

Face Shield Literature Review

GUIDANCE DOCUMENTS

- + [Pennsylvania Department of Education \(PDE\) - Guidance on the Phased Reopening of Pre-K to 12](#)
 - Pennsylvania Department of Education. Preliminary Guidance for Phased Reopening of Pre-K to 12 Schools; June 2020, Rev 1.
 - Recommended use of face coverings (masks or face shields)
- + [Pennsylvania Department of Education \(PDE\) – Guidance on Resuming In-Person Instruction at Postsecondary Education Institutions and Adult Education Programs](#)
 - Pennsylvania Department of Education. Preliminary Guidance for Resuming In-Person Instruction at Postsecondary Education Institutions and Adult Education Programs; June 2020; Rev 1.
 - Recommended use of face coverings (masks or face shields when appropriate)
- + [Guidance for All Sports Permitted to Operate During the COVID-19 Disaster Emergency to Ensure the Safety and Health of Employees, Athletes and the Public](#)
 - June 22, 2020.
 - Recommended use of face coverings (masks or face shields)
- + [Children’s Hospital of Philadelphia \(CHOP\) - Policy Review](#)
 - Children’s Hospital of Philadelphia- Policy Review: Evidence and Considerations for School Re openings; June 2020.
 - Face shields may be the most well-suited facial protection option as these devices do not obstruct the mouth. Students who are deaf, hard-of-hearing, or have autism spectrum disorder must be able to see the face and mouth of their teacher.
- + [Occupational Safety and Health Administration \(OSHA\)- Guidance for employers](#)
 - Recommends that employers encourage workers to wear face coverings at work. Where cloth face coverings are not appropriate in the work environment or during certain job tasks (e.g., because they could become contaminated or exacerbate heat illness), employers can provide PPE, such as face shields and/or surgical masks, instead of encouraging workers to wear cloth face coverings. Like cloth face coverings, surgical masks and face shields can help contain the wearer's potentially infectious respiratory droplets and can help limit spread of COVID-19 to others.
- + [Important coronavirus updates for ophthalmologists - American Academy of Ophthalmology.](#)
 - Important coronavirus updates for ophthalmologists; May 11, 2020.
 - Updated recommendations that PPE be worn by medical personnel to protect mouth, nose (e.g., an N95 mask), and eyes (e.g., goggle or face shield) when caring for patients, especially those suspected of having COVID-19.

PEER REVIEWED LITERATURE

- + [Moving Personal Protective Equipment Into the Community](#), Face Shields and Containment of COVID-19.
 - *Journal of the American Medical Association Viewpoint*, Volume 323 (22), Pages 2252-2253; April 2020.
 - Discussed limitations to the supply chain have made obtaining medical masks for the general public difficult, and face shields for the community may be a viable alternative.
 - While no existing studies have evaluated face shields for containing a sneeze or cough by the wearer but based on a face shield’s ability to provide a physical barrier this appears to be a possible benefit.
- + [Asymptomatic and presymptomatic SARS-CoV-2 infections in residents of a long-term care skilled nursing facility—King County, Washington.](#)
 - *CDC- Morbidity and Mortality Weekly Report*, Volume 69(13); Pages 377–381; April 3, 2020.
 - Following identification of a case of coronavirus disease 2019 (COVID-19) in a health care worker, 76 of 82 residents of an skilled nursing facility were tested for SARS-CoV-2; 23 (30.3%) had positive test results, approximately half of whom were asymptomatic or presymptomatic on the day of testing.

- + [Respiratory virus shedding in exhaled breath and efficacy of face masks](#)
 - *Nature Medicine*, Volume 26, Pages 676–680; April 2020.
 - Gave promise to surgical masks but did not investigate cloth masks.
 - Surgical face masks significantly reduced detection of influenza virus RNA in respiratory droplets and coronavirus RNA in aerosols, with a trend toward reduced detection of coronavirus RNA in respiratory droplets. Our results indicate that surgical face masks could prevent transmission of human coronaviruses and influenza viruses from symptomatic individuals.

- + [Simple Respiratory Protection—Evaluation of the Filtration Performance of Cloth Masks and Common Fabric Materials Against 20–1000 nm Size Particles.](#)
 - *The Annals of Occupational Hygiene*, Volume 54, Issue 7, Pages 789–798; October 2010.
 - Materials commonly used to produce cloth masks may only provide marginal protection against virus-containing particles [nanoparticles] in exhaled breath.
 - Cloth masks and other fabric materials tested in the study had 40–90% instantaneous penetration levels against polydisperse NaCl aerosols employed in the National Institute for Occupational Safety and Health particulate respirator test protocol at 5.5 cm s⁻¹.
 - Varying levels of penetrations (9–98%) were obtained for different size monodisperse NaCl aerosol particles in the 20–1000 nm range.

- + [A cluster randomized trial of cloth masks compared with medical masks in healthcare workers.](#)
 - *British Medical Journal Open*. Volume 5, Issue 4:e006577; 2015.
 - Compared cloth vs medical masks for health care workers.
 - Handmade cloth masks shown to be less effective than surgical masks for prevention of communicable respiratory illnesses.
 - **Moisture retention, reuse of cloth masks and poor filtration may result in increased risk of infection.**
 - First randomized control trial of cloth masks, and the results caution against the use of cloth masks [in a medical setting].

- + [Efficacy of face shields against cough aerosol droplets from a cough simulator](#)
 - *Journal of Occupational and Environmental Hygiene*, Volume 11, Issue 8, Pages 509-518; 2014.
 - **Face shields reduced immediate viral exposure by 96% when worn by a simulated health care worker within 18 inches of a cough. When the study was repeated at a distance of six (6) feet, face shields reduced inhaled virus by 92%.**

- + [Universal masking in hospitals in the COVID-19 era: Is it time to consider shielding?](#)
 - *Infect Control Hosp Epidemiol*, Pages 1-2; April 29, 2020
 - **Face shields have the potential to overcome some of the major drawbacks of face masks.**
 - **Face shields provide better coverage of the face, compared with masks, thus reducing the risk of self-contamination.**
 - Face shields are durable, and they can be cleaned and reused.
 - Face shields do not impede facial nonverbal communication; they can be worn concurrently with other face and eye protective equipment, and they do not impact vocalization.

- + [A schlieren optical study of the human cough with and without wearing masks for aerosol infection control.](#)
 - *J R Soc Interface*- Volume 6 (suppl_6), Pages S727-736; Oct 8, 2009.
 - Effectiveness of any face mask at filtering incoming or outgoing air is likely compromised by leakage that typically occurs around the mask, which can be substantial, especially for non-N95 masks.

- + [The airborne lifetime of small speech droplets and their potential importance in SARS-CoV-2 transmission.](#)
 - *Proceedings of the National Academy of Sciences Brief Report*, Volume 117 (22) 11875-11877; June 2, 2020.
 - Loud speech can emit thousands of oral fluid droplets per second.
 - Confirm that there is a substantial probability that normal speaking causes airborne virus transmission in confined environments.

- + [Aerosol emission and superemission during human speech increase with voice loudness.](#)
 - *Nature Scientific Reports*, Volume 9, Article 2348, February 2019
 - Face masks make it difficult to communicate as the listener can no longer see lip movement (especially important for hard of hearing individuals), and the mask tends to muffle speech. To overcome this, the speaker tends to strain or raise their voice, increasing the emission of respiratory droplets according to experimental studies.
- + [Tropism, replication competence, and innate immune responses of the coronavirus SARS-CoV-2 in human respiratory tract and conjunctiva: an analysis in ex-vivo and in-vitro cultures.](#)
 - *Lancet, Respiratory Medicine*, doi:10.1016/S2213-2600(20)30193-4, May 7, 2020.
 - SARS-CoV-2 virus was highly infective of cultured human conjunctiva (the outer protective membrane of the eye) explant tissue, with 100x higher viral replication rates than SARS-CoV.
- + [2019-nCoV transmission through the ocular surface must not be ignored](#)
 - *Lancet*, Volume 395(10224): e39; February 22, 2020.
 - Chaolin Huang and colleagues reported the epidemiology, symptoms, and treatment of patients infected by the 2019 novel coronavirus (2019-nCoV) in Wuhan, China. As ophthalmologists, we believe that transmission of 2019-nCoV through the eyes was ignored.
 - The respiratory tract is probably not the only transmission route for 2019-nCoV, and all ophthalmologists examining suspected cases should wear protective eyewear.
- + [Ocular conjunctival inoculation of SARS-CoV-2 can cause mild COVID-19 in Rhesus macaques.](#)
 - bioRxiv, March 30, 2020.
 - Researchers successfully inoculated Rhesus monkeys with the SARSCoV-2 virus via eye swabs, confirming this is a viable infection route.
- + [The Use of Eye-Nose Goggles to Control Nosocomial Respiratory Syncytial Virus Infection.](#)
 - *Journal of the American Medical Association*, Volume 256(19), Pages 2706-2708; 1986.
 - Only 5% of goggle-wearing hospital staff in New York who entered the hospital room of infants with respiratory illness were infected by a common respiratory virus, while without the goggles, 34% of personnel were infected.
 - The use of the disposable eye-nose goggles was associated with a significant decrease in nosocomial RSV infections ($P < .003$ for staff and $P < .05$ for contact infants).

WEB ARTICLES:

- + [Face shields may be better than homemade masks. Here's why we should all try one on.](#)
 - May 1, 2020. Business Insider.
 - Face masks are being touted as a way to help slow the spread of the novel coronavirus around the world, when physical distancing isn't possible.
 - But surgical masks were never really designed to catch or trap viruses, and they're also not as readily available, or easy to clean as face shields, which also provide a lot of protection against spreading virus particles.
- + [All UI Health Care employees to wear face shields at all times while at work.](#)
 - April 13, 2020. University of Iowa, The Loop.
 - Our Program [University of Iowa] of Hospital Epidemiology believes that face shields are the best way to keep our teams protected from the spread of COVID-19 because it covers the eyes, nose, and mouth, as well as helps you from touching your face.
 - We know that COVID-19 is spread by droplets, such as from a cough or sneeze, so using face shields helps protect us from these infectious droplets.

+ [Some Experts Say Face Shields Better Than Masks for Coronavirus Protection.](#)

- June 15, 2020. American Association of Retired Persons (AARP)
- The Centers for Disease Control and Prevention continues to recommend wearing “cloth face coverings in public settings where other social distancing measures are difficult to maintain.” But some health experts say shields appear to be very effective at preventing infection — maybe even more effective than masks — for someone going about regular daily activities and not in a high-risk health care setting.
- Amesh Adalja, M.D., a pandemic preparedness expert at the Johns Hopkins Center for Health Security, says, “There’s a lot of at least biological possibility to suspect that [shields] are definitely better than homemade face masks, and maybe even better than other types of masks as well, because they not only prevent you from spreading it ... [and] because it also covers your eyes, it provides more protection to the mucus membranes of your face where you might be getting infected.”
- That reasoning [face mask + face shield] may make sense in a health care setting, says Adalja, but “I don’t think you get much added benefit to wearing a mask if you’ve already got a face shield on, for the average person.” The odds of the viral particles floating upwards under your shield are a long shot for most of us, he adds: “Someone would have to stand underneath you and sneeze up into you. It would be an odd circumstance that would cause that.”
- Lauren Lek, head of school at Academy of Our Lady of Peace, in San Diego, plans to have her 750 returning faculty and students wear face shields at school rather than masks this August. “Safety and health for our community is a priority for us in reopening,” she says. “As soon as we saw from the CDC [Centers for Disease Control and Prevention] and our local public health office that face shields would be an acceptable alternative to face masks, we knew this was a direction we wanted to move in.” Noting that face-to-face interaction is key to the education her school provides, Lek adds that face shields are better than masks for students with learning differences, including autism spectrum disorders (ASDs), because they allow for full visibility of facial expressions that can help them read and understand social cues.

+ [What We Know About Face Shields and Coronavirus.](#)

- June 16, 2020. The Wall Street Journal.
- With face shields a growing part of hospital protocol, some infectious disease doctors are calling for greater adoption outside the medical setting. Unlike masks that protect the nose and mouth, face shields may also keep the virus from entering through the eyes.

+ [Face Shield vs. Face Mask: Which Provides Better Protection Against Coronavirus?](#)

- June 3, 2020. Medical Daily.com
- Per Keith Kaye, a professor of medicine and director of research for the division of infectious diseases at the University of Michigan Medical School, face shields also come with the perk of being easily sanitized and reused. They’re also better for communication and leave a lot of room for comfort.

+ [Dr. Joseph Fair details his COVID-19 battle: ‘If it can take me down, it can take anybody.’](#)

- May 14, 2020. Today.
- In a recent interview Dr. Joseph Fair, a virologist and epidemiologist, shares that as a passenger on a crowded commercial flight, he suspects he contracted the SARS-CoV-2 virus through his eyes.

+ [Dr. Joseph Fair on coronavirus recovery: ‘Day by day, feeling better’.](#)

- May 19, 2020. Today.
- “I had a mask [fitted N95] on, I had gloves on, I did my normal wipes routine ... but obviously, you can still get it through your eyes,” Fair told NBC News from his hospital bed. “And of course, I wasn’t wearing goggles on the flight. Instinctively, I probably should have gotten off.”

- + [Face shields could be the new, next thing](#)
 - June 9, 2020. Fox KTVU.
 - A growing number of wearers - and doctors- say **shields are not only more protective but easier to wear and keep clean.**
 - "They're a lot more comfortable than masks, and they also **keep you from inadvertently touching your face,**" said Reason Bradley, leader of a shield-making coalition on the Sausalito waterfront in Marin County [CA].
 - Around the world, children are wearing face shields to attend school and many U.S. schools may be next. Locally, Sausalito and Marin City expect to be one of the first local districts to adopt shields for staff and students.
 - "It's almost an impossibility to get the kids to wear the masks properly or keep them on for any length of time," said Itoco Garcia, Superintendent of the Sausalito - Marin City School District.
 - **"It's a very good and effective substitute for a mask and maybe even better"** - Dr. Jake Scott, an infectious disease specialist who teaches at Stanford University's Medical School.

- + [Why face shields may be better coronavirus protection than masks alone.](#)
 - April 24, 2020. Los Angeles Times.
 - Dr. James Cherry, a UCLA infectious diseases expert, said supermarket cashiers and bus drivers who aren't otherwise protected from the public by plexiglass barriers should actually be wearing face shields.
 - **Face shields are more effective than masks in protecting the wearer from viral infection,** Cherry said.
 - Dr. Robert Kim-Farley, an epidemiologist and infectious diseases expert at the UCLA Fielding School of Public Health, said **face shields would be helpful for those who come in contact with lots of people every day.**

- + [Chinese expert who came down with Wuhan coronavirus after saying it was controllable thinks he was infected through his eyes.](#)
 - January 23, 2020. South China Morning Post.
 - Wang said the most likely explanation was that the virus had entered his body through his eyes.

- + [Can plastic face shields prevent the spread of coronavirus?](#)
 - April 22, 2020. Today.
 - **"A face shield can serve as a physical barrier to the particles you emanate when you breathe, and as a physical barrier to particles hitting you when someone coughs or sneezes,"** said Adalja. "This is something people have been trying to think about as an improvement to the cloth mask recommendation.- Dr. Amesh Adalja, a senior scholar at the Johns Hopkins University Center for Health Security in Baltimore, Maryland.

- + [Florida Doctor Urges Young Residents Not To Assume COVID-19 Is 'Benign'](#)
 - June 23, 2020. NPR.
 - "Are you saying we should go to face shields?"
 - We may have to because looking at the data, **it protects the eyes, protects the nose, the mouth, and it may be easier to use.** ... It's not airborne, but if somebody is speaking and the droplets come out at you, it's anything to protect you. The key is we've got to protect ourselves and our communities until a vaccine comes in or even proper treatment." - Dr. Cheryl Holder, an associate professor at Herbert Wertheim College of Medicine at Florida International University

- + [Will a Face Shield Protect You From the Coronavirus?](#) If you've been struggling with masks, this might be the alternative you've been looking for
 - June 24, 2020. Cleveland Clinic.
 - If you're tired of struggling with a mask or don't enjoy having a pocket of hot air on your face for long periods of time, a **face shield offers protection and the sweet relief of fresh air.** "You don't get to feel the breeze on your face, but you do get some fresh air, rather than trying to breathe through a cloth mask," says Dr. Frank Esper, MD, pediatric infectious disease specialist.. It's also easier to talk and most importantly, people can still see your face during interactions.
 - While surgeons and other skilled medical professionals wear face shields over face masks, **it's not necessary for the average person to do so.** However, it's good to keep social distancing guidelines in mind when wearing your face shield in public to maximize its effectiveness.

YOUTUBE VIDEOS:

- + [Thinking of getting a face shield? Here are some things to consider](#)
 - May 12, 2020. KUSA (Denver 9 News).
 - From *Journal of Occupational and Environmental Hygiene*: Face shields reduced immediate viral exposure by 96% when worn by a simulated health care worker within 18 inches of a cough. When the study was repeated at a distance of six (6) feet, face shields reduced inhaled virus by 92%.
 - **Easier to clean – just use soap and water and dry it and it's ready to use again.**
 - Important to make sure the design is FDA approved.

- + [Universal Face Shields: A Better Option for COVID-19 Containment?](#)
 - May 4, 2020. Contagion Live by Infectious Diseases Today.
 - Contagion Editorial Director Allie Ward speaks with Michael B. Edmond, MD, MPH, MPA, MBA, associate chief medical officer, University of Iowa Health Care, about a viewpoint published in JAMA, which hypothesized that **universally adopting face shields could help cut the transmissibility of COVID-19.**

- + [Ask an Expert: Mask vs. Face Shield](#)
 - June 26, 2020. The Doctors.
 - Dr. Ravina Kullar: **"Face shields are actually more protective than those face masks"** due to covering the mucus membrane through the eyes.
 - Face masks don't protect your mucus membrane.
 - Face masks – "you're touching your face a lot."
 - Able to protect you more around crowded workplace settings.
 - Face masks uncomfortable in summer for a long period of time.