Subject: Adopt a "Mask-Optional" Policy for K-6th grade Students in Hollis and Brookline: A response to Chairperson Tammy Fareed.

To: Tammy Fareed, Andrew Corey, Paula Izbicki, Candice Fowler, Brooke Arthur, Amy Kellner, Robert Mann, Carryl Roy, Patricia Bouley, Daniel Molinari, Kenneth Haag, Rebecca Howie, Alison Marsano, Karen Jew, Erin Sarri

CC: All of the Hollis/Brookline COOP School Board Members and SAU 41 officials

This letter is respectfully submitted in response to Hollis Public School Board Chairperson Tammy Fareed's correspondence dated August 29, 2021 in which all the HPS and BPS board members were cc'd.

As you will see below, Tammy stated her position that it would be unconscionable not to mask the children in our schools. Her sincere concern for the health and welfare of Hollis and Brookline students is deeply appreciated and the data she provided in support of her position deserves a careful review and response.

To that end, a number of contributors (including Cindi Marsden, MD a physician who is actively treating Covid patients and educating the public on the actual science and data about masks and SARS-Cov 2/variants and treatment protocols) have taken the time to dive into the documentation Tammy offered and provide further clarity.

This in-depth response is provided to demonstrate that there is substantial evidence to reasonably and responsibly support a "mask-optional" approach in our schools and to affirm the rights of parents to choose what medical devices their children use or wear.

We applaud the courageous, common sense action of the Hollis/Brookline COOP School Board members who voted in favor of a mask-optional policy for the COOP and strongly support this decision.

We urge you to support such a policy for the children of Hollis and Brookline and their teachers and we thank each of you for your service to our communities.

Please let us know if you would like to work together with us to read and review each of the studies referenced.

Letter from Chairperson Fareed, August 29, 2021:

"The current transmissibility among children and the adults around them is informed by current medical studies of the current spread of "delta" variant. Please see the attached items. Hope you don't mind that I've deleted our prior thread so new attachments don't get mixed up with earlier items.

- CDC study of a classroom infected by one teacher who took off her mask briefly to read a story.
- American Academy of Pediatrics guideline pertaining to masks https://www.aap.org/en/pages/2019-novel-coronavirus-covid-19-infections/clinical-guidance/covid-19-planning-considerations-return-to-in-person-education-in-schools/
- August letter to SAU41 school boards, NHDOE, and the governor from local pediatricians and specialists in pediatric medicine across southern NH

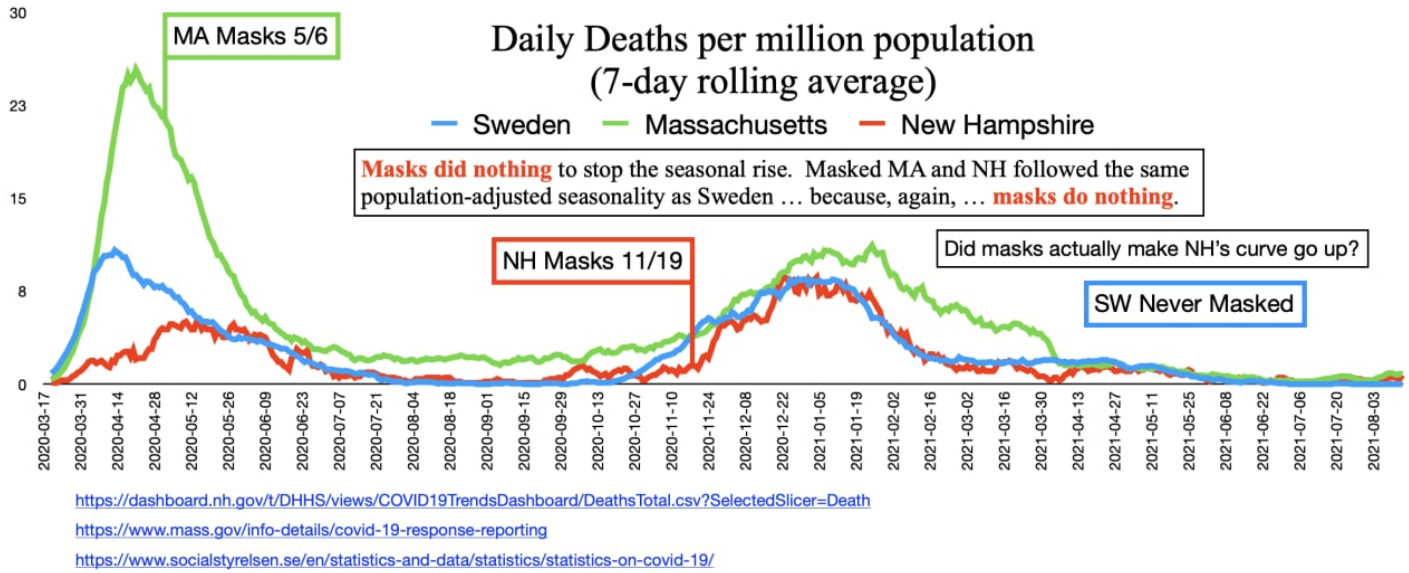
It would be unconscionable to ignore the overwhelming consensus among thousands upon thousands of highly knowledgeable, experienced medical professionals across the state and beyond - all of whom are directly responsible for lives, including their own as they treat mounting pediatric and adult cases - recommending universal masking for students and the adults around them."

Tammy
Hollis School Board
🇺🇸

The documents Tammy listed were provided to all the school officials cc'd in the email.

- *A CDC study of a classroom infected by one teacher who took off her mask briefly to read a story.*
- *An American Academy of Pediatrics guideline pertaining to masks https://www.aap.org/en/pages/2019-novel-coronavirus-covid-19-infections/clinical-guidance/covid-19-planning-considerations-return-to-in-person-education-in-schools/*
- *An August letter to SAU41 school boards, NHDOE, and the governor from local pediatricians and specialists in pediatric medicine across southern NH*

To commence this response, we would like to present a visual. As the data below clearly shows, the virus follows seasonal patterns without regard to mitigation attempts. If masks worked, the implementation of them would *not* have been followed by an increase in deaths.



https://dashboard.nh.gov/t/DHHS/views/COVID19TrendsDashboard/DeathsTotal.csv?SelectedSlicer=Death

https://www.mass.gov/info-details/covid-19-response-reporting

https://www.socialstyrelsen.se/en/statistics-and-data/statistics/statistics-on-covid-19/

It is critical that the actual data about risks to children be given due weight vs. the fear-inducing media stories that often garner the most attention.

- **Regarding Covid risks for schools and school children we point you to this study from Sweden which demonstrates the following:**

  Sweden never went to lockdown, never closed schools, and DID NOT require masks.

Regarding any characterization of the Swedish study as *not* applicable to New Hampshire. **Please consider the following reasons why the Swedish study is, in fact, entirely applicable to our state:**

Sweden's largest city, Stockholm, has 1.6 million people and the urban living density is far greater than anywhere in NH. We are here to discuss Hollis and Brookline New Hampshire, not USA as an aggregate. Scientific analyses of USA across 3,000 miles, 340 Million people, multiple different climates, 1,500 miles in latitude difference is a waste of time debating. Stockholm, one city, has far more people than the entire state of New Hampshire. Covid-19 would spread far faster in Stockholm alone than NH. The fact is that Sweden did far better without masks than small nations and states did with masks. Climate and seasonality are similar to NH. Public transportation and other community spread vectors are far greater in Sweden than in NH. **In every category, Sweden would've done worse if masks had any effect at all.** By offering this study for your consideration, Sweden is not being compared to the USA. It is being compared to New Hampshire.

Having established the basis for reasonable comparison of Sweden with New Hampshire. Let us return to the results of the Swedish study:

At the most dangerous part of the pandemic, when there was no known effective treatment for COVID and no vaccine, (March to June 2020), **here is what happened to the 1,951,000 Swedish children age 0-16 who were never locked down and never required to wear masks: 15 went to the hospital due to COVID — 0 died**

https://www.nejm.org/doi/full/10.1056/NEJMc2026670

In mid-March 2020, many countries decided to close schools in an attempt to limit the spread of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), the virus causing coronavirus disease 2019 (Covid-19). Sweden was one of the few countries that decided to keep preschools (generally caring for children 1 to 6 years of age) and schools (with children 7 to 16 years of age) open. Here, we present data from Sweden on Covid-19 among children 1 to 16 years of age and their teachers. In Sweden, Covid-19 was prevalent in the community during the spring of 2020. Social distancing was encouraged in Sweden, but wearing face masks was not.

The number of deaths from **any cause** among the 1,951,905 children in Sweden (as of December 31, 2019) who were 1 to 16 years of age was 65 during the pre–Covid-19 period of November 2019 through February 2020 and 69 during 4 months of exposure to Covid-19 (March through June 2020).

From March through June 2020, a total of 15 children with Covid-19 (including those with MIS-C) were admitted to an ICU (0.77 per 100,000 children in this age group) (Table 1), 4 of whom were 1 to 6 years of age (0.54 per 100,000) and 11 of whom were 7 to 16 years of age (0.90 per 100,000). Four of the children had an underlying chronic coexisting condition (cancer in 2, chronic kidney disease in 1, and hematologic disease in 1). ***No child with Covid-19 died.***

Now, here is a point-by-point response to the sources Tammy provided in her letter.

- **Regarding the CDC study and its findings:**

The CDC Morbidity and Mortality Weekly Report covering a SARS-CoV-2 B.1.607.2 (delta) outbreak in Marin County California is a methodological nightmare. The most salient issues that bring this "study" into question are:

(1) The statistical Methods used

The statistical analysis was post-hoc and narrative driven. Even in a well-controlled environment, disciplined scientists would be weary of any multi-variate study with a sample size n = 27. In fact, the statistical method used (Fisher's exact test) is a rarely used methodology that is only employed when sample sizes are so small as to prevent standard parametric statistical tests. Fisher's exact test is not without controversy. It is known to drastically underestimate uncertainty by producing overly conservative 'p' values. Also, it's worth mentioning that the statics presented (mainly in the opening paragraph) are in no way designed to establish causation. The authors were obviously trying to establish a causal link between the un-masked teacher and the outbreak. Unfortunately for them, the statistical method used is not designed to, nor capable of establishing this link. Even under the most charitable interpretation of the "study "- while disregarding the gross limitations of Fisher's exact test, it only informs us that the likelihood that 80% of students in the front row contracted COVID-19 by sheer chance stands at 3.6 times out of a hundred. However, I'm not 100% sure what the authors were trying to convey

with this information because they failed to include any supplementary data for independent review, nor did they state their null hypothesis.

(2) Model of Spread and phylogenetic analysis

Instead of allowing the evidence to drive conclusions, the authors appeared to start with an assumption and then built an entire study framework around validating it. It did not escape my attention that the teacher became symptomatic on May 19th, while another case with no identifiable link to her classroom was detected on May 18th (figure 3). Of the cases analyzed in the study 22% had no identifiable link to suspected outbreak origin. The authors used Whole Genome Sequencings (WGS) in an awkward attempt to source the outbreak to the teacher in question. This choice is baffling. Without going too deep into phylogenic analysis and why it is an inadequate substitute for contact tracing, it is safe to say that it is far more likely that the initial strain implicated was a regional flavor of COVID-19, and not tied to a singular teacher. Additionally, those strains with additional mutations noted in the phylogenetic analysis strongly suggest that COVID-19 was already prevalent at the school.

(3) Logical inconsistency, outliers, and faulty assumptions

The narrative of the study can be distilled down to "bad unmasked, unvaccinated teacher starts outbreak." Points 1 & 2 could stand alone in providing a strong framework for dismantling this assertion. However, the biggest logical inconsistencies come from information the study openly volunteers. According to the authors, besides the single incident in which the teacher in question read to her class without a mask, the school followed a strict adherence to masking protocols. If all the students were masked, how did the outbreak get as far as it did? How did COVID-19 jump between classrooms separated by a wall in a building with an air filtration system? They cannot in one breath say the outbreak was caused by a single violation of masking policy, while in another describe the subsequent spread between masked, socially distanced children as unremarkable. The study is unwilling to admit what it doesn't know.

This study is flawed at every echelon of the scientific method and should not be used as a justification for masking policy in public schools. It lacks any measure of objectivity, it's poorly designed, and its statistical methodology/phylogenic analysis could at best be described as cavalier – at its worst, intentionally misleading.

It's interesting to note that the lead author of the paper is credentialed with an MBA (Master's Degree in Business Administration) which is not a scientific or medical discipline.

Finally, Dr. Marsden weighs in on this matter and is copied on this email. She would be happy to answer any questions you have on the CA anecdote that the CDC is calling a 'study.'

Dr. Marsden has immersed herself in the studying Covid research and engaging with doctors worldwide who are developing outpatient treatment protocols. She is active in educating the public about multi-drug available treatment, lockdowns, masking, and vaccines.

*"**Not one of the kids became ill.** They tested everyone and ASSUMED it was the Delta variant. No one sequenced the PCR. If they tested the kids in the first week after exposure, which they did, then the teacher could not have been the culprit. The kids would not have had time to get infected, replicate the virus, produce enough viral proteins to turn a PCR positive and do all of this without ever having a single symptom. This is yet another example of using a fraudulent, highly erroneous test on asymptomatic students to spread fear and to manipulate behavior. If the teacher had symptoms of the coronavirus how did she fall through the LA county school pristine protocols? Why was there not a test done for influenza, RSV and streptococcus? Because we DON'T want to know this data. This was a typical cold as far as these kids*

are concerned. There is no "study" and all of the studies to date show that the kids run through this virus better than the flu. I want to know what the cycle threshold was on this rapid PCR test, what company produced the reagents and which lab billed the tax payers thousands of dollars to sequence all of these kids and teacher. This is pure fabrication."

"Furthermore, all of the theoretical mask benefits are based on a well-fitted, not-handled, not-removed-to-eat-and-talk and ***definitely*** *not reused mask."*

- **Regarding Reference to the American Academy of Pediatrics Guideline Article**

This is guidance given without any scientific data to substantiate the guidance. We parents are professionals, too and we can read studies. With a decision that could impact the physical and psychological health of our children, and given there is so much data contradicting the "guidance," we need to see proof that masks work, proof that mask don't harm children physically or psychologically and proof that they don't increase the spread of the virus. In addition, when this article came out, there were many practicing physicians in shock over it. The inability for the AAP to consider the 18 months of data that is now known about Covid is, as you say, unconscionable. There are thousands and thousands of doctors speaking out about the very bad decisions being made by school boards with regard to masking. Please provide us with specific data and scientific research proving that masks are working. Everything we have seen has shown that regardless of when a mask mandate was instituted, cases were not reduced. If we missed a formal study showing how masks improved outcome, please provide it. There is so much data contradicting the "guidance," we need to see the scientific basis for the guidance given…especially when it turns from guidance into mandates. In a situation where we are seeing lower IQs in young children in 2020, increased suicides, pediatric mental health emergencies at levels never seen before and a generation of children missing out on a regular childhood, we demand it.

COVID-19 Guidance for Safe Schools (aap.org)

Pediatricians are not qualified to determine mask efficacy. You might as well have an electrician or a plumber write a paper on mask efficacy. Regarding masks, specification development (spec-dev), design (computer aided design "CAD" schematic generation), manufacturing process development and implementation, quality assurance and control test fixture development, and failure analysis are all performed by engineers. Medical doctors put masks on their faces and trust that the product meets specification for a purpose of preventing spittle from entering a patient's open wound. Doctors also do not know the tensile strength of their scalpels, lattice structure of the metal used in their clamps, sheer stress of the shaft of a nasal swab, or the processor that runs the latest dialysis machine. Reading research papers from doctors is an admission that demonstrates a lock of understanding about whom to ask as an expert in mask efficacy.

- **Regarding the letter received from the NHDOE with the doctor signatures, once again, there is no scientific basis here and this letter is clearly an opinion letter. At the bottom of the letter, they reference an article by the American Academy of Pediatrics (AAP). Within this article is no specific science supporting their guidance. Masks are a medical device; an NPI (non-pharmaceutical intervention), these have specifications.**

If the objective of masking is to prevent virus from spreading, then one would provide a specification for masks and then adhere to that specification. But no specification is given. Thus, the objec-

tive is clearly not to stop aerosolized virus from escaping into the air around someone. Neoprene, cotton, one-layer, two-layer, polyester, nylon? Which work and which don't? Which are form fit to the face and which aren't? If the true concern was stopping the spread of virus aerosols, there would be a specification. CDC would provide a specification. N95 masks come with a specification assured by the engineers. And even those don't practice what they' are purporting as effective for kids. The reason no specification is required can only be because they simply want something to cover the kids' faces and don't care at all about retarding aerosol escape. There is no study that shows real-world scenarios of mask wearing making any difference whatsoever. The defense for masking seems to be that the overwhelming absence of any evidence of efficacy is evidence of efficacy. There is no substantive argument regarding mask efficacy and there is nothing but a collection of personal anecdotes and family relatives with zero scientific relevance or evidence. The types of masks that all children will wear have zero efficacy in stopping aerosolized virus with particle sizes of 1 micron or less.

Here's the link to that article:

> AAP urges in-person learning, masking in updated guidance on safe schools | American Academy of Pediatrics (aappublications.org)

And below are the resources/citations in that article. None of these cite any scientific research regarding the effectiveness of masks or any risk/benefit analysis of children wearing masks for 7 hours, 5 days per week in a classroom setting. These are mainly links to guidelines and articles. If a doctor agrees to sign a letter supporting mask mandates in schools, shouldn't there be some actual formal studies referenced? The fact is, there is nothing supporting the guidance and so why is that the guidance we are given and why is alternate guidance that is based on scientific studies ignored? Something is very wrong here and that is why millions of parents around the country are outraged.

- Here are the resources utilized to substantiate the AAP claim. These provide guidance but no facts.
    - AAP COVID-19 Interim Guidance, https://services.aap.org/en/pages/2019-novel-coronavirus-covid-19-infections/clinical-guidance/
    - Information for parents from HealthyChildren.org on safe schools during the COVID-19 pandemic, https://www.healthychildren.org/English/health-issues/conditions/COVID-19/Pages/Return-to-School-During-COVID-19.aspx
    - Information for parents from HealthyChildren.org on what to look for in a summer camp during COVID-19, https://www.healthychildren.org/English/health-issues/conditions/COVID-19/Pages/What-to-Look-for-In-a-Summer-Camp-COVID-19.aspx

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On the flip side of the AAP "Guidance", here is an article published by **AAPS, The American Association of Physicians and Surgeons.**

- **Here is the research provided by the Association of American Physicians and Surgeons which takes the opposite stance on masks.**

AAPS | Association of American Physicians and Surgeons (aapsonline.org) **Mask Facts**

This professional association of Physicians and Surgeons not only *take the opposite stance on masks* but they also provide a breadth of resources. *Unlike the AAP, the resources are all scientific studies which support their stand.*

This professional association of Physicians and Surgeons appear to follow the science rather than the media or the government bureaucracies. The conclusions in these studies PROVE (if you believe in the scientific method) that face masks **DO NOT WORK**. In addition, they also cite studies proving that masks HARM CHILDREN. And finally, the AAPS refers to a formal mask study that proves face masks actually SPREAD MORE VIRUS than no mask at all. Respiratory droplets are greater than 5 microns. They remain in the air for a very short time and travel very short distances. Masks aerosolize respiratory droplets by breathing through a fabric, impeding the flow of droplets such that they break into aerosols. Aerosolized droplets can remain in the air for at least 3 hours and travel up to 27 feet.

It's puzzling why the NHDOE and the doctors who signed the letter did not include any scientific studies given the gravity of forcing young children to cover both airways all day in school. It's even more puzzling that the various health agencies are erring on the side of no proof rather than proof when making decisions that affect the physical and psychological health of our children.

https://aapsonline.org/mask-facts/ While a few of these studies do not contain all the elements of a formal study, the fact remains that there is an overwhelming amount of formal science on masks here and yet there is no formal science proving that masks are effective being provided by the agencies and doctors that you are continually referring to when making decisions for our children.

MASK FACTS:

curated by Marilyn M. Singleton, M.D., J.D. – http://marilynsingletonmdjd.com/
Updated September 26, 2020

Introduction

COVID-19 is as politically-charged as it is infectious. Early in the COVID-19 pandemic, the WHO, the CDC and NIH's Dr. Anthony Fauci discouraged wearing masks as not useful for non-health care workers. Now they recommend wearing cloth face coverings in public settings where other social distancing measures are hard to do (e.g., grocery stores and pharmacies). The recommendation was published without a single scientific paper or other information provided to support that cloth masks actually provide any respiratory protection. Let's look at the data.The theory behind mask wearing:

- Source control: Cloth mask can trap droplets that come out of a person's mouth when they cough or sneeze.
- Protection: Personal Protective Equipment (PPE) – only N95 masks

Transmission of SARS-CoV-2

Note: A COVID-19 (SARS-CoV-2) particle is 0.125 micrometers/microns (μm); influenza virus size is 0.08 – 0.12 μm; a human hair is about 150 μm.
**1 nm = 0.001 micron; 1000 nm = 1 micron; Micrometer (μm) is the preferred name for micron*
**1 meter is = 1,000,000,000 [billion] nm or 1,000,000 [million] microns*
*For a complete dissection and explanation of aerosols and airborne particles, please see *Understanding Particle Size and Aerosol-based Transmission* by Steve Probst. https://www.4cconference.com/wp-content/uploads/2020/07/Understanding-Particle-Size-and-Aerosol-Based-Transmission.pdf

*For a complete dissection and explanation of aerosols and airborne particles, please see *Understanding Particle Size and Aerosol-based Transmission* by Steve Probst. https://www.4cconference.com/wp-content/uploads/2020/07/Understanding-Particle-Size-and-Aerosol-Based-Transmission.pdf

Droplets

- Virus is transmitted through respiratory droplets produced when an infected person coughs, sneezes, or talks.
    - Larger respiratory droplets (>5 µm) remain in the air for only a short time and travel only short distances, generally <1 meter. They fall to the ground quickly.*https://www.thelancet.com/journals/lanres/article/PIIS2213-2600(20)30245-9/fulltext*
    - This idea guides the CDC's advice to maintain at least a 6-foot distance.
- Small (<5 µm) aerosolized droplets can remain in the air for at least 3 hours and travel long distances (up to 27 ft.).
    - *https://www.nejm.org/doi/pdf/10.1056/NEJMc2004973?articleTools=true;*
    - https://www.cidrap.umn.edu/covid-19/podcasts-webinars/special-ep-masks;
    - https://www.nap.edu/catalog/25769/rapid-expert-consultation-on-the-possibility-of-bioaerosol-spread-of-sars-cov-2-for-the-covid-19-pandemic-april-1-2020

Air currents

- In an air conditioned environment these large droplets may travel farther.
- Ventilation. Even the opening of an entrance door and a small window can dilute the number of small droplets to one half after 30 seconds. *(This study looked at droplets from uninfected persons).* This is clinically relevant because poorly ventilated and populated spaces, like public transport and nursing homes, have high SARS-CoV-2 disease transmission despite physical distancing.
    - *https://www.thelancet.com/journals/lanres/article/PIIS2213-2600(20)30245-9/fulltext*

Humidity

- Since 1961, experiments showed that viral-pathogen-carrying droplets were inactivated within shorter and shorter times as ambient humidity was increased. Dryness drives the small aerosol particles. See e.g., review of studies, *https://aaqr.org/articles/aaqr-20-06-covid-0302*

Conclusions

The preponderance of scientific evidence supports that aerosols play a critical role in the transmission of SARS-CoV-2. Years of dose response studies indicate that if anything gets through, you will become infected.

- Thus, any respiratory protection respirator or mask must provide a high level of filtration and fit to be highly effective in preventing the transmission of SARS-CoV-2. (Works for Mycobacterium tuberculosis (3µm)
- Public health authorities define a significant exposure to COVID-19 as face-to-face contact within 6 feet with a patient with symptomatic COVID-19 that is sustained for at least a few minutes (and some say more than 10 minutes or even 30 minutes).
    - The chance of catching COVID-19 from a passing interaction in a public space is therefore minimal.

MASKS

Filter Efficiency and Fit

Data from a University of Illinois at Chicago review *https://www.cidrap.umn.edu/news-perspective/2020/04/commentary-masks-all-covid-19-not-based-sound-data*

- HEPA (high efficiency particulate air) filters are 99.97 to 100% efficient. HEPA filters are tested with particles that are 0.125 µm (the size of SARS-CoV-2).
- Masks and respirators work by collecting particles through several physical mechanisms, including diffusion (small particles) and interception and impaction (large particles).
- Surgical masks are loose-fitting devices that were designed to be worn by medical personnel to protect accidental contamination of patient wounds, and to protect the wearer against splashes or sprays of bodily fluids. They aren't effective at blocking particles smaller than 100 µm. *https://multimedia.3m.com/mws/media/957730O/respirators-and-surgical-masks-contrast-technical-bulletin.pdf*
    - OSHA/CDC: A surgical mask is not a respirator. It cannot be used to protect workers who perform or assist with aerosol-generating procedures, which may create very fine aerosol sprays. **A surgical mask can only be used to protect workers from contact with the large droplets made by patients when they cough, sneeze, talk or breathe**. *https://www.osha.gov/dts/guidance/flu/healthcare.html*

Laboratory Studies

- N95 filtering face-piece respirators (FFRs) are constructed from electret (a dielectric material that has a quasi-permanent electric charge.) *An electret generates internal and external electric fields so the filter material has electrostatic attraction for additional collection of all particle sizes. As flow increases, particles will be collected less efficiently.*
- A *properly fitted* N95 will block 95% of tiny air particles down to 0.3 µm from reaching the wearer's face.
    - *https://www.honeywell.com/en-us/newsroom/news/2020/03/n95-masks-explained*.
    - Problem: no source control. An N95 does not filter exhaled air passing through the exhaust/exhalation valve (for easier breathing and less moisture inside the mask).
- Study measuring filter efficiency (2010)
    - *https://academic.oup.com/annweh/article/54/7/789/202744; https://www.cidrap.umn.edu/news-perspective/2020/04/commentary-masks-all-covid-19-not-based-sound-data*; *https://academic.oup.com/annweh/article/54/7/789/202744*
    - Filter efficiency was measured across a wide range of small particle sizes (0.02 to 1 *µ*m) at 33 and 99 L/min.
    - All the cloth masks and materials had near zero efficiency at 0.3 *µ*m, a particle size that easily penetrates into the lung (SARS-CoV-2 is 0.125 *µ*m)
    - Efficiency for the entire range of particles
        - T-shirts — 10%
        - Scarves — 10% to 20%
        - Cloth masks — 10% to 30%

        - Sweatshirts — 20% to 40%
        - Towels — 40%
- Study measuring filter efficiency (2014, Korea)
    - *https://aaqr.org/articles/aaqr-13-06-oa-0201*
    - Evaluated 44 masks, respirators, and other materials with similar methods and small aerosols (0.08 and 0.22 μm)
        - N95 FFR filter — >95% efficiency
        - Medical masks — 55% efficiency
        - General (cloth) masks — 38% efficiency
        - Handkerchiefs — 2% (one layer) to 13% (four layers) efficiency.
- **Conclusion**: Wearing masks (other than N95) will not be effective at preventing SARS-CoV-2 transmission, whether worn as source control or as PPE.
    - N95s protect health care workers, but are not recommended for source control transmission.
    - Surgical masks are better than cloth but not very efficient at preventing emissions from infected patients. Cloth masks must be 3 layers, plus adding static electricity by rubbing with rubber glove.
    - The cloth that serves as the filtration for the mask is meant to trap particles being breathed in and out. But it also serves as a barrier to air movement because it forces the air to take the path of least resistance, resulting in the aerosols going in and out at the sides of the mask.
    - An August 2020 UCSF study suggested that the mask would decrease the absolute volume of the inoculum. (The concentrations of bacteria upstream and downstream of the test devices were measured with an aerodynamic size spectrometer) *https://ucsf.app.box.com/s/blvolkp5z0mydzd82rjks4wyleagt036*

Human Studies

- Study of correct use of masks (2020, Singapore).
    - *https://www.medpagetoday.com/infectiousdisease/publichealth/86601*
    - Overall, data were collected from 714 men and women. Of all ages, only 90 participants (12.6%) passed the visual mask fit test. About 75% performed strap placement incorrectly, 61% left a “visible gap between the mask and skin,” and about 60% didn’t tighten the nose-clip.
- Study of surgical face mask use in health care workers (2009, Japan).
    - *https://pubmed.ncbi.nlm.nih.gov/19216002/*
    - Masks did not provide benefit in terms of cold symptoms or getting cold.
- Randomized clinical trial of standard medical/surgical masks in health care workers (2010, Australia).

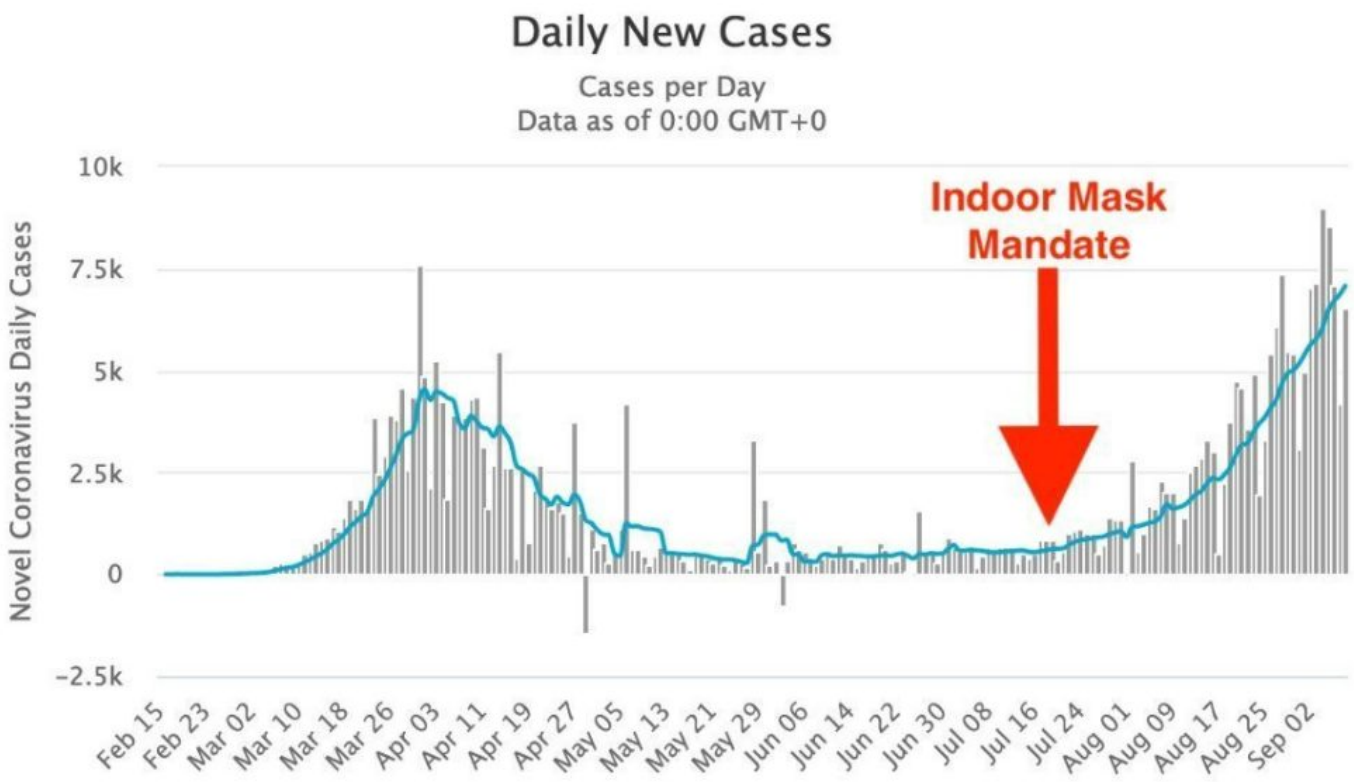
- *https://onlinelibrary.wiley.com/doi/epdf/10.1111/j.1750-2659.2011.00198.x?fbclid=IwAR3kRYVYDKb0aR-su9_me9_vY6a8KVR4HZ17J2A_80f_fXUABRQdhQlc8-Wo*.
- Study was spurred by the H1N1 flu. While N95 masks offered protection against respiratory illness, medical mask wearers and control group numbers were similar.

- Review of influenza virus and face masks in health care workers (HCWs) (2010, Hong Kong).
  - *https://www.cambridge.org/core/journals/epidemiology-and-infection/article/face-masks-to-prevent-transmission-of-influenza-virus-a-systematic-review/64D368496EB-DE0AFCC6639CCC9D8BC05*
  - 6 studies of face mask use, both surgical masks and N-95 respirators in HCWs and community settings. The effectiveness of face masks is probably impacted by compliance issues in both the healthcare and community setting. Various studies show a lower level of compliance with face masks or find lower reported acceptability of face masks compared to hand hygiene behaviors and other non-pharmaceutical interventions.
- Review of masks against influenza (2012, Europe).
  - *https://onlinelibrary.wiley.com/doi/epdf/10.1111/j.1750-2659.2011.00307.x*
  - 17 eligible studies. One study had improvement with mask plus hand sanitizer. None of the studies established a conclusive relationship between mask/respirator use and protection against influenza infection.
- *The first randomized controlled trial of cloth masks in health care workers (2015, Australia).
  - *https://bmjopen.bmj.com/content/5/4/e006577; https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4420971/pdf/bmjopen-2014-006577.pdf*
  - Penetration of:
    - Cloth masks by particles — 97%
    - Medical masks — 44%,
    - 3M Vflex 9105 N95 — 0.1%
    - 3M 9320 N95 — <0.01%
  - Cloth masks resulted in significantly higher rates of infection than medical masks, and also performed worse than the control arm some of whom may have worn masks.
  - The virus may survive on the surface of the face masks
  - Self-contamination through repeated use and improper doffing is possible. A contaminated cloth mask may transfer pathogen from the mask to the bare hands of the wearer.
  - Moisture retention, reuse of cloth masks, and poor filtration may result in increased risk of infection.
  - Cloth masks should not be recommended for health care workers, particularly in high-risk situations.
- Review of N95 and surgical masks against respiratory infection (2016). *https://www.cmaj.ca/content/cmaj/188/8/567.full.pdf*
  - From January 1990 to December 2014. 6 clinical studies: 3 randomized controlled trials (RCTs), 1 cohort study and 2 case–control studies, and 23 surrogate exposure studies.

    - In the meta-analysis of the clinical studies, “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.”
- Review of masks and N95s against respiratory infection (2017, Singapore).
    - *https://doi.org/10.1093/cid/cix681*
    - Separate meta-analyses of 6 randomized controlled trials (RCTs) and 23 observational studies conducted during the 2003 SARS pandemic.
    - Compared to medical masks, N95 respirators provided greater protection against clinical respiratory illness (CRI) and bacterial respiratory illness (BRI). These 2 outcomes were common in these trials (average risks of 8.7% and 7.3%, respectively).
    - Compared to masks, N95 respirators conferred superior protection against clinical respiratory illness and laboratory-confirmed bacterial, but not viral infections or influenza life illness (ILI).
    - Self-reported assessment of clinical outcomes was prone to bias.
    - Evidence of a protective effect of masks or respirators against verified respiratory infection was not statistically significant (compared to no mask)
- Randomized Controlled Trial: N95s vs medical masks in health care workers (HCWs) against influenza (2019).
    - *https://jamanetwork.com/journals/jama/fullarticle/2749214*
    - 2862 randomized participants, 2371 completed the study and accounted for 5180 HCW-seasons.
    - Among outpatient health care personnel, N95 respirators (8.2%) vs medical masks (7.2%) resulted in no significant difference in the incidence of laboratory-confirmed influenza. 90% said they wore the mask all the time.
- Review of N95 respirators versus surgical masks against influenza (March 2020, China).
    - *https://doi.org/10.1111/jebm.12381*
    - 6 randomized controlled trials (RCTs) involving 9,171 participants were included (2015-2020). There were no statistically significant differences in preventing laboratory-confirmed influenza, laboratory-confirmed respiratory viral infections, laboratory-confirmed respiratory infection and influenza-like illness using N95 respirators and surgical masks.
    - Meta-analysis indicated a protective effect of N95 respirators against laboratory-confirmed bacterial colonization.
- CDC Review since 1946 of masks and influenza (May 2020)
    - Nonpharmaceutical Measures for Pandemic Influenza in Nonhealthcare Settings—Personal Protective and Environmental Measures.” *https://wwwnc.cdc.gov/eid/article/26/5/19-0994_article*
    - Systematic review. 10 RCTs that reported estimates of the effectiveness of face masks in reducing laboratory-confirmed influenza virus infections in the community from literature published during 1946–July 27, 2018.
    - There is limited evidence for face masks’ effectiveness in preventing laboratory-confirmed influenza virus transmission either when worn by the infected person for source control or when worn by uninfected persons to reduce exposure.

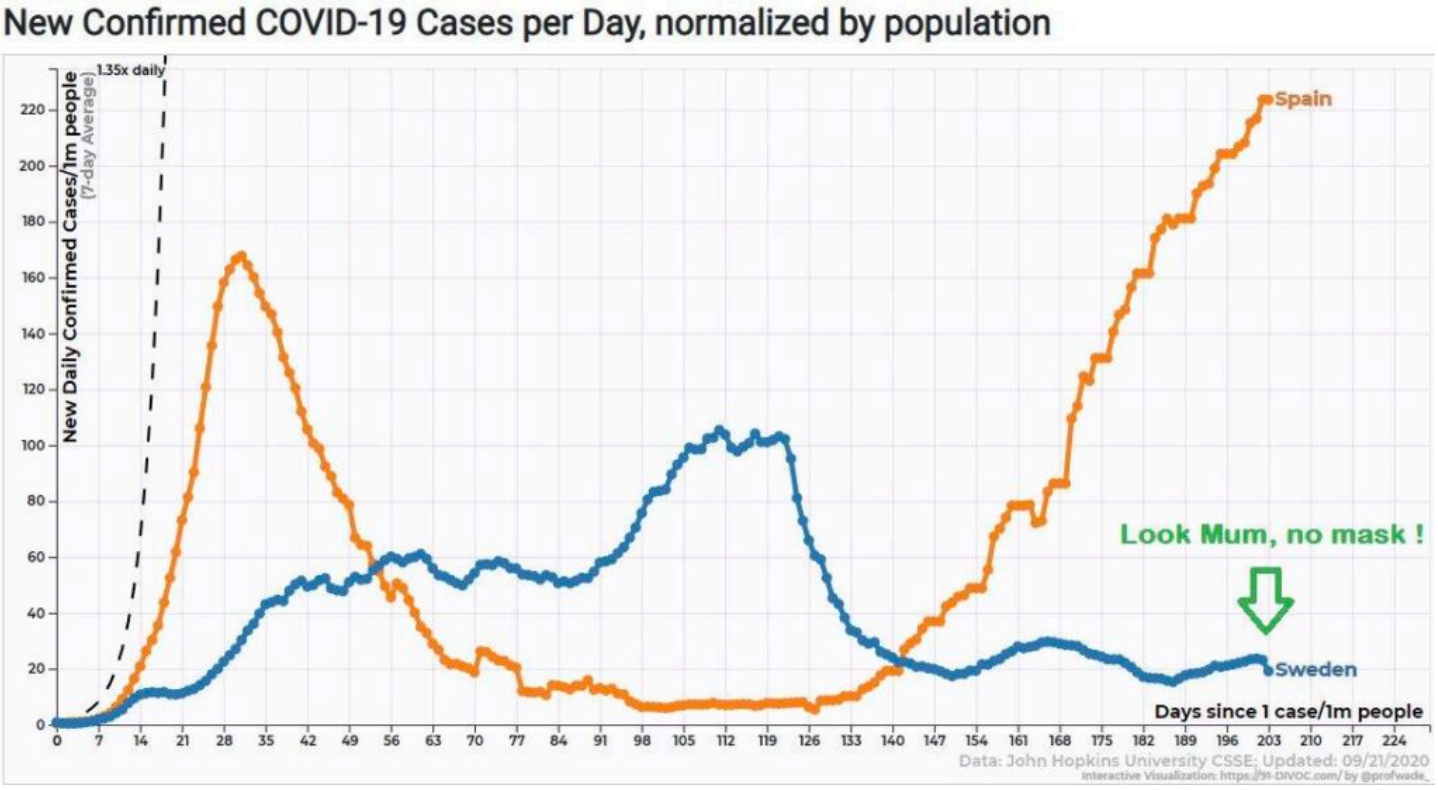
    - "Proper use of face masks is essential because improper use might increase the risk for transmission."
- A study of 4 patients (July 2020, South Korea).
    - *https://www.acpjournals.org/doi/10.7326/M20-1342*
    - Known patients infected with SARS-CoV-2 wore masks and coughed into a Petrie dish. "Both surgical and cotton masks seem to be ineffective in preventing the dissemination of SARS–CoV-2 from the coughs of patients with COVID-19 to the environment and external mask surface."
- Studied different types of face coverings in non-clinical setting (August 2020).
    - *https://advances.sciencemag.org/content/early/2020/08/07/sciadv.abd3083*
    - *They used a black box, a laser, and a camera.* A person wears a face mask and speaks into the direction of an expanded laser beam inside a dark enclosure. Droplets that propagate through the laser beam scatter light, which is recorded with a camera. A simple computer algorithm then counts the droplets seen in the video.
    - The N95 led to a droplet transmission of below 0.1%.
    - Cotton and polypropylene masks, some of which were made from apron material showed a droplet transmission ranging from 10% to 40%.
    - Knitted mask had up to 60% droplet transmission.
    - Neck fleece had 110% droplet transmission (10% higher than not wearing a mask).
    - Speaking through some masks (particularly the neck fleece, bandanas) seemed to disperse the largest droplets into a multitude of smaller droplets … which explains the apparent increase in droplet count relative to no mask in that case.
- See "Positive Effects of Masks" below. A recent study suggested that the mask would decrease the absolute volume of the inoculum. (The concentrations of bacteria upstream and downstream of the test devices were measured with an aerodynamic size spectrometer) *https://ucsf.app.box.com/s/blvolkp5z0mydzd82rjks4wyleagt036*
- Austrian observation (August 2020)
    - *https://corona-transition.org/maskenpflicht-brachte-in-osterreich-keinerlei-messbaren-nutzen* (in German)
    - The introduction, retraction and re-introduction of mandatory face masks in Austria had no influence at all on the infection rate.
- News report (August 13, 2020)
    - *https://sentinelksmo.org/more-deception-kdhe-hid-data-to-justify-mask-mandate/*
    - In Kansas, the 90 counties without mask mandates had lower coronavirus infection rates than the 15 counties with mask mandates. To hide this fact, the Kansas health department tried to manipulate the official statistics and data presentation.

Study from France:



https://swprs.org/face-masks-evidence/ (Swiss Policy Research)

Johns Hopkins, 9/21/20



https://twitter.com/Covid19Crusher/status/1308013900546428928

Negative Effects of Masks

Air inside the mask is definitely stale. In filtering particles, the mask makes it harder to breathe.

Decreased PaO2

- A 2004 observational study of end stage renal disease patients during dialysis for 4 hours (2004, Taiwan).
    - *https://pubmed.ncbi.nlm.nih.gov/15340662/;*
    - *https://www.researchgate.net/publication/8371248_The_physiological_impact_of_wearing_an_N95_mask_during_hemodialysis_as_a_precaution_against_SARS_in_patients_with_end-stage_renal_disease*
    - 39 patients, mean age, 57 years. 70% had decreased PaO2 (from 100 to 92); 19% had hypoxemia (PaO2 <70); all patients had increased respiratory rate 16 to 18; chest discomfort (3 baseline patients to 11 patients); respiratory distress (1 baseline patient to 17 patients)
- Stanford engineers estimated that N95 masks cause a 5% to 20% reduction in O2 intake. This can cause dizziness and lightheadedness. This can be life-threatening for someone with lung disease or with respiratory distress.
    - *https://engineering.stanford.edu/magazine/article/covid-19-prompts-team-engineers-rethink-humble-face-mask*
- Study of surgeons in the OR (2008, Turkey).
    - *http://scielo.isciii.es/pdf/neuro/v19n2/3.pdf*
    - Scientists looked at O2 levels of surgeons wearing masks while performing surgery. Found a decrease in the oxygen saturation of arterial pulsations (peripheral capillary O2 saturation/SpO2) fell from 98% to 96% and a slight increase in pulse rates compared to preoperative values in all surgeon groups.

Increased CO2

- This may be merely theoretical. Carbon dioxide molecules freely diffuse through the masks, allowing normal gas exchange while breathing.
- CO2 is present in the atmosphere at a level of about 0.04% (400ppm). According to the U.S. Department of Agriculture / OSHA, carbon dioxide becomes toxic at concentrations above 4 percent (40,000ppm); symptoms at 5,000-10,000 ppm. 10,000 ppm has been measured behind mask.
- Experiment (July 2020).
    - *https://www.wthr.com/article/news/health/coronavirus/verify-do-face-masks-reduce-oxygen-intake-carbon-dioxide-experiment-multiple-maskss/531-c00c96cb-9273-4947-949c-0807f94454a7*
    - Pulse oximeter and exhaled CO2 (via tube in mask) No change with mask. (End-tidal capnography or end-tidal CO2 (EtCO2) monitoring is a non-invasive technique that measures the partial pressure or maximal concentration of carbon dioxide (CO2) at the end of an exhaled breath. The normal values are 5-6% CO2, which is equivalent to 35-45 mmHg.)
- Health care worker study (2005, Scandinavia)

    - *https://pubmed.ncbi.nlm.nih.gov/16441251/*
    - 37.3% reported face-mask-associated headaches, 32.9% reported headache frequency >6 times per month. 7.6% had taken sick leave from March 2003 to June 2004 (mean 2 days; range 1-4 days) and 59.5% required use of abortive analgesics because of headache.
- Health care worker study (2009, Japan) with similar headache results as Scandinavian study (above).
    - *https://pubmed.ncbi.nlm.nih.gov/19216002/*
- While there are some articles reporting OSHA tests, it is not clear they were proper tests.
- Some people have mistakenly claimed that OSHA standards (e.g., the Respiratory Protection standard, 29 CFR 1910.134; the Permit-Required Confined Space standard 29 CFR 1910.146; and the Air Contaminants standard, 29 CFR 1910.1000) apply to the issue of oxygen or carbon dioxide levels resulting from the use of medical masks or cloth face coverings in work settings with normal ambient air (e.g. healthcare settings, offices, retail settings, construction). These standards do not apply to the wearing of medical masks or cloth face coverings in work settings with normal ambient air). These standards would only apply to work settings where there are known or suspected sources of chemicals (e.g., manufacturing facilities) or workers are required to enter a potentially dangerous location (e.g., a large tank or vessel). *https://www.osha.gov/SLTC/covid-19/covid-19-faq.html*
- It is hard to tell if the headaches experienced by HCWs with N95s is CO2 or having a strap around the head.
- But when asked should we be worried about CO2, mask proponents say, “No” because you can exhale around the sides of the mask. This defeats the purpose. (2006) *https://pubmed.ncbi.nlm.nih.gov/16441251/*

Moisture retention

- Reuse of cloth masks, frequency and effectiveness of cleaning, and poor filtration may result in increased risk of infection.
- Observations during SARS suggested double-masking and other practices increased the risk of infection because of moisture, liquid diffusion.
    - *https://bmjopen.bmj.com/content/5/4/e006577; https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4420971/pdf/bmjopen-2014-006577.pdf*
- Recent study (in German) cultured 82 bacterial colonies & 4 mold (fungoid) colonies from a child’s masks after 8 hours of wear.
    - *https://twitter.com/MMaccruiskeen/status/1307266527662669825?s=20*

Self-contamination

- Contamination through repeated use and improper doffing is possible. The virus may survive on the surface of the mask. The pathogen goes from mask to bare hands.

“Mask mouth”

- Reported by dentists. *https://nypost.com/2020/08/05/mask-mouth-is-a-seriously-stinky-side-effect-of-wearing-masks/*
- Wearing masks increases dryness, which leads to decrease in saliva. It is the saliva that fights bacteria. Result is decaying teeth, receding gum lines and seriously sour breath. Gum disease — or periodontal disease — will eventually lead to strokes and an increased risk of heart attacks.”

World Health Organization (WHO), June 2020

- https://apps.who.int/iris/bitstream/handle/10665/332293/WHO-2019-nCov-IPC_Masks-2020.4-eng.pdf?sequence=1&isAllowed=y
- "The likely disadvantages of the use of mask by healthy people in the general public include:
    - potential increased risk of self-contamination due to the manipulation of a face mask and subsequently touching eyes with contaminated hands;
    - potential self-contamination that can occur if non- medical masks are not changed when wet or soiled. This can create favourable conditions for microorganism to amplify;
    - potential headache and/or breathing difficulties, depending on type of mask used;
    - potential development of facial skin lesions, irritant dermatitis or worsening acne, when used frequently for long hours;
    - difficulty with communicating clearly;
    - potential discomfort;
    - a false sense of security, leading to potentially lower adherence to other critical preventive measures such as physical distancing and hand hygiene;
    - poor compliance with mask wearing, in particular by young children;
    - waste management issues; improper mask disposal leading to increased litter in public places, risk of contamination to street cleaners and environment hazard;
    - difficulty communicating for deaf persons who rely on lip reading;
    - disadvantages for or difficulty wearing them, especially for children, developmentally challenged persons, those with mental illness, elderly persons with cognitive impairment, those with asthma or chronic respiratory or breathing problems, those who have had facial trauma or recent oral maxillofacial surgery, and those living in hot and humid environments.

The Hamburg Environmental Institute (July 2020) warned of the inhalation of chlorine compounds in polyester masks as well as problems in connection with face mask disposal. https://swprs.org/face-masks-evidence/; https://corona-transition.org/maskentragen-noch-ungesunder-als-gedacht (in German)

Psychological Damage in Children (September 11, 2020).
https://www.world-today-news.com/70-doctors-in-open-letter-to-ben-weyts-abolish-mandatory-mouth-mask-at-school-belgium/

- 70 Belgian doctors begged for cancellation of mask mandate at school. "In recent months, the general well-being of children and young people has come under severe pressure. We see in our practices an increasing number of children and young people with complaints due to the rules of conduct that have been imposed on them. We diagnose anxiety and sleep problems, behavioral disorders and fear of contamination. We are seeing an increase in domestic violence, isolation and deprivation. Many lack physical and emotional contact; attachment problems and addiction are obvious. **'The mandatory mouth mask in schools is a major threat to their development. It ignores the essential needs of the growing child. The well-being of children and young people is highly dependent on the emotional connection with others.** (…) The aim of education is to create an optimal context so that a maximum development of young people is possible. The school environment must be a safe practice field. **The mouth mask obligation, on the other hand, makes the school a threatening and unsafe environment, where emotional connection becomes difficult. 'In addition, there is no large-scale evidence that wearing face masks in a non-professional environment has any positive effect on the spread of viruses, let alone on general health.'**

Unanswered questions

- Can virions escape an evaporating droplet stuck to a mask fiber?
- What are long-term health effects on HCW, such as headaches, arising from impeded breathing?
- Are there negative social consequences to a masked society?
- Are there negative psychological consequences to wearing a mask, as a fear-based behavioral modification?
- What are the environmental consequences of mask manufacturing and disposal?

Positive Mask Studies

- Some cite a September 2019 study mentioned above (*https://jamanetwork.com/journals/jama/fullarticle/2749214)* comparing N95s and surgical masks in preventing flu. BUT there was no control wearing no mask. The point of the study found that both types had similar incidence of flu. (N95-8.2% vs 7.2%).
- The main study used is the Missouri hairdressers who were SARS-CoV-2 infected but asymptomatic and wore a mask; clients did not get infected.(July 2020)
    - *https://www.livescience.com/hair-stylists-infected-covid19-face-masks.html;*
    - *https://www.cdc.gov/mmwr/volumes/69/wr/mm6928e2.htm*
    - But there is a Chinese report (May [August] 2020) of a COVID infected asymptomatic person who did not infect 455 persons with whom he was in contact. *https://pubmed.ncbi.nlm.nih.gov/32513410/*
    - Asymptomatic people do not cough and sneeze. But one study showed they shed just as many viruses as symptomatic. (August 2020, Korea)
    - *https://jamanetwork.com/journals/jamainternalmedicine/fullarticle/2769235*
- Review of mask use (March 2020, multi-country)
    - *https://www.sciencedirect.com/science/article/pii/S1477893920302301?via%3Dihub*
    - 21 studies; 8,686 participants. Mask use by health care workers (HCWs) and non-HCWs. HCWs had 80% reduction of viral infections. Non-HCW had 56%. Asian better than Western. Study stressed that masks were an adjunct to other measures.
    - Other factors:
        - Older age of the population, urbanization, obesity, and longer duration of the outbreak in a country were independently associated with higher country-wide per-capita coronavirus mortality.
        - International travel restrictions were associated with lower per-capita mortality.
        - Other containment measures, testing and tracing polices, and the amount of viral testing were not statistically significant predictors of country-wide coronavirus mortality, after controlling for other predictors.
        - Societal norms and government policies supporting mask-wearing by the public were independently associated with lower per-capita mortality from COVID-19.
- Review of 8 pre-COVID-19 studies (June 2020, Australia).

    - *https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7323223/?fbclid=IwAR2Ukyt8GCrK-qoc-bgCJhHknW5pqytBFOfe6txHWl_7eUs9p8vsrQ26KIM*
    - Surgical masks reduced influenza like illnesses (ILI) by 41% and N95 by 66% (difference was not statistically significant). Save N95 for aerosols.
    - No good evidence face masks protect the public against viral respiratory illnesses
    - "Australia and New Zealand currently, the questionable benefits arguably do not justify health−care staff wearing surgical masks when treating low−risk patients and may impede the normal caring relationship between patients, parents and staff."
- Review of masks, physical distancing, eye protection (June 2020, WHO).
    - *https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(20)31142-9/fulltext*
    - 172 observational studies across 16 countries and six continents; MERS, SARS, beta-corona, SARS-CoV-2 in health care and non-healthcare settings. N95s better than surgical or 12 layer cotton. Authors did not rate the certainty of effect as high. Findings were in accord with those of a cluster randomized trial showing a potential benefit of continuous N95 respirator use over medical masks against seasonal viral infections.
- Review of face mask efficacy (July 2020, China).
    - *https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7253999;*
    - *https://www.sciencedirect.com/science/article/pii/S1477893920302301?via%3Dihub*
    - 21 studies, 8,686 participants: 13 case-control studies, 6 cluster randomized trials, and 2 cohort studies. 12 studies of health care workers (HCWs); 8 studies of non-healthcare professional populations; 1 study of HCWs and relatives of patients. SARS, H1N1, influenza lab confirmed.
    - Masks (N95 and surgical) were generally effective in preventing the spread of respiratory viruses. After wearing a mask, the risk of contracting RVIs was significantly reduced. Use of masks by HCWs and non-HCWs can reduce the risk of respiratory virus infection by 80% and 47% respectively.
    - The study they reference regarding "social" masks is footnoted to a model that assumes complete compliance and universality.
- CDC review of masks and antibody presence in health care workers (HCWs) (September 2020).
    - *https://www.cdc.gov/mmwr/volumes/69/wr/mm6935e2.htm?s_cid=mm6935e2_w*
    - 3,248 HCWs observed. 6% had antibodies to SARS-CoV-2; 29% were asymptomatic; 69% had not had a diagnosis of SARS-Co-V-2 infection. Prevalence of antibodies was lower (6%) in HCWs who wore masks that those who did not (9%).
- *Experiment (human) measuring surgical mask efficacy in reducing virus transmission (April 2020, Hong Kong).
    - *https://www.nature.com/articles/s41591-020-0843-2*
    - 246 participants. Infection measured by PCR. Bioaerosol collecting device, to capture exhaled breath particles. Two size fractions: < and >5 microns. Surgical masks can efficaciously reduce the emission of influenza virus particles into the environment in respiratory droplets, but not in aerosols. Surgical face masks could be used by ill people to reduce onward transmission.
- Summer 2020 study with laboratory coughs (Summer 2020)

- *https://www.vumedi.com/video/airborne-transmission-face-masks-how-do-different-types-of-masks-protect-against-various-ranges-of-t/*
  Forward motion distance:
  - Handkerchief — 4 feet
  - 3 layer cloth –- 1 foot
  - 2 layers sewn cloth –- 2-3 inches
  - Problems:
    - But drops go around the nose and sides of mask.
    - Shields only work for large droplets.
    - Exhalation ports reduce humidity but defeat the purpose of using the mask.

- A U.S. study of airborne transmission (May 2020)
  - *https://www.pnas.org/content/117/26/14857*
  - Study claimed that masks had led to a decrease in infections in three global hotspots (including New York City). This did not take into account the natural decrease in infections and other measures. The study was so flawed that over 40 scientists recommended that the study be withdrawn.
- A U.S. study comparing states with mask mandates (June 2020).
  - *https://www.healthaffairs.org/doi/full/10.1377/hlthaff.2020.00818*
  - Study concluded that mandatory masks had led to a decrease in infections in 15 states. The study did not take into account that the incidence of infection was already declining in most states at that time. A comparison with other states was not made.
- A U.S. study comparing masks, lockdowns in various countries (June 2020).
  - *https://www.medrxiv.org/content/10.1101/2020.05.22.20109231v3.full.pdf*
  - Study concluded that countries with mandatory masks had fewer deaths than countries without mandatory masks. But the study compared African, Latin American, Asian and Eastern European countries with very different infection rates and population structures.
- *July-August 2020– UCSF – Mask can be a crude "vaccine."
  - *https://link.springer.com/article/10.1007/s11606-020-06067-8*;
  - *https://ucsf.app.box.com/s/blvolkp5z0mydzd82rjks4wyleagt036;*
  - *https://www.nejm.org/doi/full/10.1056/NEJMp2026913;*
  - *https://epibiostat.ucsf.edu/news/new-theory-asks-could-mask-be-crude-'vaccine'*;
  - *https://www.vumedi.com/video/covid-19-mortality-update-does-masking-reduce-viral-inoculum-to-which-wearer-is-exposed/*
  - Universal masking reduces the "inoculum" or dose of the virus for the mask-wearer, leading to more mild and asymptomatic infection manifestations similar to variolation with small pox. CDC estimates 40% asymptomatic. But masked cruise ship folks had 81% asymptomatic, 95% masked prison folks, food processing plants. (The concentrations of bacteria upstream and downstream of the test devices were measured with an aerodynamic size spectrometer.)

- Many studies ignore the effect of other measures, the natural development of infection numbers, changes in test activity, or they compare countries with very different conditions.

Conclusions from Organizations

- The World Health Organization (WHO): **(April 6, 2020)**
  - https://apps.who.int/iris/bitstream/handle/10665/331693/WHO-2019-nCov-IPC_Masks-2020.3-eng.pdf?sequence=1&isAllowed=y
  - **"Advice to decision makers on the use of masks for healthy people in community settings:**
  - The wide use of masks by healthy people in the community setting is not supported by current evidence and carries uncertainties and critical risks."
  - **"Medical masks should be reserved for health care workers.** The use of medical masks in the community may create a false sense of security, with neglect of other essential measures, such as hand hygiene practices and physical distancing, and may lead to touching the face under the masks and under the eyes, result in unnecessary costs, and take masks away from those in health care who need them most, especially when masks are in short supply."
  - "**Masks are effective only when used in combination with frequent hand-cleaning with alcohol-based hand rub or soap and water." WHO acknowledges that most people do not use masks properly.**
- But in June 8, 2020
  - *https://apps.who.int/iris/bitstream/handle/10665/332293/WHO-2019-nCov-IPC_Masks-2020.4-eng.pdf?sequence=1&isAllowed=y*
  - The World Health Organization has changed its stance on wearing face masks during the COVID-19 pandemic. People over 60 and people with underlying medical conditions should wear a medical-grade mask when they're in public and cannot socially distance. The general public should wear a three-layer fabric mask in those situations. Admitting that this was despite evidence with randomized controlled trials. "The use of a mask alone is insufficient to provide an adequate level of protection or source control, and other personal and community level measures should also be adopted to suppress transmission of respiratory viruses."
  - The reasons for recommending masks has little to do with effectiveness. "The likely advantages of the use of masks by healthy people in the general public include:
  - reduced potential exposure risk from infected persons before they develop symptoms;
  - reduced potential stigmatization of individuals wearing masks to prevent infecting others (source control) or of people caring for COVID-19 patients in non-clinical settings;
  - making people feel they can play a role in contributing to stopping spread of the virus;
  - reminding people to be compliant with other measures (e.g., hand hygiene, not touching nose and mouth).
  - potential social and economic benefits.
    - Amidst the global shortage of surgical masks and PPE, encouraging the public to create their own fabric masks may promote individual enterprise and community integration.
    - the production of non-medical masks may offer a source of income for those able to manufacture masks within their communities.

        - Fabric masks can also be a form of cultural expression, encouraging public acceptance of protection measures in general.
        - The safe re-use of fabric masks will also reduce costs and waste and contribute to sustainability."
- Dr. Nancy Messonnier, director of the Center for the National Center for Immunization and Respiratory Diseases (January 31, 2020):
    - *https://www.cdc.gov/media/releases/2020/t0131-2019-novel-coronavirus.html*
    - "We don't routinely recommend the use of face masks by the public to prevent respiratory illness…. And we certainly are not recommending that at this time for this new virus."
- The Centers for Disease Control and Prevention (CDC)
    - *https://www.cdc.gov/flu/professionals/infectioncontrol/maskguidance.htm*
    - In March 5, 2019 regarding the flu: "Masks are not usually recommended in non-healthcare settings; however, this guidance provides other strategies for limiting the spread of influenza viruses in the community":
    - *Cover their nose and mouth when coughing or sneezing,
    - *Use tissues to contain respiratory secretions and, after use, to dispose of them in the nearest waste receptacle, and
    - *Perform hand hygiene (e.g., handwashing with non-antimicrobial soap and water, and alcohol-based hand rub if soap and water are not available) after having contact with respiratory secretions and contaminated objects/materials.
- On August 7, 2020
    - Masks are recommended as a simple barrier to help prevent respiratory droplets from traveling into the air and onto other people when the person wearing the mask coughs, sneezes, talks, or raises their voice. This is called source control.
    - CDC recommends that people wear masks in public settings and when around people who don't live in your household, especially when other social distancing measures are difficult to maintain.
    - Masks may help prevent people who have COVID-19 from spreading the virus to others.
    - Masks are most likely to reduce the spread of COVID-19 when they are widely used by people in public settings.
    - Masks should NOT be worn by children under the age of 2 or anyone who has trouble breathing, is unconscious, incapacitated, or otherwise unable to remove the mask without assistance.
    - Masks with exhalation valves or vents should NOT be worn to help prevent the person wearing the mask from spreading COVID-19 to others (source control).
- From the New England Journal of Medicine, Universal Masking in the Covid-19 Era, July 9, 2020;
    - *https://www.nejm.org/doi/full/10.1056/NEJMp2006372*
    - "We know that wearing a mask outside health care facilities offers little, if any, protection from infection. Public health authorities define a significant exposure to Covid-19 as face-to-face contact within 6 feet with a patient with symptomatic Covid-19 that is sus-

tained for at least a few minutes (and some say more than 10 minutes or even 30 minutes). The chance of catching Covid-19 from a passing interaction in a public space is therefore minimal. In many cases, the desire for widespread masking is a reflexive reaction to anxiety over the pandemic." It is also clear that masks serve symbolic roles. **Masks are not only tools, they are also talismans that may help increase health care workers' perceived sense of safety**, well-being, and trust in their hospitals. Although such reactions may not be strictly logical, we are all subject to fear and anxiety, especially during times of crisis. One might argue that fear and anxiety are better countered with data and education than with a marginally beneficial mask.

    - But later authors said, "A growing body of research shows that the risk of SARS-CoV-2 transmission is strongly correlated with the duration and intensity of contact: the risk of transmission among household members can be as high as 40%, whereas the risk of transmission from less intense and less sustained encounters is below 5%. This finding is also borne out by recent research associating mask wearing with less transmission of SARS-CoV-2, particularly in closed settings." *https://www.nejm.org/doi/full/10.1056/NEJMc2020836*

- Holland's Medical Care Minister Tamara van Ark
    - https://www.thesun.co.uk/news/uknews/12292821/face-masks-not-necessary-say-holland-scientists/
    - "Despite a global stampede of mask-wearing, data show that 80-90 percent of people in Finland and Holland say they "never" wear masks when they go out, a sharp contrast to the 80-90 percent of people in Spain and Italy who say they "always" wear masks when they go out. "From a medical point of view, there is no evidence of a medical effect of wearing face masks, so we decided not to impose a national obligation."
- Panel, Rational use of face masks in the COVID-19 pandemic (March 2020)
    - https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7118603/

- **Wuhan CHINA STUDY of ASYMPTOMATIC SPREAD - 10 million participants tested and contact traced. No evidence of Asymptomatic Spread.**

Below is the study which indicates that of the 10M participants there were zero cases of asymptomatic spread.

Results:

There were 10,652,513 eligible people aged ≥6 years in Wuhan (94.1% of the total population). The nucleic acid screening was completed in 19 days (from May 14, 2020 to Jun 1, 2020), and tested a total of 9,899,828 persons from the 10,652,513 eligible people (participation rate, 92.9%). Of the 9899,828 participants, 9,865,404 had no previous diagnosis of COVID-19, and 34,424 were recovered COVID-19 patients.

The screening of the 9,865,404 participants without a history of COVID-19 found no newly confirmed COVID-19 cases, and identified 300 asymptomatic positive cases with a detection rate of 0.303 (95% CI 0.270–0.339)/10,000. The median age-stratified Ct-values of the asymptomatic cases were shown in Supplementary Table 1. Of the 300 asymptomatic positive cases, two cases came from one family

and another two were from another family. There were no previously confirmed COVID-19 patients in these two families. A total of 1174 close contacts of the asymptomatic positive cases were traced, and they all tested negative for the COVID-19. There were 34,424 previously recovered COVID-19 cases who participated in the screening. Of the 34,424 participants with a history of COVID-19, 107 tested positive again, giving a repositive rate of 0.310% (95% CI 0.423–0.574%). Virus cultures were negative for all asymptomatic positive and repositive cases, indicating no “viable virus” in positive cases detected in this study. “

Link to the study: https://www.nature.com/articles/s41467-020-19802-w

And an easier to digest article relating to this summary:
https://www.aier.org/article/asymptomatic-spread-revisited/

Final Summation:

This in-depth response demonstrates that there is substantial evidence to reasonably and responsibly support a “mask-optional” approach in our schools and to affirm the rights of parents to choose what medical devices their children use or wear.

We urge you to support such a policy for the children of Hollis and Brookline and their teachers and we thank each of you for your service to our communities.