## Facemasks Ineffective at Mitigating the Spread of Respiratory Viruses

Yr	Author(s)	Type and Details	Results and Quotes	Significance	Full Citation(s)
2010 2012	Aiello et al 2010 Aiello et al 2012	Cluster-Randomized Intervention Trials Reports the results of a series of trials from 2006 to 2008 totalling <u>2,475 student participants</u> living in residence halls.	"Neither face mask use and hand hygiene nor face mask use alone was associated with a significant reduction in the rate of ILI cumulatively." "Both intervention groups compared to the control showed cumulative reductions in rates of influenza over the study period, although results did not reach statistical significance."	No statistically significant differences between medical mask vs no mask for rates of influenza- like illness (ILI).	<ul> <li>Aiello, A. E., G. F. Murray, V. Perez, R. M. Coulborn, B. M. Davis, M. Uddin, D. K. Shay, S. H. Waterman, and A. S. Monto. "Mask Use, Hand Hygiene, and Seasonal Influenza-Like Illness among Young Adults: A Randomized Intervention Trial." J Infect Dis 201, no. 4 (Feb 15 2010): 491-8. https://dx.doi.org/10.1086/650396.</li> <li>Aiello, Allison E., Vanessa Perez, Rebecca M. Coulborn, Brian M. Davis, Monica Uddin, and Arnold S. Monto. "Facemasks, Hand Hygiene, and Influenza among Young Adults: A Randomized Intervention Trial." PLoS One 7, no. 1 (2012): e29744. https://dx.doi.org/10.1371/journal.pone.0029744.</li> </ul>
2007	Al-Asmary et al 2007	Nested Case-control/cross-sectional study among healthcare workers Evaluated the rate of respiratory infections in 250 healthcare workers serving on a Hajj medical mission.	"In our study regular use of facemasks offered no significant protection against ARI [Acute Respiratory Infections]. Our finding is in agreement, however, with the conclusion of the Centers for Disease Control and Prevention (CDC) in the USA which stated that surgical masks are not designed for use as particulate respirators and do not provide much protection against air-borne diseases because they do not effectively filter small particles from the air or prevent leakage around the edge of the mask when the user inhales." "Furthermore, we found that intermittent use of surgical-type masks was actually associated with more than a 2.5-fold greater risk of infection. It is possible that once a facemask is worn in the presence of an infected patient, the mask could become contaminated with infectious material and touching the outside of the device could result in hand transmission of the infection to the respiratory tract during nose-rubbing."	"The common practice among pilgrims and medical personnel of using surgical facemasks to protect themselves against ARI [Acute Respiratory Infections] should be discontinued and regular use of alco-hol-based hand scrubs should be more vigorously encouraged."	Al-Asmary, S., A. S. Al-Shehri, A. Abou-Zeid, M. Abdel-Fattah, T. Hifnawy, and T. El-Said. "Acute Respiratory Tract Infections among Hajj Medical Mission Personnel, Saudi Arabia." Int J Infect Dis 11, no. 3 (May 2007): 268-72. https://dx.doi.org/10.1016/j.ijid.2006.04.008.
2009	Bahli et. al. 2009	"Systematic literature review and analysis of all available trials (randomized controlled trials) regarding use of surgical face masks in elective surgeries." Searched trails from 1966-2007	From the limited randomized trials it is still not clear that whether wearing surgical face masks harms or benefit the patients undergoin elective surgery.	<b>g</b> If facemasks were highly effective in preventing the transmission of respiratory viruses sufficient to justify forcing everyone to wear one, we would expect to find clear evidence of this in the literature showing a substantial effect on post-surgical infection rates. Instead we find no such thing.	Bahli, Z.M., Does evidence based medicine support the effectiveness of surgical facemasks in preventing postoperative wound infections in elective surgery? J Ayub Med Coll Abbottabad, 2009. 21(2): p. 166-70.
2014 2015 2019	Barasheed et al 2014 Wang et al 2015 Alfellali et al (Preprint) 2019	Cluster Randomized Controlled Trials (Pilot study of 164 participants conducted in 2014 followed up by a larger study described in 2015, the results of which have been in preprint since 2019) <u>7,851 total participants</u> . Tents of pilgrims used as the cluster randomization units	Though the pilot study of 164 participants suggested a possible protective effect from medical masks, the larger study with 7,687 participants foun that masks were not associated with decreased risk for infections in Hajj pilgrims with or without an infected index case within the same tent. "In intention-to-treat analysis, facemask use was neither effective against laboratory-confirmed vRTIs [Viral Respiratory Tract Infections nor against CRI [Clinical Respiratory Infections], not even in per-protocol analysis."	d "Facemask use does not prevent clinical or laboratory-confirmed viral respiratory infections among Hajj pilgrims."	<ul> <li>Barasheed, O., N. Almasri, A. M. Badahdah, L. Heron, J. Taylor, K. McPhee, I. Ridda, E. Haworth, D. E. Dwyer, H. Rashid, and R. Booy. "Pilot Randomised Controlled Trial to Test Effectiveness of Facemasks in Preventing Influenza-Like Illness Transmission among Australian Hajj Pilgrims in 2011." Infect Disord Drug Targets 14, no. 2 (2014): 110-6. https://dx.doi.org/10.2174/1871526514666141021112855</li> <li>Wang, M., O. Barasheed, H. Rashid, R. Booy, H. El Bashir, E. Haworth, I. Ridda, E. C. Holmes, D. E. Dwyer, J. Nguyen-Van-Tam, Z. A. Memish, and L. Heron. "A Cluster-Randomised Controlled Trial to Test the Efficacy of Facemasks in Preventing Respiratory Viral Infection among Hajj Pilgrims." J Epidemiol Glob Health 5, no. 2 (Jun 2015): 181-9. https://dx.doi.org/10.1016/j.jegh.2014.08.002.</li> <li>Alfelali, Mohammad, Elizabeth Haworth, Osamah Barasheed, Al-Mamoon Badahdah, Hamid Bokhary, Mohamed Tashani, Mohammad Azeem, Jen Kok, Janette Taylor, Elizabeth Barnes, Haitham Bashir, Gulam Khandaker, Edward Holmes, Dominic Dwyer, Leon Heron, Godwin Wilson, Robert Booy, and Harunor Rashid. "Facemask Versus No Facemask in Preventing Viral Respiratory Infections During Hajj: A Cluster Randomised Open Label Trial." SSRN Electronic Journal (01/01 2019). https://dx.doi.org/10.2139/ssrn.3349234. (Preprint)</li> </ul>
2012	bin-Reza et al 2012	Systematic Literature Review "Inclusion criteria included randomised controlled trials and quasi-experimental and observational studies of humans published in English with an outcome of laboratory-confirmed or clinically-diagnosed influenza and other viral respiratory infections. <b>There were 17 eligible studies.</b> "	" development of evidence-based guidance about mask/respirator use is inextricably linked to what is known about how influenza is spread and specific risk factors that can affect transmissibility (e.g. host factors, pathogen fac-tors, environmental factors and particle size). However, this is an area equally fraught with uncertainty; there are lim-ited and conflicting evidence regarding the relative impor-tance and frequency of direct contact, indirect contact, droplet and aerosol modes of transmission."	"None of the studies established a conclusive relationship between mask/respirator use and protection against influenza infection." "Further, a simulation study found that strict adherence to guidance about personal protective equipmen (which included masks and respirators) compromised normal ward functioning in a UK hospital setting."	Bin-Reza, F., V. Lopez Chavarrias, A. Nicoll, and M. E. Chamberland. "The Use of Masks and Respirators to Prevent Transmission of Influenza: A Systematic Review of the Scientific Evidence." Influenza Other Respir Viruses 6, no. 4 (Jul 2012): 257-67. https://dx.doi.org/10.1111/j.1750- 2659.2011.00307.x.
2020	Bundgaard et al 2020	Randomized Controlled Trial "The Danish Facemask Study" The only Randomized Controlled Trial that has examined SARS-CoV-2 infections in masked vs. non-masked civilian populations. 4,862 participants completed the study (2,392 masked; 2,470 non-masked).	The authors found no statistically significant difference in SARS-CoV-2 infection rates between the masked (1.8%) and non-masked (2.1%) study cohorts. The study cohort that reported wearing the mask "exactly as instructed" had a 2.0% SARS-CoV-2 infection rate. There were no statistically significant differences between the study cohorts in rates of other respiratory viral infections either. "We observed no statistically significant interaction between wearers and nonwearers of eyeglasses."	In addition to the primary data providing evidence against the efficacy of face masks, the supplemental data collected during this study suggests that eye protection is not useful, and also conclusively demostrates that wearing a mask for 2 months will - even in the absence of legal or social pressure - cause 16-18% of mask-wearers to shift their views to favor wearing masks in the future.	Bundgaard, H., J. S. Bundgaard, D. E. T. Raaschou-Pedersen, C. von Buchwald, T. Todsen, J. B. Norsk, M. M. Pries-Heje, C. R. Vissing, P. B. Nielsen, U. C. Winsløw, K. Fogh, R. Hasselbalch, J. H. Kristensen, A. Ringgaard, M. Porsborg Andersen, N. B. Goecke, R. Trebbien, K. Skovgaard, T. Benfield, H. Ullum, C. Torp-Pedersen, and K. Iversen. "Effectiveness of Adding a Mask Recommendation to Other Public Health Measures to Prevent Sars-Cov-2 Infection in Danish Mask Wearers : A Randomized Controlled Trial." Ann Intern Med 174, no. 3 (Mar 2021): 335-43. https://dx.doi.org/10.7326/m20-6817.
2010	Canini et. al. 2010	"A cluster randomized intervention trial" 105 households (305 contacts)	"We observed a good adherence to the intervention. In various sensitivity analyses, we did not identify any trend in the results suggesting effectiveness of facemasks" This study should be interpreted with caution since the lack of statistical power prevents us to draw formal conclusion regarding effectiveness of facemasks in the context of a seasonal epidemic.	Though this study did not have sufficient statistical power to draw formal conclusions, its results are consistent with the body of evidence from many other trials. (c.f. Jacobs et. al., 2009)	Canini, L., et al., Surgical Mask to Prevent Influenza Transmission in Households: A Cluster Randomized Trial. PLoS ONE, 2010. 5(11): p. e13998.
2020	Chin et al 2020	<i>In vitro</i> study of SARS-CoV-2 surface viability Compares the length of time SARS-CoV-2 remains infectious on various surface materials.	Compared viability duration of SARS-CoV-2 on paper, tissue paper, wood, cloth, glass, banknotes, stainless steel, plastic, mask inner layer, and mask outer layer. Of all the materials tested, SARS-CoV-2 remained viable longest on medical masks. "No infectious virus could be recovered from printing and tissue papers after a 3-hour incubation, whereas no infectious virus could be detected from treated wood and cloth on day 2. By contrast, SARS-CoV-2 was more stable on smooth surfaces. No infectious virus could be detected from treated smooth surfaces on day 4 (glass and banknote) or day 7 (stainless steel and plastic). <u>Strikingly, a detectable level of infectious virus could still be present on the outer layer of a surgical mask on day 7.</u> "	Findings show that <b>SARS-CoV-2 remains viable longer on the inner and outer layer of medical masks than on most other common materials.</b> Taken in conjunction with the inferior protective performance from other respiratory viruses of cloth masks, and the studies suggesting that medical masks and N95 masks have comparable performance, this suggests that the vast majority of masks in use today are not useful in preventing the spread of SARS-CoV-2, and may even have a detrimental effect by extending the viral period of viability.	Chin, A. W. H., J. T. S. Chu, M. R. A. Perera, K. P. Y. Hui, H. L. Yen, M. C. W. Chan, M. Peiris, and L. L. M. Poon. "Stability of Sars-Cov-2 in Different Environmental Conditions." Lancet Microbe 1, no. 1 (May 2020): e10. https://dx.doi.org/10.1016/s2666-5247(20)30003-3.
2020	Chou et al 2020	Living Systematic Review updated quarterly Suvery of pertinenant literature updated frequently	"Randomized trials in community settings found possibly no difference between N95 versus surgical masks and <b>probably no difference betweer</b> surgical versus no mask in risk for influenza or influenza-like illness."	After a comphrehensive literature survey, the authors still could not definitively conclude that masks provide an antiviral benefit.	Chou, Roger, Tracy Dana, Rebecca Jungbauer, Chandler Weeks, and Marian S. McDonagh. "Masks for Prevention of Respiratory Virus Infections, Including Sars-Cov-2, in Health Care and Community Settings." Annals of Internal Medicine 173, no. 7 (2020): 542-55. https://dx.doi.org/10.7326/m20-3213.
2008 2009 2010	Cowling et al 2008 Cowling et al 2009 Cowling et al 2010	Cluster Randomized Controlled Trial - 122 index cases and their household contacts (2008) Cluster Randomized Controlled Trial - 322 index cases and their household contacts (2009) Literature Review (2010)	Divided participants into 3 groups: A) Control (Education) B) Education + Hand Hygiene C) Education + Hand Hygiene + Face Masks "Hand hygiene with or without facemasks seemed to reduce influenza transmission, but the differences compared with the control group were not significant." (Cowling et al 2009) "No significant difference was found between the face-mask plus hand hygiene group and the hand hygiene group in RT- PCR-confirmed influenza virus infections in house-hold contacts." (Cowling et al 2009)	"No significant differences between surgical masks and control" (Cowling et al 2010 describing his own Cowling et al 2008 study) "No significant difference overall" (Cowling et al 2010 describing his own Cowling et al 2009 study) Found no statistically significant benefit from use of facemasks to control respiratory viral illnesses.	<ul> <li>Cowling, Benjamin J., Rita O. P. Fung, Calvin K. Y. Cheng, Vicky J. Fang, Kwok Hung Chan, Wing Hong Seto, Raymond Yung, Billy Chiu, Paco Lee, Timothy M. Uyeki, Peter M. Houck, J. S. Malik Peiris, and Gabriel M. Leung. "Preliminary Findings of a Randomized Trial of Non-Pharmaceutical Interventions to Prevent Influenza Transmission in Households." PLoS One 3, no. 5 (2008): e2101. https://dx.doi.org/10.1371/journal.pone.0002101.</li> <li>Cowling, B. J., K. H. Chan, V. J. Fang, C. K. Cheng, R. O. Fung, W. Wai, J. Sin, W. H. Seto, R. Yung, D. W. Chu, B. C. Chiu, P. W. Lee, M. C. Chiu, H. C. Lee, T. M. Uyeki, P. M. Houck, J. S. Peiris, and G. M. Leung. "Facemasks and Hand Hygiene to Prevent Influenza Transmission in Households: A Cluster Randomized Trial." Ann Intern Med 151, no. 7 (Oct 6 2009): 437-46. https://dx.doi.org/10.7326/0003-4819-151-7-200910060-00142.</li> <li>Cowling, B. J., Y. Zhou, D. K. Ip, G. M. Leung, and A. E. Aiello. "Face Masks to Prevent Transmission of Influenza Virus: A Systematic Review." Epidemiol Infect 138, no. 4 (Apr 2010): 449-56. https://dx.doi.org/10.1017/s0950268809991658.</li> </ul>
1994	Davies et al 1994	Cross-sectional study 100 participants Compared the results of serological antibody tests for respiratory viruses between dentists and the general population. Compared the results of serological tests with PPE use within the sample of tested dentists.	50 practicing dental surgeon completed questionaires related to their use of PPE, including masks. Blood serum was collected from 50 practicing dental surgeons and 50 members of the general population matched to the dentsits for age and sex. The serum samples were tested for antibodies to Influenza A, Influenza B, Respiratory Syncytial Virus, and Adenovirus. "The dental group had a significantly elevated prevalence of antibodies to influenza A, influenza B and respiratory syncytial virus compared with th controls Wearing of masks or eye protection did not markedly reduce infection with these viruses among the dentists. "	Given the nature of dental work, and the PPE protocols that have been in place since the 1990s, <b>if any</b> group of medical providers could be expected to see obvious differences in respiratory viral infection rates from wearing masks, it would be dentists. Instead, we see no such thing, and this implies that masks, while they are useful barriers against visible droplets and splashes, are of no use preventing respiratory viral infections.	Davies, K. J., A. M. Herbert, D. Westmoreland, and J. Bagg. "Seroepidemiological Study of Respiratory Virus Infections among Dental Surgeons." Br Dent J 176, no. 7 (Apr 9 1994): 262-5. https://dx.doi.org/10.1038/sj.bdj.4808430.
2020	Estrich et al 2020	Practitioner Survey In June of 2020, 2,195 dentists from across the united states completed surveys regarding their PPE use and COVID-19 related symptoms over the previous months.	In total, 0.9% of the responding dentists had confirmed or probable COVID-19. Dentists were grouped into medium and high-risk categories based on the PPE they reported using.	The authors did not report any differences in the rates of COVID-19 between the minimal (surgical mask only) and maximal (N95 and Faceshield) PPE-using groups, providing indirect evidence that N95s and Faceshields provide confer no additional benefit.	Estrich, C. G., M. Mikkelsen, R. Morrissey, M. L. Geisinger, E. Ioannidou, M. Vujicic, and M. W. B. Araujo. "Estimating Covid-19 Prevalence and Infection Control Practices among Us Dentists." J Am Dent Assoc 151, no. 11 (Nov 2020): 815-24. https://dx.doi.org/10.1016/j.adaj.2020.09.005.
2021	Guerra et. al. 2021	Compared COVID-19 case growth rates among all 50 states from June 1, 2020 to March 6, 2021 and assessed whether statewide mask mandates and compliance made a difference.	"We assessed if statewide mask mandates and compliance predict (and thus potentially decrease) statewide COVID-19 growth rates after 1 June 2020, when test capacity reached a threshold for minimal contact tracing. We found little to no association between COVID 19 case growth and mask mandates or mask use at the state level. These findings suggest that statewide mandates and enhanced mas use did not detectably slow COVID-19 spread." "Mask mandates and use are not associated with slower state-level COVID-19 spread during COVID-^^^ 19 growth surges"	<ul> <li>k</li> <li>Compare the strength of this study on all 50 states for 9 months with that of Lyu and Wehby (2020), cited by the CDC, which only compared 15 states from April 8 to May 15 of 2020, or Van Dyke's Kansas Mask Mandate study (2020), also cited by the CDC.</li> </ul>	Guerra, D. and D.J. Guerra, Mask mandate and use efficacy in state-level COVID-19 containment. 2021, Cold Spring Harbor Laboratory.
2020 2018	Gund et al 2020 Zhiqing et al 2018	<i>In vivo</i> observational study Laboratory cultures of personal protective equipment used during patient procedures compared with unused PPE.	"The surgical mask seems to provide excellent conditions for the survival of oral or dermal bacteria." "It was found that when wearing surgical masks for more than 2 h, an increasing number of microorganisms from the environment or from the oral cavity and respiratory system of the mask wearer accumulate." "Touching the outer surface of the mask should be avoided at any time. After touching or removing the mask, the hands must be disinfected."	<ul> <li>This study highlights several of the <i>inescapable</i> risk tradeoffs inherent in wearing masks.</li> <li>Results indicate that a medical mask itself can be a source of pathogen contamination and transfer for both the user and those around them via transfer to the hands and other surfaces.</li> <li>This has even stronger implications when taken in conjunction comparing the observed infection rates between cloth masks and medical masks in randomized controlled trials.</li> <li>Even if effective in filtering viruses, masks (especially when worn beyond two hours) are known to provide excellent breeding grounds for bacteria, effectively trading a guaranteed dramatic increase in exposure to one pathogen for an unlikely protective benefit from another.</li> </ul>	<ul> <li>Gund, M., J. Isack, M. Hannig, S. Thieme-Ruffing, B. Gärtner, G. Boros, and S. Rupf. "Contamination of Surgical Mask During Aerosol-Producing Dental Treatments." Clin Oral Investig (Oct 27 2020): 1-8. https://dx.doi.org/10.1007/s00784-020-03645-2.</li> <li>Zhiqing, L., C. Yongyun, C. Wenxiang, Y. Mengning, M. Yuanqing, Z. Zhenan, W. Haishan, Z. Jie, D. Kerong, L. Huiwu, L. Fengxiang, and Z. Zanjing. "Surgical Masks as Source of Bacterial Contamination During Operative Procedures." J Orthop Translat 14 (Jul 2018): 57-62. https://dx.doi.org/10.1016/j.jot.2018.06.002.</li> </ul>
2009	Jacobs et al 2009	Randomized Controlled Trial - excluded from most meta- analyses due to small size 32 Healthcare workers in Japan randomized to mask or non- masked groups were followed for 77 days.	"Face mask use in health care workers has not been demonstrated to provide benefit in terms of cold symptoms or getting colds." "Compliance with mask use and nonuse was good, with most (84.3% of subjects) self-reporting full com-pliance (remainder complying 79.2%- 98.7% of the time)." <b>"There were no significant differences between the 2 groups for symptom severity scores."</b>	" the findings do not support the utility of surgical face masks in protecting health care workers in Japan from URI [Upper Respiratory Infections]. There were significantly fewer people experiencing days with 'headache' in the group that did not wear masks and a trend for this group to report fewer days with the symptom labeled 'feel bad.' This clearly does not sug-gest a protective effect of masks for common cold symptoms."	Jacobs, J. L., S. Ohde, O. Takahashi, Y. Tokuda, F. Omata, and T. Fukui. "Use of Surgical Face Masks to Reduce the Incidence of the Common Cold among Health Care Workers in Japan: A Randomized Controlled Trial." Am J Infect Control 37, no. 5 (Jun 2009): 417-19. https://dx.doi.org/10.1016/j.ajic.2008.11.002.
2020 2016 2104	Jefferson et. al. 2020 Vincent et. al. 2016 Lipp et. al. 2014	The latest three in a series of systematic reviews and meta- analyses going back to 2002.	"Compared to no masks there was no reduction of influenza-like illness (ILI) cases or influenza for masks in the general population, no in healthcare workers." (Jefferson et. al., 2020) "We included three trials, involving a total of 2106 participants. There was no statistically significant difference in infection rates between the masked and unmasked group in any of the trials" (Vincent et. al., 2016)	All of these conclude that the evidence does not show benefit to surgical masks vs. no masks in either the general population or healthcare workers at reducing post-operative infections or influenza transmission when worn by asymptomatic personnel. If the use of masks during a wide range of surgies does not produce a significant change in post operative infections for organisms many times the size of a virus, there is no reason to think that they will be of any use in reducing viral transmission in a far less-controlled general environment.	Jefferson, T., et al., Physical interventions to interrupt or reduce the spread of respiratory viruses. Part 1 - Face masks, eye protection and person distancing: systematic review and meta-analysis. 2020, Cold Spring Harbor Laboratory. Vincent, M. and P. Edwards, Disposable surgical face masks for preventing surgical wound infection in clean surgery. Cochrane Database of Systematic Reviews, 2016. Lipp, A. and P. Edwards, Disposable surgical face masks for preventing surgical wound infection in clean surgery. Cochrane Database of Systematic Reviews, 2014.
1920	Kellogg 1920	Retrospective assessment and laboratory tests using humans to disperse proxy organisms.	The authors of this study used a proxy organism (Bacillus prodigiosus, also known as Serratia marcescens) which are typically 500 to 2,000 nanometers - many times the size of the 60-140nm SARS-CoV-2 virus. "We found that with the element of aspiration introduced, as in the natural use of masks, even five layers did not give a sufficient reduction in count to make such a mask of value."	The author's stated intent was to explain the utter lack of observed efficacy of facemasking during the Spanish Flu. "masks, contrary to expectation, were worn cheerfully and universally, and also, contrary to expectation of what should follow under such circumstances, no effect on the epidemic curve was to be seen." If cloth masks can't provide protection against an organism hundreds of times the size of a virus like SARS-CoV-2, they cannot reasonably be expected to protect against a virus either.	Kellogg, W. H., and Grace Macmillan. "An Experimental Study of the Efficacy of Gauze Face Masks." American Journal of Public Health 10, no. 1 (1920): 34-42. https://dx.doi.org/10.2105/ajph.10.1.34.
2001	Lahme et. al., 2001	Evaluated whether the use of masks by patients undergoing surgery affected the airborne germ count above the surgical site. Cultured airborne bacteria from four sites during 72 surgeries	"Surgical face masks worn by patients during regional anaesthesia,did not reduce the concentration of airborne bacteria over the operation field in our study.Thus they are dispensable." "Regardless of the measurement location, no significant difference in the average CFU [Colony-Forming Unit] number could be determined between the groups with or without a face mask "	Bacteria are orders of magnitude larger than viruses, and so are easier to filter If masks worn by the patient don't affect the amount of airborne bacteria around their surgical wound less than 6 feet away, they're not going to affect respiratory viruses less than a tenth of that size.	Lahme, T., et al., [Patient surgical masks during regional anesthesia. Hygenic necessity or dispensable ritual?]. Der Anaesthesist, 2001. 50(11): p. 846-851.

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2010 Larson et al 2010	Cluster-randomized intervention trial A total of 509 primarily Hispanic households in New York ( <b>2,788 persons total</b> ) were followed over a period of 19 months.	"In this population, <b>there was no detectable additional benefit of hand sanitizer or face masks over targeted education on overall rates of</b> <b>URIs</b> , but mask wearing was associated with reduced secondary transmission and should be encouraged during outbreak situations." "However, <b>there were no significant differences in rates of URI, ILI, or influenza by intervention group.</b> "	No differences in rates of upper respiratory infections between medical masks plus handwashing versus handwashing alone in risk for infections in household contacts of index cases STRONGLYimplies that medical masks are not effective at preventing respiratory infections.	Larson, Elaine L., Yu-Hui Ferng, Jennifer Wong-Mcloughlin, Shuang Wang, Michael Haber, and Stephen S. Morse. "Impact of Non-Pharmaceutical Interventions on Uris and Influenza in Crowded, Urban Households." Public Health Reports 125, no. 2 (2010): 178-91. https://dx.doi.org/10.1177/003335491012500206.
1989 Laslett et al 1989	Prospective Review Analyzed 504 operations involving 1008 operator-experiences total.	"Wearing of Caps and Masks Not Necessary During Cardiac Catheterization" " we found by a prospective review of the experience in our institution's catheterization laboratory that whether caps or masks were worn by the operators performing the (percutaneous) procedures had no effect on the apparent infection rate."	The authors found no difference in the rate of post-operative infections for cardiac catherization procedures whether or not the surgeons wore caps and masks.	Laslett, Lawrence J., and Alisa Sabin. "Wearing of Caps and Masks Not Necessary During Cardiac Catheterization." https://doi.org/10.1002/ccd.1810170306, Catheterization and Cardiovascular Diagnosis 17, no. 3 (1989/07/01 1989): 158-60. Accessed 2021/04/07. https://dx.doi.org/https://doi.org/10.1002/ccd.1810170306.
2009 Loeb et al 2009	Randomized Controlled Trial 446 Nurses in 8 Ontario Hospitals	"We conducted a randomized trial to compare the surgical mask with the N95 respirator in health care workers." "46 nurses were enrolled and randomly assigned the intervention; 225 were allocated to receive surgical masks and 221 to N95 respirators. Influenza infection occurred in 50 nurses (23.6%) in the surgical mask group and in 48 (22.9%) in the N95 respirator group."	"The major implication of this study is that protection with a surgical mask against influenza appears to be similar to the N95 respirator, meeting criteria for noninferiority." "The fact that attack rates were similar may suggest that small aerosols did not dominate transmission."	Loeb, M., N. Dafoe, J. Mahony, M. John, A. Sarabia, V. Glavin, R. Webby, M. Smieja, D. J. Earn, S. Chong, A. Webb, and S. D. Walter. "Surgical Mask Vs N95 Respirator for Preventing Influenza among Health Care Workers: A Randomized Trial." Jama 302, no. 17 (Nov 4 2009): 1865-71. https://dx.doi.org/10.1001/jama.2009.1466.
2011 MacIntyre et al 2011 2013 MacIntyre et al 2013 2015 MacIntyre et al 2015	Cluster-Randomized Controlled Trials Series of Randomized controlled trials comparing the efficacy of medical masks and N95 masks and double-layered cotton cloth masks with medical masks. Involved a total of 4,717 healthcare workers in China and Vietnam. Included a convenience non-randomized non-masked control group.	"The original purpose of medical masks was to prevent microbial contamination of wounds while worn by surgeons during surgery (hence their common name "surgical masks"), yet randomized controlled trials show no efficacy against wound contamination Masks in community settings have no clearly proved efficacy." (MacIntyre et al 2013) "Cloth masks resulted in significantly higher rates of infection than medical masks, and also performed worse than the control arm." (MacIntyre et al 2015) "Observations during SARS suggested double-masking and other practices increased the risk of infection because of moisture, liquid diffusion and pathogen retention." (MacIntyre et al 2015) "we compared rates of infection in the medical mask arm with rates observed in medical mask arms from two previous RCTs in which no efficacy of medical masks could be demonstrated when compared with control or N95 respirators." (MacIntyre et al 2015) "the rate of virus isolation in the no-mask control group in the first Chinese RCT was 3.1%, which was not significantly different to the rates of virus isolation in the medical mask arms in any of the three trials including this one." (MacIntyre et al 2015) " the magnitude of difference raises the possibility that cloth masks cause an increase in infection risk in HCWs." (MacIntyre et al 2015) "The rates of all infection outcomes were highest in the cloth mask arm and the results caution against the use of cloth masks." (MacIntyre et al 2015)	Represents a best-case scenario for cloth mask use, involving trained personnel and daily washings. The dramatically worse performance of cloth masks <i>even under optimal conditions in preventing respiratory viral infections</i> when compared to medical masks has profound implications when we take into account the multiple other studies which show medical masks conferring no benefit as either source control or personal protection. If cloth masks are not recommended for healthcare workers, they should not be forced on the general public. The lack of differences in overall respiratory viral infection rates in the non-randomized convenience no mask group in MacIntyre's 2011 study when compared with the masked groups in MacIntyre's 2011, 2013, and 2015 studies is consistent with the findings in Bundgaard's 2020 randomized controlled trial comparing medical masks vs. no masks.	<ul> <li>MacIntyre, C. R., Q. Wang, S. Cauchemez, H. Seale, D. E. Dwyer, P. Yang, W. Shi, Z. Gao, X. Pang, Y. Zhang, X. Wang, W. Duan, B. Rahman, and N. Ferguson. "A Cluster Randomized Clinical Trial Comparing Fit-Tested and Non-Fit-Tested N95 Respirators to Medical Masks to Prevent Respiratory Virus Infection in Health Care Workers." Influenza Other Respir Viruses 5, no. 3 (May 2011): 170-9. https://dx.doi.org/10.1111/j.1750-2659.2011.00198.x.</li> <li>MacIntyre, C. R., Q. Wang, H. Seale, P. Yang, W. Shi, Z. Gao, B. Rahman, Y. Zhang, X. Wang, A. T. Newall, A. Heywood, and D. E. Dwyer. "A Randomized Clinical Trial of Three Options for N95 Respirators and Medical Masks in Health Workers." Am J Respir Crit Care Med 187, no. 9 (May 1 2013): 960-6. https://dx.doi.org/10.1164/rccm.201207-1164OC.</li> <li>MacIntyre, C. R., H. Seale, T. C. Dung, N. T. Hien, P. T. Nga, A. A. Chughtai, B. Rahman, D. E. Dwyer, and Q. Wang. "A Cluster Randomised Trial of Cloth Masks Compared with Medical Masks in Healthcare Workers." BMJ Open 5, no. 4 (Apr 22 2015): e006577. https://dx.doi.org/10.1136/bmjopen-2014-006577.</li> </ul>
2021 Marks et. al. 2021	Specifically looked at the transmission of COVID-19 Cohort study done as part of a randomized controlled trial Followed 282 COVID patients with 753 contacts.	" we did not find any evidence of decreased risk of transmission in individuals who reported mask use."	The significance lies in the results.	Marks, M., et al., Transmission of COVID-19 in 282 clusters in Catalonia, Spain: a cohort study. The Lancet Infectious Diseases, 2021.
1991 Mitchell et al 1991	<i>In vivo</i> simulation <i>In vivo</i> simulation conducted in an operating room with unmasked volunteers breathing and speaking with their mouths and nostrils 15 cm (6 inches) from agar plates, and 1 meter from agar plates	"Oral microbial dispersal by talking non-scrubbed staff poses no risk to the patient on the operating table. The routine wearing of mask by all staff working in a modern operating room with forced ventilation is a costly and unnecessary ritual."	Outdoor conditions are even less conducive to microbial transmission than the operating room conditions in this study.         Is       Wearing masks outdoors is utterly useless.         If masks don't provide protection against much larger bacteria, there is no reason to think they will be of any use against viruses.         These findings also imply that singing is not nearly as risky as many people now believe.	Mitchell, N. J., and S. Hunt. "Surgical Face Masks in Modern Operating Roomsa Costly and Unnecessary Ritual?", J Hosp Infect 18, no. 3 (Jul 1991): 239-42. https://dx.doi.org/10.1016/0195- f 6701(91)90148-2.
1981 Murphy et al 1981	Randomized Controlled Trial 58 pediatric nursing staff completed the study, being assigned to Handwashing or Handwashing+Masks+Gowns group in different wards .	"gowning and masking did not appear to influence either illness or specific virus infection" d "We were unable to demonstrate any effect of adding the use of both gown and mask to the usual handwashing routine on the development of illness in personnel caring for infants with respiratory disease."	Evidence against masks as effective source control. Gowning and masking nursing personnel in pediatric hospital wards did not decrease rates of respiratory viral infections when compared with handwashing alone.	Murphy, Dianne, James K. Todd, Ru Kwa Chao, Inara Orr, and Kenneth McIntosh. "The Use of Gowns and Masks to Control Respiratory Illness in Pediatric Hospital Personnel." The Journal of Pediatrics 99, no. 5 (1981): 746-50. https://dx.doi.org/10.1016/s0022-3476(81)80401-5
1995 Norman 1995	Observational study Compared the post-surgical infection rates when the entire operating team wore visors (faceshields) and when they wors surgical masks. 412 total surgeries	There was no statistically-significant difference between the group <sup>50</sup> "The literature indicates that there is no need for masks to be worn to prevent infection of the patient. Indeed the rubbing of the mask against the skin may even increase shedding of skin squames and adversely affect infection rates."	Current laboratory theory supporting facemask use and mandates states that the better the seal, the stronger the protective effect. Face visors have no seal, yet produced no statistically-significant difference in post-surgical infection rates (including more invasive thoracic surgeries). This is the opposite of what we should expect to see if the theory justifying facemask mandates was true.	Norman, A., A comparison of face masks and visors for the scrub team. A study in theatres. The British journal of theatre nursing: NATNews: the official journal of the National Association of Theatre Nurses, 1995. 5(2): p. 10-13.
1981 Orr 1981	Observational study The author compared infection rates after discontinuing the use of masks in an operating theater to infection rates recorded over the previous 4 years.	"No masks were worn in one operating theatre for 6 months. There was no increase in the incidence of wound infection." "There was no increase in wound infections when masks were discarded in 1980; in fact there was a significant (p<0.05) decrease. The 8 infections which did occur (Table ii) bore no relation to the throat or nose cultures from the the theatre team, which from time to time yielded Staphylococcus albus or Staph. aureus."	Findings provide evidence against masks having benefits for source control. "The conclusion is that the wearing of a mask has very little relevance to the wellbeing of patients undergoing routine general surgery and it is a standard practice that could be abandoned."	Orr, N. W. "Is a Mask Necessary in the Operating Theatre?", Ann R Coll Surg Engl 63, no. 6 (Nov 1981): 390-2.
2019 Radonovich et al 2019	Cluster Randomized Controlled Trial Followed over 4,000 healthcare workers at 137 outpatient study sites in 7 medical centers across the United States over four flu seasons from 2011 to 2015.	By far the most rigorous study done on this topic to-date. "In this pragmatic, cluster randomized trial that involved multiple outpatient sites at 7 health care delivery systems across a wide geographic area over 4 seasons of peak viral respiratory illness, there was no significant difference between the effectiveness of N95 respirators and medical masks in preventing laboratory-confirmed influenza among participants routinely exposed to respiratory illnesses in the workplace. In addition, there were no significant differences between N95 respirators and medical masks in the rates of acute respiratory illness, laboratory- detected respiratory infections, laboratory-confirmed respiratory illness, and influenzalike illness among participants."	"Among outpatient health care personnel, <b>N95 respirators vs medical masks as worn by</b> participants in this trial resulted in no significant difference in the incidence of laboratory- confirmed influenza."	Radonovich, L. J., Jr., M. S. Simberkoff, M. T. Bessesen, A. C. Brown, D. A. T. Cummings, C. A. Gaydos, J. G. Los, A. E. Krosche, C. L. Gibert, G. J. Gorse, A. C. Nyquist, N. G. Reich, M. C. Rodriguez- Barradas, C. S. Price, and T. M. Perl. "N95 Respirators Vs Medical Masks for Preventing Influenza among Health Care Personnel: A Randomized Clinical Trial." Jama 322, no. 9 (Sep 3 2019): 824-33. https://dx.doi.org/10.1001/jama.2019.11645.
1984 Ruthman et. al. 1984	Observational study looking at whether the use of caps and masks made any difference in post-operative infection rates 442 lacerations sutured in emergency departments.	of "There was no significant difference in infection rate between our study groups."	If the use or non-use of caps and masks when suturing open wounds in the emergency department made no difference in post-operative infection rates, we should not expect it to make a difference in infection rates where no open wounds are involved.	Ruthman, J.C., et al., Effect of cap and mask on infection rates in wounds sutured in the emergency department. IMJ III Med J, 1984. 165(6): p. 397-9.
2011 Simmerman et al 2011	Cluster-Randomized Controlled Trial Examined the rates of influenza transmission in households from symptomatic child index cases in Thailand. Involved a total of 442 index children and 1,147 househol members.	Secondary Influenza Attack Rates between the handwashing and handwashing + facemask group were identical. "Influenza transmission was not reduced by interventions to promote hand washing and face mask use." "Relative to the control group, the ORs [odds ratios] for ILI [influenza-like illness] among household members in the hand-washing arm (2Æ09; 95% CI 1Æ25, 3Æ50; P = 0Æ005) and hand washing plus face mask arm (2Æ15; 95% CI: 1Æ27, 3Æ62; P = 0Æ004) were <b>twofold in the</b> <b>opposite direction from the hypothesized protective effect</b> ."	No differences in rates of upper respiratory infections between medical masks plus handwashing versus handwashing alone in risk for infections in household contacts of index cases STRONGLY implies that medical masks are not effective at preventing respiratory infections.	Simmerman, James M., Piyarat Suntarattiwong, Jens Levy, Richard G. Jarman, Suchada Kaewchana, s Robert V. Gibbons, Ben J. Cowling, Wiwan Sanasuttipun, Susan A. Maloney, Timothy M. Uyeki, Laurie Kamimoto, and Tawee Chotipitayasunondh. "Findings from a Household Randomized Controlled Trial of Hand Washing and Face Masks to Reduce Influenza Transmission in Bangkok, Thailand." Influenza and Other Respiratory Viruses 5, no. 4 (2011): 256-67. https://dx.doi.org/10.1111/j.1750-2659.2011.00205.x.
2002 Sjøl et. al., 2002	Performed a randomized study on the effect the use or non- use of masks by the operators has on local and general post- operative infections for percutaneous cardiac catheterization procedures. 855 patients	There were no post-operative infections in either group. "Our results suggest that routine use of hat and mask in catheterization compartments does not affect the incidence of procedure- related inflammation or infection."	The non-use of masks and/or caps did not increase the rate of post-operative infections for percutaneous cardiac catheterization procedures.	Sjøl, A. and H. Kelbaek, [Is use of surgical caps and masks obsolete during percutaneous heart catheterization?]. Ugeskrift for laeger, 2002. 164(12): p. 1673-1675.
<ul> <li>2016 Smith et al 2016</li> <li>2017 Offeddu et al 2017</li> <li>2020 Long et al 2020</li> <li>2020 Bartoszko et al 2020</li> </ul>	Meta-analyses Incorporated randomized controlled trials and observational studies.	<ul> <li>"In the meta-analysis of the clinical studies, we found no significant difference between N95 respirators and surgical masks in associated risk of (a laboratory-confirmed respiratory infection; (b) influenza-like illness; or (c) reported work-place absenteeism." (Smith et al 2016)</li> <li>"Evidence of a protective effect of masks or respirators against VRI [viral respiratory infections, a rarer outcome, was not statistically significant." (Offeddu et al 2017)</li> <li>"Disposable, cotton, or paper masks are not recommended." (Offeddu et al 2017)</li> <li>"Single-use medical masks are preferable to cloth masks, for which there is no evidence of protection and which might facilitate transmission of pathogens when used repeatedly without adequate sterilization." (Offeddu et al 2017)</li> <li>"There were no statistically significant differences in preventing laboratory-confirmed influenza, laboratory-confirmed respiratory viral infections, laboratory-confirmed respiratory infection and influenzalike illness using N95 respirators and surgical masks." (Long et al 2020)</li> <li>"The use of N95 respirators compared with surgical masks is not associated with a lower risk of laboratory-confirmed influenza." (Long et al 2020)</li> <li>"There is no convincing evidence that medical masks are inferior to N95 respirators for protecting healthcare workers against laboratory-confirmed viral respiratory infections during routine care and non-aerosol-generating procedures." (Bartoszko et al 2020)</li> </ul>	<ul> <li>N95 masks have a filtration efficacy exceeding that of medical masks. When properly fitted, they are supposed to filter out 95% of particles greater than 300 nanometers in size. This filtration efficacy declines dramatically for particles &lt;300nm, and respiratory viruses like SARS-CoV-2 and influenza are typically &lt;150nm in diameter.</li> <li>Nevertheless, laboratory studies have shown N95 masks to have superior filtration of &lt;300nm particles when compared to medical masks.</li> <li>The fact that multiple meta-analyses have consistently failed to demonstrate that N95 masks provide statistically significant respiratory virual protection over medical masks despite laboratory studies arguing for their efficacy suggests that the same lack of additional benefit may very well be true when comparing surgical masks with no masks.</li> </ul>	<ul> <li>Smith, J. D., C. C. MacDougall, J. Johnstone, R. A. Copes, B. Schwartz, and G. E. Garber.</li> <li>"Effectiveness of N95 Respirators Versus Surgical Masks in Protecting Health Care Workers from Acute Respiratory Infection: A Systematic Review and Meta-Analysis." Cmaj 188, no. 8 (May 17 2016): 567-74. https://dx.doi.org/10.1503/cmaj.150835.</li> <li>Offeddu, V., C. F. Yung, M. S. F. Low, and C. C. Tam. "Effectiveness of Masks and Respirators against Respiratory Infections in Healthcare Workers: A Systematic Review and Meta-Analysis." Clin Infect Dis 65, no. 11 (Nov 13 2017): 1934-42. https://dx.doi.org/10.1093/cid/cix681.</li> <li>Long, Y., T. Hu, L. Liu, R. Chen, Q. Guo, L. Yang, Y. Cheng, J. Huang, and L. Du. "Effectiveness of N95 Respirators Versus Surgical Masks against Influenza: A Systematic Review and Meta-Analysis." J Evid Based Med 13, no. 2 (May 2020): 93-101. https://dx.doi.org/10.1111/jebm.12381.</li> <li>Bartoszko, J. J., M. A. M. Farooqi, W. Alhazzani, and M. Loeb. "Medical Masks Vs N95 Respirators for Preventing Covid-19 in Healthcare Workers: A Systematic Review and Meta-Analysis of Randomized Trials." Influenza Other Respir Viruses 14, no. 4 (Jul 2020): 365-73. https://dx.doi.org/10.1111/jrv.12745.</li> </ul>
2020 Szablewski et al 2020	Observational study	The article's emphasis was on the contagiousness of SARS-CoV-2 and that "the multiple measures adopted by the camp were not sufficient to prevent an outbreak in the context of substantial community transmission." "Cloth masks were required for staff members The overall attack rate was 44% with staff members having the highest attack rate (56%)."	<ul> <li>While the authors noted that staff members had the highest attack rate, they attributed this to length of time spent at the camp (11 days for staff members compared to 7 days for campers or 5 days for trainees).</li> <li>An alternative hypothesis that is equally consistent with the evidence, but also takes account of the results from MacIntyre's 2015 study, is that all individuals were exposed during their time at the camp and the staffers' wearing of cloth maks resulted in a higher rate of illness than their less-stringently-masked campers.</li> <li>It would have been helpful for the authors to include symptom data to see whether the cloth-mask-wearing staffers or the non-mask-wearing campers experienced more asymptomatic infections.</li> </ul>	Szablewski, Christine M., Karen T. Chang, Marie M. Brown, Victoria T. Chu, Anna R. Yousaf, Ndubuisi Anyalechi, Peter A. Aryee, Hannah L. Kirking, Maranda Lumsden, Erin Mayweather, Clinton J. McDaniel, Robert Montierth, Asfia Mohammed, Noah G. Schwartz, Jaina A. Shah, Jacqueline E. Tate, Emilio Dirlikov, Cherie Drenzek, Tatiana M. Lanzieri, and Rebekah J. Stewart. "Sars-Cov-2 Transmission and Infection among Attendees of an Overnight Camp — Georgia, June 2020." MMWR. Morbidity and Mortality Weekly Report 69, no. 31 (2020): 1023-25. https://dx.doi.org/10.15585/mmwr.mm6931e1.
1991 Tunevall 1991	Randomized Controlled Trial Conducted over 2 years and involved 3,088 patients. Compared post-medical infection rates when operating teams wore masks vs no masks. Same patient pool, same procedures, same operating rooms.	"After 1,537 operations performed with face masks, 73 (4.7%) wound infections were recorded and, after 1,551 operations performed without face masks, 55 (3.5%) infections occurred. This difference was not statistically significant (p > 0.05)" <sup>S</sup> "It has not been possible to demonstrate any advantages for the patient when the medical team wears face masks. There- fore, the routine use of face masks ought to be reconsidered."	Findings provide strong evidence against medical masks having beneficial source control effects. Even in the operating room, medical masks provide no protection to people around the user even from bacteria which are more than 10x the size of viruses like SARS-CoV-2. Bottom line: my mask does not protect you, and your mask does not protect me.	Tunevall, T. G. "Postoperative Wound Infections and Surgical Face Masks: A Controlled Study." World J Surg 15, no. 3 (May-Jun 1991): 383-7; discussion 87-8. https://dx.doi.org/10.1007/bf01658736
1992 Tunevall et. al. 1992	Study conducted during 14 operations on the thyroid gland comparing the counts of airborne bacteria in the vicinity of the op-eration wound during operations when masks were worn b the team and omitted, respectively.	"We found almost identical air counts of aerobic and anaerobic skin bacteria whether or not masks were worn by the operating staff. The greatest differences in numbers were found among different operations during the pilot study and depended on the kind of operation, the number of people in the theatre, and the amount of activity in the theatre during the opera-tion" "We conclude that the use of masks during operations does not influence the number of potentially pathogenic bacteria in the air close to the operation wound."	(c.f. Lahme etl. al., 2001, who found a similar non-effect when the patients wore masks) If the use of masks does not affect bacterial populations, there is no reason to think it will influence vira populations.	Tunevall, T.G., Postoperative wound infections and surgical face masks: a controlled study. World J I Surg, 1991. 15(3): p. 383-7; discussion 387-8.
2020 Van Dyke et al 2020	Cited by the CDC as evidence that mask mandates work to slow the spread of COVID, this study actually shows the opposite when critically examined. Provides a premium example of how study data presentation can be manipulated to mislead readers' conclusions.	Over the period of time covered by this Kansas Mask Mandate study, the number of COVID-19 cases in the mask mandate counties increased almost twice as quickly as the non-masked counties. The NON-mask-mandate Kansas county cohort started the study period (July 3rd) at 825 COVID cases per 100,000 population, and by August 21st, was at 1,271 cases per 100,000; while the mask-mandated county cohort started the study period (July 3rd) at 411 COVID cases per 100,000 population, and ended (August 23rd) at 1,262 COVID cases per 100,000. The Kansas Mask Mandate study doesn't take the straightforward approach of looking at the total numbers of COVID cases between the two stud cohorts over a period of time. It doesn't even emphasize the overall trends in the rate of change - the daily new cases - of COVID-19 among the masked and the non-masked counties, because doing so STILL would not make masking look like a good idea. Just look at the table from their own study. According to the Kansas Mask Mandate study's own metric, as of June 1st, the two study cohorts started at almost the same rate of acceleration (3 or 4 daily new COVID cases per 100,000 people), but by the end of the study, the non-masked counties were still doing better than the masked counties (COVID-19 daily new case incidence of 12 per 100,000 vs the masked counties' incidence of 16 per 100,000), even though it's completely true that from the day the mask mandate went into effect on July 3rd, through to August 23rd, the incidence of daily new cases of COVID-19 per 100,000 population in mask mandate counties decreased from 17 to 16.	<ul> <li>This study is a premium example of how technically correct data can be presented in a misleading way depending on what the authors want to achieve.</li> <li>The non-masked county cohort started and ended the study period with a lower incidence of COVID-19 cases than the masked county cohort.</li> </ul>	Van Dyke, M. E., T. M. Rogers, E. Pevzner, C. L. Satterwhite, H. B. Shah, W. J. Beckman, F. Ahmed, D. C. Hunt, and J. Rule. "Trends in County-Level Covid-19 Incidence in Counties with and without a Mask Mandate - Kansas, June 1-August 23, 2020." MMWR Morb Mortal Wkly Rep 69, no. 47 (Nov 27 2020): 1777-81. https://dx.doi.org/10.15585/mmwr.mm6947e2.

## Facemasks Ineffective at Mitigating the Spread of Respiratory Viruses

2	020 V	Vang et al 2020	Observational Study "The Massachusetts General Brigham Facemask Study" Cited by the CDC as evidence that mask mandates work to slow the spread of COVID, this study actually suggests the opposite when critically examined.	"This study assessed the association of hospital masking policies with the SARS-CoV-2 infection rate among HCWs." "We believe that our study provides definitive data on the value of universal masking in a healthcare setting during a pandemic, and that the results can be generalized to other settings even where social distancing is not possible." The study authors point out that the timing of the SARS-CoV-2 infection rate peak and downturn in the population of Massachusetts General Brigham hospital employees is consistent with what would be expected if the universal use of facemasks conferred a protective benefit on the population, and state that . The authors neglect to include any kind of control group.	<ul> <li>When the findings of this study with regard to the mask-manded employee population of the Massachusetts General Brigham Hospital System are overlaid onto the course of the SARS-CoV-2 epidemic in the non-mandated overall population of the State of Massachusetts, we see two epidemic curves that follow an identical course - even peaking on the same day - April 13 - with no difference in the timing of the peak and downturn of the infection.</li> <li>When this additional data analysis is extended chronologically to include May of 2020, the general-population mask mandate by Governor Baker produced no beneficial effect on the already downward epidemic curve.</li> <li>Differences in observed infection rates between the hospital employee population and the general population can easily be explained by the hospital eliminating double-counting of cases and testing every symptomatic employeed, whereas this was not done in the general population.</li> </ul>	Wang, X., E. G. Ferro, G. Zhou, D. Hashimoto, and D. L. Bhatt. "Association between Universal Masking in a Health Care System and Sars-Cov-2 Positivity among Health Care Workers." Jama 324, no. 7 (Jul 14 2020): 703-4. https://dx.doi.org/10.1001/jama.2020.12897.
2	010 V	Vebster et al 2010	Randomized Controlled Trial 811 start-to-finish participants Compared post-surgical infection rates between surgeries where the non-scrubbed staff were and were not masked.	"Overall, 83 (10.2%) surgical site infections were recorded; 46/401 (11.5%) in the Masked group and 37/410 (9.0%) in the No Mask group."	If having all the non-scrubbed surgical staff not wearing masks did not increased post-surgical infections, this provides good inferential evidence that the use of masks does not have a substantial effect on microbial transmission.	Webster, J., et al., Use of face masks by non-scrubbed operating room staff: a randomized controlled trial. ANZ J Surg, 2010. 80(3): p. 169-73.
2	020 X	(iao et al. 2020	Systematic Review and Meta-analysis looking specifically at whether the use of masks makes a difference in the transmission of laboratory-confirmed influenza.	"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" "Although mechanistic studies support the potential effect of hand hygiene or face masks, evidence from 14 randomized controlled trials of these measures did not support a substantial effect on transmission of laboratory-confirmed influenza."	If surgical-type facemasks are not effective in reducing influenza transmission, then cloth masks certainly will not be, and when combined with the few studies that have looked at cloth masks, this strongly implies a net detrimental effect from the use of cloth masks.	Xiao, J., et al., Nonpharmaceutical Measures for Pandemic Influenza in Nonhealthcare Settings—Personal Protective and Environmental Measures. Emerging Infectious Diseases, 2020. 26(5): p. 967-975.

## Tso, R.V. and B.J. Cowling, Importance of Face Masks for COVID-19: A Call for Effective Public Education. Clin Infect Dis, 2020. 71(16): p. 2195-2198.

Table 1. Summary of the Earlier Recommendations on Medical Masks Use in the General Community Across Different Credible Health Authorities Prior to 6 April 2020

Source	Encourages Community Use of Face Masks?	Reasons/Further Notes Provided?	Suggestions on the Use of Masks for Healthy Individuals Under Alternative Circumstances?
WHO [2, 3]	No	<ul> <li>Improper use may hamper its use</li> <li>No evidence to support the effectiveness against COVID-19 of mask-use in the community</li> </ul>	<ul> <li>Use masks when:</li> <li>When the culture has been to use masks</li> <li>When the local government encourages their use</li> <li>Upon close contact with infected/suspected/high-risk individuals</li> </ul>
United States [4]	No	<ul> <li>Spread of SARS-CoV-2 is mainly through close contact</li> <li>Stockpiling of masks may place a burden on the supply to medical staff</li> </ul>	Use masks when [5]: – In workplaces of and upon contact with infected/sus- pected/high-risk individuals
Canada [6]	No	<ul> <li>Improper use may increase infection risks</li> <li>May induce a false sense of security that that played down other essential hygiene measures</li> </ul>	<ul> <li>Use masks when:</li> <li>When the culture has been using masks</li> <li>when the local government encourages their use</li> <li>Upon close contact with infected/suspected/high-risk individuals</li> </ul>
Jnited Kingdom [7, 8]	Not explicit <sup>a</sup>	Nil	Use masks when: – Upon close contact with infected/suspected/high-risk individuals
Australia [9]	No	<ul> <li>little evidence supporting the widespread use of surgical masks in healthy people</li> </ul>	Use masks when: – Upon close contact with infected/suspected/high-risk individuals
Vew Zealand [10]	No	<ul> <li>Cited as suggestions from WHO</li> </ul>	Use masks when: – In workplaces of contact with infected/suspected/ high-risk individuals
rance [11]	No	<ul> <li>Facemasks cannot be worn at all times</li> </ul>	Use masks when: – Upon prolonged close contact with an infected indi- vidual.
aly [12]	No	<ul> <li>Citing as suggestions from WHO</li> <li>Increased the risk of infection due to a false sense of security and greater contact between hands, mouth and eyes.</li> </ul>	Use masks when: – Upon close contact with infected individuals
pain [13]	No	<ul> <li>Worn by people who are sick.</li> <li>An inadequate use of masks can contribute to a shortage of them in those situations for which they are indicated.</li> </ul>	Use masks when: - Upon close contact with infected individuals
ermany [14]	No	<ul> <li>Citing as suggestions from WHO</li> </ul>	Nil
ngapore [15]	No <sup>b</sup>	<ul> <li>Only for sick individuals</li> </ul>	Nil
China [16, 17]	Yes	<ul> <li>The general community should make the judgment of mask-usage based the risk levels.</li> <li>Masks are recommended in situations which include, going to medical institutions, in crowded open spaces, in a crowded or densely populated indoor environment, and close contact with people of quarantine at home</li> </ul>	<ul> <li>Masks are not required:</li> <li>when you are at home (in isolation), engaging in out- door activities or in well-ventilated indoor places</li> </ul>
Hong Kong SAR, China [18, 19]	Yes	<ul> <li>Recommended when taking public transport or staying in crowded place, clinics or hospitals visits.</li> <li>Face mask provides a physical barrier to fluids and large particle droplets. When used properly, surgical masks can prevent infections transmitted by respiratory droplets.</li> </ul>	Nil
Macau SAR, Chin [20, 21]	a Yes	<ul> <li>If it is necessary to go out, wear a mask at all times</li> </ul>	Nil
outh Korea [22]	Yes	<ul> <li>Wearing a mask can prevent infectious diseases</li> </ul>	Nil.
Japan [23]	Yes and No <sup>b</sup>	<ul> <li>If you wear a facemask in confined, badly ventilated spaces, it might help avoid catching droplets emitted from others</li> </ul>	<ul> <li>Masks are not required:</li> <li>If you are in an open-air environment, the use of facemask is not very efficient.</li> </ul>

Majority of the suggestions issued by governments from various affected regions did not argue that proper use of masks would be ineffective. Health authorities that initially discouraged the use of masks have also cited other valid reasons for its lack of necessity:

1. In open space where people keep a distance from each other.

2. When you are alone.

3. When there is no outbreak in your region.

Health authorities from countries that promoted the use of masks acknowledged that face masks are effective but also explained the importance of their proper use along with other hygiene measures. In contrast, authorities that recommended against the use of masks in the general community mainly cited shortage of supplies as well as the argument that the public do not have the adequate skills to wear them or that wearing masks might reduce compliance with other important behaviors.

Abbreviations: COVID-19, coronavirus disease 2019; SAR, Special Administrative Region; SARS-CoV-2, severe acute respiratory syndrome coronavirus 2; WHO, World Health Organization <sup>a</sup>Although the representatives from National Health Service (UK) have previously spoken again the use of masks through the press.

<sup>b</sup>Despite ambiguous guidelines on the use of masks, Japan and Singapore ensured all citizens weekly rations of medical masks and banned exports of medical masks.

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