Mask Facts

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Introduction

COVID-19 is a globally-integrated, or a pandemic. Early in the COVID-19 pandemic, the WHO, CDC, and other health agencies recommended that healthy people do not need to wear masks to protect themselves against the virus. Recently, the WHO has changed its guidance, and now advises that all adolescents and adults in areas where transmission is occurring, such as in e.g., grocery stores and pharmacies, should wear masks when they are in close proximity to other people, in order to protect themselves against the coronavirus, particularly when physical distancing is difficult.

The theory behind mask wearing:

- Masks block droplets from spread of droplets that come out of a person's mouth when they cough or sneeze.
- Protection. Personal Protective Equipment (PPE) – wear masks.

Recommendations of SAMHSA/CDC

Note: 6-12 CFR 25.0/NFPA 1581/12 generally is a US microorganisms/virus, influenza virus over 2 years, 1 year, 6 months, 3 months, 1 month.

- Cloth masks are not as effective as surgical masks or N95 respirators.
- 1 cubic m = 1,000,000 (1M) bacteria and/or viruses and 1,000,000 (million) neurons

Recommendations for the public and the general population and patients, please see Understanding Particle Size and Aerosolized Transmission by Steve Fonte

- https://www.linkedin.com/pulse/understanding-particle-size-aerosolized-transmission-steve-fonte/

Recommendations for healthcare workers, please see Understanding Particle Size and Aerosolized Transmission by Steve Fonte

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Cloth Masks

- Cloth/handmade/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 rapidly settle onto surfaces or are inhaled by people within 1 m (3 ft) of the person.
- Fine droplets (≤5 µm) can remain in suspension in the air for a longer time and travel further than 1 m (3 ft).

Recommendations of SAMHSA/CDC

- https://www.cdc.gov/coronavirus/2019-ncov/prevention-treatment/cloth-face-cover.html
- https://www.cdc.gov/coronavirus/2019-ncov/hcp/faq.html#Personal-Protective-Equipment
- https://www.cdc.gov/coronavirus/2019-ncov/hcp/ppe-strategies/index.html
- https://www.cdc.gov/coronavirus/2019-ncov/hcp/ppe-strategies/index.html#Decontamination-Reuse-Disposal

Accessibility

- In an an environment environment those large droplets may travel farther.
- Droplets can be as small as 1 µm in diameter and remain suspended in the air for a number of days and travel up to 1 meter (3 feet). (This study looked at droplets in a closed environment, and droplets may travel further in an open environment, such as a grocery store, a hospital, and nursing homes, from large COVID-19 Gamma-COVID-19 Delta-Omicron variant.)
- https://www.cdc.gov/coronavirus/2019-ncov/hcp/faq.html#Personal-Protective-Equipment

Variable

- Mask: CDC recommends shorter that small/larger carrying droplets were inactivated within shorter and shorter time as ambient humidity was increased. Dryness (more the air) spread droplets, and humidity (more the air) kills droplets.

Conclusions

The preparedness of scientific evidence supports the aerosols any a short a lot in the transmission of COVID-19 – Nature. A short interview reviews Aerosol Science and Technology, Nature, and Science.

- Thus, any respiratory protection respirator or mask that provides a high level of filtration and fit is not highly effective in preventing the transmission of SARS-CoV-2, the virus that causes COVID-19 – Nature.
- Public health authorities take a significant risk in relation to COVID-19 or face to face contact, and the WHO and CDC have recommended that healthy people do not need to wear masks to protect themselves against the virus – Nature.
- The impact of wearing COVID-19 face coverings/masks in a public space is therefore minimal.

Variable

- In an an outdoor

- https://www.medrxiv.org/content/10.1101/2020.05.22.20109219v1.full.pdf
- Study concluded that countries with mandatory masks had fewer death 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/8nvfkp5z0mydzu8l52ej4w4ywlag8330;
  - https://www.nejm.org/doi/full/10.1056/NEJMp2028913;
  - https://epidoistat.ucsf.edu/news/new-theory-asks-could-mask-be-crude-%22vaccine%3F%22;
  - 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/10665/331683/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 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. 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/NEJMc2020838*

- Holland's Medical Care Minister Tamara van Ark
  - https://www.theaun.co.uk/news/uknews/1229281/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/
  - Recommendations on face mask use in community settings
    - WHO
      - If you are healthy, you only need to wear a mask if you are taking care of a person with suspected SARS-CoV-2 infection.
    - China
      - People at moderate risk[a] of infection: surgical or disposable mask for medical use.
      - People at low risk[b] of infection: disposable mask for medical use.
      - People at very low risk[c] of infection: do not have to wear a mask or can wear non-medical mask (such as cloth mask).
    - Hong Kong
      - Surgical masks can prevent transmission of respiratory viruses from people who are ill. It is essential for people who are symptomatic (even if they have mild symptoms) to wear a surgical mask.
      - Wear a surgical mask when taking public transport or staying in crowded places. It is important to wear a mask properly and practice good hand hygiene before wearing and after removing a mask.
    - Singapore
      - Wear a mask if you have respiratory symptoms, such as a cough or runny nose.
    - Japan
      - The effectiveness of wearing a face mask to protect yourself from contracting viruses is thought to be limited. If you wear a face mask in confined, badly ventilated spaces, it might help avoid catching droplets emitted from others but if you are in an open-air environment, the use of face mask is not very efficient.
    - USA
      - Centers for Disease Control and Prevention does not recommend that people who are well wear a face mask (including respirators) to protect themselves from respiratory diseases, including COVID-19.
      - US Surgeon General urged people on Twitter to stop buying face masks
    - UK
      - Face masks play a very important role in places such as hospitals, but there is very little evidence of widespread benefit for members of the public.
    - Germany
      - There is not enough evidence to prove that wearing a surgical mask significantly reduces a healthy person's risk of becoming infected while wearing it. According to WHO, wearing a mask in situations where it is not recommended to do so can create a false sense of security because it might lead to neglecting fundamental hygiene measures, such as proper hand hygiene.

Final Thoughts

- Surgical masks are loose fitting. They are designed to protect the patient from the doctors' respiratory droplets. There wearer is not protected from others' airborne particles.
- People do not wear masks properly. Many people have the mask under the nose. The wearer does not have glasses on and the eyes are a portal of entry. If the virus lands on the conjunctiva, tears will wash it into the nasopharynx.
- Most studies cannot separate out hand hygiene.
- The designer masks and scarves offer minimal protection. They give a false sense of security to both the wearer and those around the wearer.
- "Not to mention they add a perverse lightheartedness to the situation.
- If you are walking alone, no need for a mask. Avoid other folks; use common sense.
- Remember: children under 2 years should not wear masks because of accidental suffocation and difficulty breathing in some.
- Even if a universal mask mandate were imposed, several studies noted that folks do not use the mask properly and over-report their wearing. Additionally, how would the mandate be enforced??
- The positive studies are models that assume universality and full compliance.
- If wearing a mask makes people go out and get Vitamin D – go for it. In the 1918 flu pandemic people who went outside did better. Early reports are showing people with COVID-19 with low Vitamin D do worse than those with normal levels. Perhaps that is why shut-ins do so poorly.
  https://www.medrxiv.org/content/10.1101/2020.04.08.20058578v4

Wash your hands — — — If you are sick, stay home!

Objects and surfaces

- Person to person touching
- The CDC's most recent statement regarding contracting COVID-19 from touching surfaces: "Based on data from lab studies on Covid-19 and what we know about similar respiratory diseases, it may be possible that a person can get Covid-19 by touching a surface or object that has the virus on it and then touching their own mouth, nose or possibly their eyes," the agency wrote. "But this isn't thought to be the main way the virus spreads.
  https://www.cdc.gov/media/releases/2020/s0522-cdc-updates-covid-transmission.html.
- Chinese study with data taken from swabs on surfaces around the hospital (July 2020)
  - https://wwwnc.cdc.gov/eid/article/26/7/20-0885_article?deliveryName=USCDC_333-DM35257
  - The surfaces where tested with the PCR (polymerase chain reaction) test, which greatly amplifies the viral genetic material if it is present. That material is detectable when a person is actively infected. At the time of the study, it was thought to be the most reliable test. Because of the amplification of the viral material, there are many false positives. It is not clear that the mere presence of virus means it is infectious.
    - Computer mouse (ICU 6/8, 75%; General ward (GW) 1/5, 20%)
    - Trash cans (ICU 5/5, 60%; GW 0/8)
    - Sickbed handrails (ICU 6/14, 42.9%; GW 0/12)
    - Doorknobs (GW 1/12, 8.3%)
    - 81.3% of the miscellaneous personal items were positive:
      - Exercise equipment
      - Medical equipment (spirometer, pulse oximeter, nasal cannula)
      - PC and iPads
      - Reading glasses
      - Cellular phones (83.3% positive for viral RNA)
      - Remote controls for in-room TVs (64.7% percent positive)
      - Toilets (81.0% positive)
      - Room surfaces (80.4% of all sampled)
      - Bedside tables and bed rails (75.0%)
      - Window ledges (81.8%)
      - Plastic: up to 2-3 days
      - Stainless Steel: up to 2-3 days
      - Cardboard: up to 1 day
      - Copper: up to 4 hours
      - Floor – gravity causes droplets to fall to the floor. Half of ICU workers all had virus on the bottoms of their shoes

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