(5).10.1136/bmjgh-2020-002794. https://www.ncbi.nlm.nih.gov/pubmed/32467353.

34. Doung-Ngern P, Suphanchaimat R, Panjangampatthana A, et al. Case-Control Study of Use of Personal Protective Measures and Risk for Severe Acute Respiratory Syndrome Coronavirus 2 Infection, Thailand. Emerg Infect Dis. 2020;26(11).10.3201/eid2611.203003. https://www.ncbi.nlm.nih.gov/pubmed/32931726.

November, 2020, Quote:

"Evaluation of the effectiveness of mask-wearing to protect healthy persons in the general public from infection with severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), the causative agent of coronavirus disease (COVID-19), is urgently needed."

35. Payne DC, Smith-Jeffcoat SE, Nowak G, et al. SARS-CoV-2 Infections and Serologic Responses from a Sample of U.S. Navy Service Members – USS Theodore Roosevelt, April 2020. MMWR Morb Mortal Wkly Rep. 2020;69(23):714-721.10.15585/mmwr.mm6923e4. https://www.ncbi.nlm.nih.gov/pubmed/32525850.

36.Schwartz KL, Murti M, Finkelstein M, et al. Lack of COVID-19 transmission on an international flight. Cmaj. 2020;192(15): E410.10.1503/cmaj.75015. https://www.ncbi.nlm.nih.gov/pubmed/32392504.

This Letter, (not study), states:

"In our investigation, transmission may have been mitigated by mild symptoms and masking during the flight. ***However, the lack of secondary cases after prolonged air travel exposure supports droplet transmission, not airborne****, as the likely route of spread of the COVID-19."*

37.Freedman DO, Wilder-Smith A. In-flight Transmission of SARS-CoV-2: a review of the attack rates and available data on the efficacy of face masks. J Travel Med. 2020.10.1093/jtm/taaa178. https://www.ncbi.nlm.nih.gov/pubmed/32975554.

September, 2020 Perspective (not study), quote:

"The absence of large numbers of confirmed and published inflight transmissions of SARS-CoV-2 is encouraging but is not definitive evidence that fliers are safe… At present, based on ***circumstantial*** *data, strict use of masks appears to be protective."*

38.Wang X, Ferro EG, Zhou G, Hashimoto D, Bhatt DL. Association Between Universal Masking in a Health Care System and SARS-CoV-2 Positivity Among Health Care Workers. JAMA. 2020.10.1001/jama.2020.12897. https://www.ncbi.nlm.nih.gov/pubmed/32663246.

Quotes:

"The decrease in HCW infections could be confounded by other interventions inside and outside of the health care system (Figure), such as restrictions on elective procedures, social distancing measures, and increased masking in public spaces, ***which are limitations of this study****."*

39.Mitze T., Kosfeld R., Rode J., Wälde K. Face Masks Considerably Reduce COVID-19 Cases in Germany: A Synthetic Control Method Approach. IZA – Institute of Labor Economics (Germany);2020.ISSN: 2365-9793, DP No. 13319. http://ftp.iza.org/dp13319.pdf

Discussion Paper Quote:

"The effect of face masks worn in public on the spread of Covid-19 has not been systematically analyzed so far… We indeed find strong and convincing ***statistical support*** *for*

the general perception that public wearing of face masks in Jena strongly reduced the number of incidences... We simultaneously stress the need for more detailed analyses."

40.Gallaway MS, Rigler J, Robinson S, et al. Trends in COVID-19 Incidence After Implementation of Mitigation Measures – Arizona, January 22-August 7, 2020. MMWR Morb Mortal Wkly Rep. 2020;69(40):1460-1463.10.15585/mmwr.mm6940e3. https://www.ncbi.nlm.nih.gov/pubmed/33031366.

41.Lyu W, Wehby GL. Community Use Of Face Masks And COVID-19: Evidence From A Natural Experiment Of State Mandates In The US. Health Aff (Millwood). 2020;39(8):1419-1425.10.1377/hlthaff.2020.00818. https://www.ncbi.nlm.nih.gov/pubmed/32543923.

Quotes:

*"However, the **effectiveness of this measure is highly debated**. The debate and uncertainty are fueled by the **limited direct empirical evidence** available on the magnitude of the effects of widespread face mask use in public on COVID-19 mitigation. **There is a critical need for empirical evidence** on the magnitude of these effects from natural experiments.... "*

42.Hatzius J, Struyven D, Rosenberg I. Face Masks and GDP. Goldman Sachs Research https://www.goldmansachs.com/insights/pages/face-masks-and-gdp.html. Accessed July 8, 2020.

43.Karaivanov A., Lu S.E., Shigeoka H., Chen C., Pamplona S. Face Masks, Public Policies And Slowing The Spread Of Covid-19: Evidence from Canada National Bureau Of Economic Research 2020.Working Paper 27891. http://www.nber.org/papers/w27891.

44.Chernozhukov V, Kasahara H, Schrimpf P. Causal Impact of Masks, Policies, Behavior on Early Covid-19 Pandemic in the U.S. medRxiv. 2020.10.1101/2020.05.27.20115139. http://medrxiv.org/content/early/2020/05/29/2020.05.27.20115139.abstract.

45.Leffler CT, Ing EB, Lykins JD, Hogan MC, McKeown CA, Grzybowski A. Association of country-wide coronavirus mortality with demographics, testing, lockdowns, and public wearing of masks (updated August 4, 2020). medRxiv. 2020.10.1101/2020.05.22.20109231. http://medrxiv.org/content/early/2020/05/25/2020.05.22.20109231.abstract.