# UCSF
## UC San Francisco Previously Published Works

**Title**

Unmasking the Ethics of Public Health Messaging in a Pandemic

**Permalink**

https://escholarship.org/uc/item/9bk8210n

**Journal**

Journal of Bioethical Inquiry, 18(4)

**ISSN**

1176-7529

**Authors**

Ho, Anita
Huang, Vivian

**Publication Date**

2021-12-01

**DOI**

10.1007/s11673-021-10126-y

Peer reviewed

CRITICAL PERSPECTIVES

# Unmasking the Ethics of Public Health Messaging in a Pandemic

**Anita Ho** (iD) · **Vivian Huang**

**Abstract** Uncertainty is inherent in new and unexpected viral outbreaks such as the current COVID-19 pandemic. It imposes challenges for health officials in soliciting cooperative behavioural changes based on incomplete information. In this paper, we use evolving mask recommendations in the United States as an example to analyse the ethical importance and practical demonstration of trustworthiness in pandemic messaging and decision-making. We argue that responsible public health interventions in the time of uncertainties requires explicit intersecting ethical considerations both in action and in communication to promote trustworthiness. First, as public health decisions have to be made in the face of incomplete and evolving data, health officials need to exhibit competence while committing to epistemic humility. They can explain the methods used in making and updating mask recommendations as well as explicitly acknowledge the need to incorporate sociocultural and other contextual considerations in translating scientific data into mask recommendations. Second, officials and agencies must uphold and communicate decisional transparency as part of their effort to demonstrate accountability and promote the public's understanding of the evolving pandemic. Third, especially since both the pandemic and mask recommendations may have disparate impact on different populations, officials should start with the fair implementation of the least restrictive measures that can help reduce harm.

**Keywords** COVID-19 · Public health · Pandemic ethics · Epistemic humility · Trustworthiness

A. Ho (✉)
University of British Columbia, Vancouver, BC V6T 1Z2, Canada
e-mail: anitaho.ethics@gmail.com

A. Ho
University of California, San Francisco, San Francisco, CA, USA

V. Huang
University of British Columbia, Vancouver, BC V6T 1Z4, Canada
e-mail: weivivh@student.ubc.ca

## Introduction

Sixteen months since the first known death from COVID-19, the disease caused by the virus SARS-CoV-2, at least 126 million people worldwide have been infected, with over 2.7 million known deaths (Worldometer 2021). Current available data suggest that the highly contagious SARS-CoV-2 is transmitted from person to person through large droplets and possibly small aerosols via coughing or sneezing, usually after close contact with an infected patient (CDC 2020).

Many strategies have been proposed and implemented across the world to slow the spread of COVID-19. After divergent opinions among

international health agencies in the early months of the pandemic, one of the mitigation measures that is now generally recommended by health officials in various countries for the highly contagious virus is the widescale use of masks or face coverings (Esposito et al. 2020). Nonetheless, some uncertainties regarding the quality of evidence remains. There is inconclusive data on whether droplets or aerosols predominate in SARS-CoV-2 transmission, the extent to which aerosol exposure would lead to infections, and the relative effectiveness of respiratory protection targeting aerosols versus droplets (Klompas, Baker, and Rhee 2020). Moreover, the impact of mask wearing may not be independently ascertained because of confounding and mediating factors such as room air ventilation, crowding, baseline incidence rates, and other concurrent mitigating practices such as hand hygiene, limited gathering, physical distancing, and travel restrictions. Even as vaccination is gradually rolling out in various high-income countries, very few jurisdictions in these regions have relaxed mask guidelines, especially in the face of new variants and inadequate data to prove that vaccinated people cannot transmit the virus.

In this paper, we use the evolving mask recommendation as an example to argue that responsible public health interventions in a new and unanticipated pandemic require explicit intersecting ethical considerations both in communication and in making interim policy decisions. We focus on the United States to explore the ethical importance of responsive and responsible pandemic messaging and policymaking in a diverse and democratic society. Lessons from inconsistent mask messaging in the United States illustrate how careful communication and implementation are necessary to facilitate significant cultural and behavioural shift needed to curb further viral spread.

We present three intersecting arguments promoting responsible and responsive pandemic messaging and policymaking. First, in times of uncertainties with evolving but incomplete evidence, health officials need to demonstrate trustworthiness by committing to epistemic humility while exhibiting competence. Second, emergency executive orders during a public health crisis give officials far-reaching authority and power over people's behaviour and data, such that officials and agencies must uphold and communicate decisional transparency to demonstrate accountability

and promote the public's understanding of a rapidly changing pandemic. Third, especially in the context of a pandemic that has disparate impact on different populations, officials should start with the fair implementation of the least restrictive measures that can help to reduce population harm, particularly for those who are most disadvantaged. While our focus is on mask wearing, these arguments can also inform how public health officials communicate and handle other pandemic measures in the face of incomplete information.

## Public Health Messaging in an Evolving Pandemic

Shortly after the first known case of COVID-19 in China, neighbouring regions such as Hong Kong, Taiwan, and South Korea utilized their experience with SARS in 2003–2004 and MERS in 2015 respectively to guide their response to the novel coronavirus. Widescale mask use was soon encouraged by local health officials or adopted based on such experience, with high compliance rate from residents in these regions (Chen et al. 2020a; The Government of Hong Kong Special Administrative Region 2020; Leung 2020). Many epidemiologists and infectious disease experts have attributed relatively low SARS-CoV-2 transmission rates in these regions to widespread mask use by the general public (Chen et al. 2020b).

In contrast, in the initial three months after COVID-19 cases had been confirmed in multiple continents, health officials and agencies in most Western countries, such as the United States, Canada, and Italy explicitly discouraged asymptomatic individuals from wearing masks (Huo 2020; Government of Canada 2020; Fraser 2020), citing the lack of efficacious evidence while expressing concerns that widespread mask use would deprive healthcare workers of personal protective equipment (PPE) needed for engaging with COVID-19 patients (Vaziri 2020; U.S. Surgeon General 2020). The World Health Organization (WHO) recommended medical masks be worn only by healthcare workers, symptomatic patients, and their caretakers, even after declaring the spread of SARS-CoV-2 a global pandemic in mid-March (WHO 2020a). In the United States, health officials expressed the worry that the public may not know how to properly wear masks, potentially leading to

self-contamination, a false sense of security, and a disregard of other preventive strategies such as physical distancing and hand hygiene (Tufekci 2020), although there was no clear evidence to support such speculations (Greenhalgh et al. 2020). No-mask recommendations persisted for a few months despite disquieting international data suggesting that infected but asymptomatic patients may still spread the virus to others (Mizumoto et al. 2020; Day 2020; Wei et al. 2020). Early regional differences in mask use guidelines without clear communication on the rationale of such variability created confusion around the world, heightening some people's scepticism and distrust towards health officials' expertise as well as their recommendations regarding various mitigation strategies (Tufekci 2020; Griffiths 2020).

The WHO finally reversed its guidelines in June 2020 based on new data and encouraged the general public in regions of substantial community transmission to wear face covering when physical distancing is difficult (WHO 2020b). However, even as more international evidence for mask wearing emerged, inconsistent recommendations persisted in the United States. While the Center for Disease Control provided public health information and recommendations, there has been no unified approach or metrics to handle the pandemic, and individual states, counties, and municipalities determined their own thresholds, emergency orders, and guidelines. Variations abound, and mixed responses and messages from political leaders across party lines in different levels of local, state, and federal governments who contradict or flout public health experts' mask recommendations reinforce the message for some people that the mask is a political symbol rather than an evidence- or science-based health prevention strategy (Karni and Astor 2020; Andrew 2020; Achenbach 2020). The resulting confusion has contributed to message fatigue and decreased adherence to mask recommendations in some populations (Sutton et al. 2020). While uncertainties are to be expected in novel pandemics with evolving evidence, the confusion created by conflicting messages on masks highlights the importance of health agencies and officials to not only enact responsible interventions but also to provide timely, transparent, consistent, and trustworthy communication that can promote health/scientific literacy and assure the public of expert competence.

## Navigating Uncertainties in an Evolving Pandemic

Uncertainties and incomplete information early in a pandemic highlight the challenges for health officials to provide definitive evidence to secure large-scale cooperation that is necessary for effective population-level response to a life-threatening crisis (Gerwin 2012). Robust mass public health studies require substantial time and resources and are difficult to conduct in a pandemic, especially across regions and populations with diverse demographic characteristics (Greenhalgh et al. 2020). Moreover, the most appropriate ways to collect and interpret evidence for public health decisions often cannot be determined a priori, as they depend on not only the types of information necessary to effectively address the particular public health goal but also the context within which such data collection and analysis will take place, including the urgency for action as well as the feasibility and ethical implications of using various methods. For example, even though randomized controlled trials (RCTs) are generally considered the "gold standard" in establishing definitive clinical evidence for various health interventions, ethical concerns challenge the justifiability of carrying out RCTs to test mask effectiveness for preventing COVID-19 by exposing participants in a controlled group with no masks to SARS-CoV-2, given the potential of significant harm and the lack of anticipated health benefits to participants.

In the current pandemic, there continues to be disagreement in the international scientific community regarding whether droplets or aerosols predominate in SARS-CoV-2 transmission, raising questions of the relative effectiveness of different types of face covering (Klompas, Baker, and Rhee 2020). However, observational evidence suggests that widescale mask wearing can reduce relative risk for infection and is a common factor in countries that have had more successful COVID-19 outbreak control (Schünemann et al. 2020; Lyu and Wehby 2020; Kenyon 2020). One systematic review of twenty-one studies indicates that masks protect both healthcare providers and the general public against influenza, SARS, and SARS-CoV-2, decreasing risk by 45 per cent, 74 per cent, and 96 per cent, respectively (Liang et al. 2020). Another systematic review of 172 observational studies of different coronaviruses (including

SARS-CoV-2) across six continents also suggests that mask use could largely reduce COVID-19 infection risk (Chu et al. 2020). Nonetheless, correlation is not causation, and it may be impossible to ascertain mask effectiveness in isolation, as there are other contributing environmental factors such as room air ventilation and gathering sizes. There are also other confounding and mediating local factors such as household sizes, cultural practices (e.g., kissing or hugging to greet), broad testing, strong healthcare system, social protection, good governance or high level of trust in the government, and well-coordinated and enforced quarantine practices (Islam et al. 2020; Baniamin, Rahman, and Hasan 2020).

In an evolving pandemic, ethical considerations are generally grounded in a public health framework, focusing on the utilitarian commitment to maximize population health benefits and prevent morbidity and premature mortality (Kass 2001). As conclusive clinical trial data may not be readily available, the urgency of pandemic decision-making requires interpreting and incorporating different types of evidence from a more pragmatic perspective (Upshur 2012). For example, public health officials may consider the types and magnitude of potential harm of not acting on tentative evidence regarding face covering within a certain timeline, especially given that mask adoption would be a relatively minor inconvenience for residents in the United States compared to the aggregate personal and societal costs of continuing viral spread and other more drastic measures such as travel restrictions and lockdowns (Udalova 2021). Mathematical modelling estimated that mandatory face masks for employees in public businesses on March 14th, 2020— three days after the WHO declared COVID-19 a global pandemic—could have reduced the growth rate of cases and that of deaths in the United States by approximately 10 per cent in six weeks (Chernozhukov et al. 2021). Another model showed that implementing universal mask use from late September 2020 to the end of February 2021 could save 130,000 lives in the United States (Reiner et al. 2021). In addition to the human toll in terms of morbidity and mortality from COVID-19 and other untreated ailments due to postponed or cancelled appointments, the pandemic has exacerbated mental-health concerns for lay citizens and overwhelmed healthcare providers (Findling, Blendon, and Benson 2020; Abbott 2021; Mehta et al. 2021). Moreover, layoffs and business

closures have distributive justice implications, especially since they further disadvantage people who have already been financially vulnerable, many of whom are members of ethnic minorities with higher infection and mortality risks (Tai et al. 2021). In the face of substantial impact of an ongoing pandemic, interim guidance on mask wearing based on rational and legitimate handling of incomplete information while scientists collect more direct data is necessary and thus justifiable (Parviainen, Koski, and Torkkola 2021).

## Trustworthiness in a Pandemic

Nonetheless, public health efforts to impose behavioural changes and restrictions in the face of uncertainty can be challenging. When lay people abide by guidance put forth by health officials based on their presumed trustworthiness, they expect that these experts possess a substantial body of knowledge or experience in the relevant domain (Goldman 2001; Weinstein 1993; Beatty 2006) and that their well-informed recommendations are guided by goodwill (Ho 2011). In this evolving pandemic, when risks and benefits of mask wearing and other behaviours are probabilistic and context-dependent rather than definitive and binary, experts cannot provide conclusive answers (Parviainen, Koski, and Torkkola 2021). Such uncertainty may pose further challenges in diverse and democratic countries that place a premium on individual freedom, including the United States, where residents face different geographical and socio-economic realities, have varying levels of health literacy, and hold competing values, social norms, priorities, and perspectives.

There are also socio-historical factors that may have contributed to scepticism by some Americans to accept widespread mask use. The country has not endured an epidemic or disaster in recent decades that necessitated protective face covering, and mask wearing in the West suggests that one is sick or contagious and should be avoided (Bourne 2020). Moreover, it is part of American social norms to be able to see the other person's facial expression when communicating and to use other non-verbal cues to judge intentions and emotions (Vahedian-Azimi, Makvandi, and Karimi 2020). It is also noteworthy that, in the United States, mask wearing by Black and Latino males is

prejudicially associated with crime or violence, and face covering for women of certain religious backgrounds is regarded by some as a symbol of oppression (Taylor 2020). These marginalized groups have endured discrimination in the social and healthcare system, and may be particularly distrustful of public health officials' proclaimed goodwill, especially if they have historically lacked access to health-enhancing opportunities and perceive that pandemic measures may impose disproportionate burdens on them (Freimuth et al. 2014).

As people may have different reasons beyond health and scientific literacy to resist mask recommendations, trustworthiness may be necessary to facilitate the public's willingness to tolerate uncertainty and to voluntarily accept behavioural guidance or comply with government-imposed mandates in a pandemic. International data on social trust suggests that while people in high-trust societies initially had more frequent in-person interactions that led to quicker viral spread, high cooperation to achieve the common goal to halt the spread had allowed those countries to neutralize COVID-19 faster once the danger was recognized and clearly communicated (Min 2020). In contrast, distrust of public health experts and their advice can have serious health and socio-economic consequences not only for the individuals disregarding such advice but also for the broader population (Bennett 2020).

To encourage a cultural and behavioural shift to minimize viral spread, people may need assurance that public health recommendations are driven by evolving scientific evidence and goodwill. Pandemic orders provide government officials sweeping power to impose restrictions requiring people to give up varying levels of privacy and freedom (Parviainen et al. 2021). Moreover, while mask wearing by itself is not the most restrictive strategy and involves relatively little economic disruption, it is generally recommended or implemented in combination with other public health restrictions such as contact tracing, quarantine orders, and physical distancing guidelines. Together, these measures can have dramatic impact on people's liberty, livelihoods, and important relationships, as they curtail people's ability to work and interact with loved ones (Smith and Upshur 2019). Unless trustworthiness and accountability are assured, the potential of abuse of power to curtail people's rights is heightened, as some of these measures may become

permanent even after the pandemic (Parviainen, Koski, and Torkkola 2021; Singer and Sang-Hun 2020). Trustworthiness of experts and officials in the current pandemic is thus an ethical, epistemological, and political problem for governments seeking to implement various mitigation measures, such as mask wearing (Camporesi, Vaccarella, and Davis 2017).

## Balancing Epistemic Humility and Competence

To demonstrate trustworthiness in an evolving pandemic, government officials and public health agencies need to commit to epistemic humility while also exhibiting competence. Epistemic humility is both an epistemological and ethical stance (Buchman et al. 2017). It is an intellectual virtue, grounded in the realization that our knowledge is provisional and incomplete, to be updated in light of new evidence (Angner 2020). It represents an appreciation for the complexity and contingency of scientific proclamations, particularly as these pronouncements are utilized to inform fair and sound pandemic policies (Kidd 2017). While epistemic humility is inherent in scientific endeavours given their defeasible and evolving nature, communication of such commitment and its implication is crucial in promoting transparency and accountability in considering unprecedented pandemic interventions that can have variable impact on diverse populations.

In determining appropriate mask guidelines, a commitment to epistemic humility requires public health officials to clearly communicate how they determine the sufficient or necessary levels of evidence for mask recommendations versus more restrictive mandates based on comparative risk-benefit analysis, what methods of data collection and analyses they are using to reach more definitive conclusion, and how they may adjust their mask recommendations accordingly. The concept of epistemic humility also reminds us that people's knowledge of the pandemic is interpreted, structured, and filtered by their multifaceted experience, priorities, and socio-historical context. Scientific evidence presented by health officials may not be the only or even the most important source of knowledge for some members of the public as they consider mask recommendations, and that reception of the presented evidence is filtered according to their broader context. In the United

States, where social media and other online platforms are increasingly utilized to design and disseminate health messages, lay citizens of diverse backgrounds and concerns appeal to different sources and types of information and incorporate other considerations in assessing whether they would trust or accept health officials' recommendations (Hocevar, Metzger, and Flanagin 2017). As people may have different conceptualizations of source credibility or trustworthiness, which may affect how they perceive, process, and evaluate health messaging, health officials need to consider not only medical factors but also the socioeconomic, political, and cultural contexts within which recommended behavioural changes would be accepted by the public (Upshur 2002). In other words, being epistemically humble means recognizing and publicly acknowledging that mask recommendations are accompanied by limitations of applying available scientific data to current decision-making, and that they are tentative and subjected to ongoing re-examination and revision based on additional data as well as other sociocultural and contextual considerations (Angner 2020).

Ironically, for laypersons who do not have substantial health literacy, experts' epistemic humility and admission of uncertainty may be mischaracterized as incompetence (Gerwin 2012), potentially amplifying confusion, perceptions of vulnerability, and pessimistic attitudes (Han et al. 2018). To promote and exhibit trustworthiness, public health and other government officials need to present a consistent and united path toward the common goal of curbing the pandemic, so that there is a unified approach to enhance the public's health literacy regarding the nature and meanings of uncertainty. Collectively, they can explain to the public that epistemic humility is part of the ideal of the scientific method and ethical commitment to trustworthiness in an unanticipated pandemic. Public health officials can educate the population around how all evidence is subjected to modification in light of new findings, and clarify that scientific precision is inherently a matter of degree and can be acquired incrementally. They can facilitate understanding by openly addressing what is already known about face covering based on best available data, what types of face covering and implementation methods had worked in other similar epidemics (e.g., SARS, MERS), how the current COVID-19 pandemic compares or differs, what mask-related evidence exists for

COVID-19, and how health agencies' ongoing work will further clarify facts and reduce uncertainty (Han et al. 2018), such as the potential of airborne transmission and whether or what types of masks would mitigate its effect (Morawska and Milton 2020). Experts can help the lay public to understand why there is not yet complete evidence for mask wearing (e.g., time and resources required for large-scale investigations), including the aforementioned ethical constraints on conducting randomized controlled trials to create definitive evidence to address the current pandemic (Upshur 2012). To demonstrate accountability, experts can also explain their methodologies in collecting, analysing, and interpreting data, handling emerging and potentially conflicting evidence, and using the best available data to assess and address health and social impact of the pandemic accordingly.

In the case of masks, additional and more rigorous studies across the globe since the beginning of the pandemic have now led to higher-quality evidence and increasing consensus among international experts regarding the utility of wearing various types of face coverings for different settings. This signals progress in achieving more certainty in this domain and can be communicated to the public accordingly. Public education that can reach diverse communities regarding these efforts and accumulative evidence, such as multilingual media and social media campaigns, virtual townhall briefings, and outreach by personal health professionals, community health workers and places of worship that are trusted by the targeted populations, can also help to promote inclusive and deliberative dialogues on how best to promote mask wearing that can address different populations' social and cultural concerns. A commitment to epistemic humility requires health officials to recognize that even citizens with the same ultimate goal to combat the pandemic and achieve safe reopening may have diverse concerns regarding face coverings, based on not only their own risk acceptance level but also the context within which they interpret public health recommendations. Nonetheless, health experts who are well-versed in scientific methods may still be ignorant of these sociocultural concerns that can be crucial to pandemic intervention planning. In translating evolving data into responsive and responsible decision-making, public and community stakeholder engagements may help to sharpen officials' ability to determine the acceptable threshold for baseline

risk that justifies recommending versus mandating mask wearing at the population level, understand and clarify the public's perceptions and worries, and address related concerns in implementation planning to the greatest extent possible. Multimodal engagement with different population groups may also help officials to demonstrate goodwill and trustworthiness that are important for facilitating public cooperation.

As mask recommendations would inconvenience people and impose additional expenses, governments may also promote trustworthiness through reciprocity (Silva and Smith 2015), by providing the necessary means for citizens and communities to protect themselves and discharge their public health duty towards others (Upshur 2002). For example, governments can ensure access to affordable and appropriate face coverings for healthcare workers and the public respectively, particularly for people who are at the highest risks of being exposed to the virus or may face financial and other burdens in accessing supplies. Such coordinated support, especially when done in collaboration with culturally and linguistically diverse communities, may promote not only government accountability but also health equity, protecting those who may be most affected by the pandemic and various mitigation measures (Robling 2020).

## Fair Implementation of the Least Restrictive Measures in an Uncertain Pandemic

Facing a new virus that has widespread transmission and high mortality rates, the significant potential benefits and apparent minimal risks from mask wearing may justify widespread mask utilization under the precautionary principle (World Commission on the Ethics of Scientific Knowledge and Technology 2005; Greenhalgh et al. 2020). This serious viral disease has been spreading in an immune naive population, sickening and killing millions around the world, including people with no pre-existing conditions. In comparison, despite uncertainties, available data suggest that the health risk of wearing face coverings for healthy individuals is minimal, as associated physical irritation for most people is temporary (Javid, Weekes, and Matheson 2020; Greenhalgh 2020). If general mask use can help to minimize the need for prolonged restrictive measures such as business closures, interim and relatively minor inconvenience

associated with mask wearing can be justified based on its potential to minimize harm.

Nonetheless, as available systematic reviews on mask outcomes include studies of variable inclusion and exclusion criteria or populations, and that different types of masks may have been used in these studies, preliminary evidence does not yet have high level of certainty (Schünemann et al. 2020). A commitment to epistemic humility and scientific rigour would thus require an iterative approach of careful investigation of mask evidence and the local context to fine tune the official recommendations along the way, including whether recommendations versus mandatory measures are necessary to promote adequate uptake to halt viral spread. As public health agencies continue to assess the need and effectiveness of widespread mask wearing as part of a comprehensive mitigation and prevention plan, they need to start by using the least restrictive measures to encourage and facilitate mask utilization as appropriate based on the prevalence or baseline risk for infection (Upshur 2002).

In the context of mask wearing in the pandemic, health officials can utilize a sliding scale to determine and tailor the required degree of restriction or enforcement for face covering for different scenarios based on the assessed strength of the data and severity of potential harm for non-adherence in various settings. For example, in rural areas with sparse populations, regions with low incidence rates, or outdoor spaces where people can keep appropriate physical distance, widespread mask use at all times may be less necessary, rendering compulsory mask orders that impose penalties for violation unjustifiable. Based on currently available data regarding how physical distance and ventilation may affect infection risks, officials may first recommend general mask wearing in densely populated regions that have high prevalence of infection, when gathering with people outside of one's household in indoor spaces where air circulation is low, or wherever physical distancing is impossible. Since some people are at higher risk of getting seriously ill if infected, including older adults and people with various chronic or autoimmune conditions, mask recommendation for people who may come into close contact with these individuals would also be acceptable. The temporary discomfort for the general public with mask wearing in specific settings or circumstances may be deemed an acceptable trade-off to avoid more significant restrictions

(e.g., prolonged school or business closures). As vaccination uptake remains slow in certain parts of the United States, and new variants raise further questions of whether currently available vaccines may provide adequate protection at the population level, mask recommendations may also help to ensure that the more disadvantaged populations, such as people who have no other viable options but to work outside of their home during the pandemic, would be protected accordingly (CDC 2021; Gostin and Powers 2006; Baylis et al. 2008).

In promoting the least restrictive measures as appropriate for the context, health officials can first focus on awareness and education by using different media and culturally appropriate venues to help the diverse public understand how the best available evidence to date regarding how, where, and when masks may be most important and beneficial in mitigating viral spread. In the United States, where individualism is considered a moral and political right for many residents, if voluntary measures supported by vast education and outreach campaigns provide adequate mitigation effect, such as sustained reduction in community spread or transmission rate, mandatory mask orders backed by punitive sanctions may not be necessary or justifiable. One of the problems in the American response to mask wearing was that various levels of government leapt from giving inconsistent messages of mask effectiveness to implementing mask mandates without first utilizing community data to assess whether voluntary measures supported by educational campaigns and free or affordable supplies may suffice in encouraging uptake. Even though strong mandates backed by sanctions at the outset of a pandemic *may* provide higher levels of compliance, they can also ironically reflect or reinforce distrust, especially in the face of incomplete and evolving data. As mask mandates restrict personal freedom, they should be pursued only if the threat is substantial and mitigation of spread cannot be achieved through voluntary means (Czypionka et al. 2020). After adjusting for other demographic differences in various communities, if comparative data shows that communities with low adherence rates have unacceptable persistence or increase of infection that results in severe illnesses, whereas regions with high adherence are succeeding in reducing infection and associated health outcomes to below the threshold level, more restrictive strategies in the face of increasingly

convincing data for the communities with low uptake may be necessary and thus justifiable.

To balance public health protection and people's liberty during a pandemic, comparative studies that attend to not only transmission routes but also various social determinants of exposure may also help to provide more tailored mask guidelines and other forms of support for different communities. Recognizing who may be at the highest versus lowest risks of being exposed or infected may further help health officials to implement mask recommendations and programmes for fair distribution of benefits and burdens (Kass 2001). Using consistent metrics while attending to different regional or demographic realities may provide valuable comparative data and help to determine the most appropriate approaches or requirements for the particular community or population group. Such locally adapted approaches may also promote trust, as people can better understand how mask recommendations may directly address their context and their community's concerns.

## Conclusion

As various parts of the United States continue to battle COVID-19 and cautiously manage the impact of gradual reopening, various levels of governing bodies will need to continuously use evolving but incomplete data for recommendations and decisions. Trust in officials' guidance on mask wearing and other mitigating measures will be essential in encouraging and securing ongoing cooperation from a weary and exhausted population that is generally suspicious of restrictive mandates. An increasing number of vaccines with good clinical trial safety and efficacy profiles are receiving authorization, but data on long-term protection and real-world effectiveness against new variants are not yet available. Mask wearing as an additional layer of precaution may be a long-term strategy. How health officials manage and communicate mask, vaccine, and other uncertainties while instilling confidence may affect the public's willingness to voluntarily abide by expert advice. Lessons about epistemic humility and trustworthiness from mask recommendations may help health officials to determine the best ways to be transparent about their decision-making processes as well as to demonstrate

their accountability and competence, so that they can facilitate public cooperation to end the pandemic.

# References

Abbott, A. COVID's mental-health toll: How scientists are tracking a surge in depression. 2021. *Nature* 590: 194–195.

Achenbach, J. 2020. "Tell me what to do! Please!": Even experts struggle with coronavirus unknowns. *The Washington Post*, May 26. https://www.washingtonpost.com/health/tell-me-what-to-do-please-even-experts-struggle-with-coronavirus-unknowns/2020/05/25/e11f9870-9d08-11ea-ad09-8da7ec214672_story.html. Accessed September 8, 2021.

Andrew, S. 2020. The psychology behind why some people won't wear masks. *CNN*, May 6. https://www.cnn.com/2020/05/06/health/why-people-dont-wear-masks-wellness-trnd/index.html. Accessed September 8, 2021.

Angner, E. 2020. Epistemic humility—knowing your limits in a pandemic. *Behavioral Scientist*, April 13. https://behavioralscientist.org/epistemic-humility-coronavirus-knowing-your-limits-in-a-pandemic/. Accessed September 8, 2021.

Baniamin, H.M., M. Rahman, and M.T. Hasan. 2020. The COVID-19 pandemic: Why are some countries coping more successfully than others? *Asia Pacific Journal of Public Administration* 42(3): 153–169.

Baylis, F, NP. Kenny, and S. Sherwin. (2008). A Relational Account of Public Health Ethics. *Public Health Ethics* 1(3): 196–209.

Beatty, J. 2006. Masking disagreement among experts. *Episteme* 3(1–2): 52–67.

Bennett, M. 2020. Should I do as I'm told? Trust, experts, and COVID-19. *Kennedy Institute of Ethics Journal Special Issue*, June 17. https://kiej.georgetown.edu/trust-experts-and-covid-19-special-issue/. Accessed September 8, 2021.

Bourne J. 2020. Why are Americans so reluctant to wear masks? *Berggruen Institute*, May 20. https://www.berggruen.org/ideas/articles/why-are-americans-so-reluctant-to-wear-masks/. Accessed September 8, 2021.

Buchman, D.Z., A. Ho, and D.S. Goldberg. 2017. Investigating trust, expertise, and epistemic injustice in chronic pain. *Journal of Bioethical Inquiry* 14(1): 31–42.

Camporesi, S., M. Vaccarella, and M. Davis. 2017. Investigating public trust in expert knowledge: Narrative, ethics, and engagement. *Journal of Bioethical Inquiry* 14 (1): 23–30.

CDC. 2020. How coronavirus spreads. Last modified June 16. https://www.cdc.gov/coronavirus/2019-ncov/prevent-getting-sick/how-covid-spreads.html?CDC_AA_refVal=https%3A%2F%2Fwww.cdc.gov%2Fcoronavirus%2F2019-ncov%2Fprepare%2Ftransmission.html. Accessed September 8, 2021.

———. 2021. When you've been fully vaccinated: How to protect yourself and others. Last modified March 23. https://www.cdc.gov/coronavirus/2019-ncov/vaccines/fully-vaccinated.html. Accessed September 8, 2021.

Chen, W.T., Y.C. Pan, P.M. Tsai, P.W. Wu, and J.Yeh. 2020a. Wear a face mask, wash hands to protect against Wuhan virus: Experts. *Focus Taiwan*, January 22. https://focustaiwan.tw/society/202001220003. Accessed September 8, 2021.

Chen, W.T., H.Y. Wu, and L. Ko. 2020b. Face masks prevent COVID-19 from spreading: CECC official. *Focus Taiwan*, May 2. https://focustaiwan.tw/society/202005020020. Accessed September 8, 2021.

Chernozhukov, V., H. Kasahara, and P. Schrimpf. 2021. Causal impact of masks, policies, behavior on early COVID-19 pandemic in the U.S. *Journal of Econometrics* 220(1): 23–62.

Chu, D.K., E.A. Akl, S. Duda, et al. 2020. Physical distancing, face masks, and eye protection to prevent person-to-person transmission of SARS-CoV-2 and COVID-19: A systematic review and meta-analysis. *The Lancet* 395(10242): 1973–1987.

Czypionka, T., T. Greenhalgh, D. Bassler, and M.B. Bryant. 2020. Masks and face coverings for the lay public: A narrative update. *Annals of Internal Medicine*. Online ahead of print, December 29. https://doi.org/10.7326/M20-6625.

Day, M. 2020. Covid-19: Identifying and isolating asymptomatic people helped eliminate virus in Italian village. *BMJ* 368: m1165.

Esposito, S., N. Principi, C.C. Leung, and G.B. Migliori. 2020. Universal use of face masks for success against COVID-19: Evidence and implications for prevention policies. *The European Respiratory Journal*. https://doi.org/10.1183/13993003.01260-2020.

Findling M.G., R.J. Blendon, and J.M. Benson. 2020. Delayed care with harmful health consequences—reported experiences from national surveys during coronavirus disease 2019. *JAMA Health Forum* 1(12):e201463.

Fraser, A. 2020. Scramble for masks as Italian region orders coronavirus cover-up. *The Guardian*, April 6. https://www.theguardian.pe.ca/news/world/scramble-for-masks-as-italian-region-orders-coronavirus-cover-up-434308/. Accessed September 8, 2021.

Freimuth, V.S., D. Musa, K. Hilyard, S.C. Quinn, and K. Kim. 2014. Trust during the early stages of the 2009 H1N1 pandemic. *Journal of Health Communication* 19(3): 321–339.

Gerwin, L.E. 2012. The challenge of providing the public with actionable information during a pandemic. *Journal of Law, Medicine and Ethics* 40(3): 630–654.

Goldman, A.I. 2001. Experts: Which ones should you trust? *Philosophy and Phenomenological Research* 63(1): 85.

Gostin, L.O., and M. Powers. 2006. What does social justice require for the public's health? Public health ethics and policy imperatives. *Health Affairs* 25(4): 1053–1060.

Government of Canada. 2020. Coronavirus disease (COVID-19): Prevention and risks. Last modified April 11. https://www.canada.ca/en/public-health/services/diseases/2019-novel-coronavirus-infection/prevention-risks.html. Accessed September 8, 2021.

Greenhalgh, T. 2020. Laying straw men to rest: Author's reply to "Urgency and uncertainty: Covid-19, face masks, and evidence informed policy." *BMJ* 369: m2240.

Greenhalgh, T., M.B. Schmid, T. Czypionka, D. Bassler, and L. Gruer. 2020. Face masks for the public during the Covid-19 crisis. *BMJ* 369: m1435.

Griffiths, J. 2020. Face masks and coronavirus: Asia may have been right and the rest of the world is coming around. *CNN*, April 23. https://www.cnn.com/2020/04/01/asia/coronavirus-mask-messaging-intl-hnk/index.html. Accessed September 8, 2021.

Han, P.K.J., B.J. Zikmund-Fisher, C.W. Duarte, et al. 2018. Communication of scientific uncertainty about a novel pandemic health threat: Ambiguity aversion and its mechanisms. *Journal of Health Communication* 23(5): 435–444.

Ho, A. 2011. Trusting experts and epistemic humility in disability. *International Journal of Feminist Approaches to Bioethics* 4(2): 102–123.

Hocevar, K.P., M. Metzger, and A.J. Flanagin. 2017. Source credibility, expertise, and trust in health and risk messaging. *Oxford Research Encyclopedia of Communication.*

Huo, J. 2020. Why guidelines for face masks are so varied during the coronavirus crisis: Goats and soda. *NPR*, April 10. https://www.npr.org/sections/goatsandsoda/2020/04/10/829890635/why-there-so-many-different-guidelines-for-face-masks-for-the-public. Accessed September 8, 2021.

Islam, S.N., H.W.J. Cheng, K.S. Helgason, N. Hunt, H. Kawamura, and M. Lafleur. 2020. Variations in COVID strategies: Determinants and lessons. *United Nations DESA Working Paper* 172. https://www.un.org/en/desa.

Javid, B., M.P. Weekes, and N.J. Matheson. 2020. Covid-19: Should the public wear face masks? *BMJ* 369: m1442.

Karni, A., and M. Astor. 2020. As leaders urge face masks, their behavior muffles the message. *The New York Times*, April 22. https://www.nytimes.com/2020/04/22/us/politics/coronavirus-masks.html. Accessed September 8, 2021.

Kass, N.E. 2001. An ethics framework for public health. *American Journal of Public Health* 91(11): 1776–1782.

Kenyon, C. 2020. Widespread use of face masks in public may slow the spread of SARS CoV-2: An ecological study. *MedRxiv*. Preprint April 6. https://doi.org/10.1101/2020.03.31.20048

Kidd, I.J. 2017. Confidence, humility, and hubris in Victorian scientific naturalism. In *Epistemic virtues in the sciences and the humanities*, edited by J. van Dongen and H. Paul. Boston Studies in the Philosophy and History of Science, vol 321. Cham: Springer.

Klompas, M., Baker, M.A., and Rhee C. 2020. Airborne transmission of SARS-CoV-2: Theoretical considerations and available evidence. *JAMA* 324(5): 441–442.

Leung, H. 2020. Why face masks are encouraged in Asia, but shunned in the U.S. *Time*. March 12. https://time.com/5799964/coronavirus-face-mask-asia-us/. Accessed September 8, 2021.

Liang, M., L. Gao, C. Cheng, et al. 2020. Efficacy of face mask in preventing respiratory virus transmission: A systematic review and meta-Analysis. *Travel Medicine and Infectious Disease* 36: 101751.

Lyu, W., and G.L. Wehby. 2020. Community use of face masks and COVID-19: Evidence from a natural experiment of state mandates in the US. *Health Affairs* 39(8): 1419–1425.

Mehta, S., F. Machado, A. Kwizera, et al. 2021. COVID-19: A heavy toll on health-care workers. *The Lancet Respiratory Medicine* 9(3): 226–228.

Min, J. 2020. Does social trust slow down or speed up the transmission of COVID-19? *Plos One* 15(12): e0244273.

Mizumoto, K., K. Kagaya, A. Zarebski, and G. Chowell. 2020. Estimating the asymptomatic proportion of coronavirus disease 2019 (COVID-19) cases on board the Diamond Princess cruise ship, Yokohama, Japan, 2020. *Eurosurveillance* 25(10): 2000180.

Morawska, L., and D.K. Milton. 2020. It is time to address airborne transmission of coronavirus disease 2019 (COVID-19). *Clinical Infectious Diseases* 71(9): 2311–2393.

Parviainen, J., A. Koski, and S. Torkkola. 2021. "Building a ship while sailing it." Epistemic humility and the temporality of non-knowledge in political decision-making on COVID-19. *Social Epistemology* 35(3): 232–244.

Reiner, R.C., R.M. Barber, J.K. Collins, et al. 2021. Modeling COVID-19 scenarios for the United States. *Nature Medicine* 27(1): 94–105.

Robling, M.R. 2020. Variable uptake of face masks could reinforce health inequalities. *BMJ* 369: m2001

Schünemann, H.J., E. Akl, R. Chou, er al. 2020. Use of facemasks during the COVID-19 pandemic. *The Lancet Respiratory Medicine* 8(10): 954-955.

Singer, N., and C. Sang-Hun. 2020. As coronavirus surveillance escalates, personal privacy plummets. *The New York Times*. April 17, 2020. https://www.nytimes.com/2020/03/23/technology/coronavirus-surveillance-tracking-privacy.html. Accessed 8 Sep 2021.

Smith, M., and R. Upshur. 2019. Pandemic disease, public health, and ethics. *The Oxford Handbook of Public Health Ethics*. Oxford: Oxford University Press.

Silva, D.S., and Smith, M.J. 2015. Limiting rights and freedoms in the context of Ebola and other public health emergencies: How the principle of reciprocity can enrich the application of the Siracusa principles. *Health and Human Rights* 17(1): E52–57.

Sutton, J., Y. Rivera, T.K. Sell, et al. 2020. Longitudinal risk communication: A research agenda for communicating in a pandemic. *Health Security* 19(4): 370–378.

Tai, D.B.G., A. Shah, C.A. Doubeni, I.G. Sia, and M.L. Wieland. 2021. The disproportionate impact of COVID-19 on racial and ethnic minorities in the United States. *Clinical Infectious Diseases* 72(4): 703–706.

Taylor, D.B. 2020. For Black men, fear that masks will invite racial profiling. *The New York Times*, May 26. https://www.nytimes.com/2020/04/14/us/coronavirus-masks-racism-african-americans.html. Accessed September 8, 2021.

The Government of Hong Kong Special Administrative Region. 2020. Latest recommendations by Scientific Committee on Emerging and Zoonotic Diseases and Scientific Committee on Infection Control after reviewing cases of novel coronavirus infection, January 24. https://www.info.gov.hk/gia/general/202001/24/P2020012400762.htm.

Tufekci, Z. 2020. Opinion: Why telling people they don't need masks backfired. *The New York Times*, March 17. https://www.nytimes.com/2020/03/17/opinion/coronavirus-face-masks.html.

Udalova, V. 2021. Pandemic impact on mortality and economy varies across age groups and geographies. *United States Census Bureau*, March 8. https://www.census.gov/library/stories/2021/03/initi

al-impact-covid-19-on-united-states-economy-more-widespread-than-on-mortality.html. Accessed September 8, 2021.

U.S. Surgeon General. 2020. [Twitter] February 29. "Seriously people- STOP BUYING MASKS! They are NOT effective in preventing general public from catching #Coronavirus, but if healthcare providers can't get them to care for sick patients, it puts them and our communities at risk!" https://twitter.com/Surgeon_General/status/1233725785283932160.

Upshur, R.E.G. 2002. Principles for the justification of public health intervention. *Canadian Journal of Public Health* 93(2): 101–103.

———. 2012. Evidence and ethics in public health: The experience of SARS in Canada. *New South Wales Public Health Bulletin* 23(5–6): 108–110.

Vahedian-Azimi, A., S. Makvandi, and L. Karimi. (2020). Cultural reasons: The most important factors in resisting wearing a mask. *Hospital Practices and Research* 5(3): 120–121.

Vaziri, A. 2020. Coronavirus: Should you wear a face mask? *Connecticut Post*, March 22. https://www.ctpost.com/news/article/Coronavirus-Should-you-wear-a-face-mask-15148966.php. Accessed September 8, 2021.

Wei, W.E., Z. Li, C.J. Chiew, S.E. Yong, M.P. Toh, and V.J. Lee. 2020. Presymptomatic transmission of SARS-CoV-2—Singapore, January 23–March 16, 2020. *Morbidity and Mortality Weekly Report* 69(14): 411–415.

Weinstein, B.D. 1993. What Is an expert? *Theoretical Medicine* 14(1): 57–73.

World Commission on the Ethics of Scientific Knowledge and Technology. 2005. The precautionary principle. UNESCO. https://unesdoc.unesco.org/ark:/48223/pf0000139578.

World Health Organization. 2020a. Advice on the use of masks in the community, during home care, and in health care settings in the context of COVID-19. *WHO*, March 19. https://apps.who.int/iris/bitstream/handle/10665/331493/WHO-2019-nCoV-IPC_Masks-2020.2-eng.pdf?sequence=14&isAllowed=y. Accessed September 8, 2021.

———. 2020b. When and how to use masks. June 5. https://www.who.int/emergencies/diseases/novel-coronavirus-2019/advice-for-public/when-and-how-to-use-masks. Accessed September 8, 2021.

Worldometer. 2021. Coronavirus cases. https://www.worldometers.info/coronavirus/. Accessed September 8, 2021.