Masks for infection prevention in a general population setting

The COVID-19 infection has created world-wide panic and for the first time in history, there is almost a universal attempt to lock down healthy people instead of the established practice of isolating and protecting the sick and vulnerable. One of these related measures are mandatory mask mandates. They vary from place to place but most require people to wear masks or face coverings of virtually any quality/construction in a public indoor setting.

Before the COVID-19 infection began and prior to the use of masks being politicized and almost venerated as the saviour of us all there was no controversy about public mandatory mask measures in other previous infections (eg. H1N1 in 2009, SARS in 2003, etc.). The idea of mandating the general public to wear masks in almost every public setting would have been ridiculous during those times. Taking the politics and rhetoric away from this debate, there simply is not any sufficient, robust objective data to justify this measure.

The use of masks for infection control is nothing new. It has been used since Victorian times but almost exclusively in the medical setting for very specific situations (eg. in the operating theatre). The medical settings are the gold standard for mask wearing. The most ideal setting is the operating theatre. Here, the masks are the best quality, they are exchanged regularly if they get wet, they are put on carefully and correctly and the face is never touched afterwards. The room is controlled, the temperature is ideal. However, while there is no doubt wearing a mask in the operating room is almost universal and they do block transfer of large particles (eg. blood, sputum) the evidence that they are good at reducing infection is not conclusive and is in fact disputed. Research into the effectiveness of masks in the operating theatre as an effective infection control measure has been done over many decades and there is no definitive evidence that even in this ideal world that wearing a mask is effective. A comprehensive review in 2014, "Unmasking the surgeons: the evidence base behind the use of facemasks in surgery (J R Soc Med. 2015 Jun; 108(6): 223–228) looked at the literature to date and concluded, "there is a lack of substantial evidence to support claims that facemasks protect either patient or surgeon from infectious contamination. A Cochrane Database Systematic Review, "Disposable surgical face masks for preventing surgical wound infection in clean surgery" (Cochrane Database Syst Rev. 2014 Feb 17;(2):CD002929), reached similar conclusions. It cannot be emphasised enough that the literature prior to COVID-19 in a medical setting with the most ideal conditions failed to show that masks were effective at reducing infections. How much less can we expect from general public masking where conditions are far from ideal and we are dealing with the smallest type of infection, a virus measuring 0.1 micron in diameter.

There has been data showing how incorrect mask applications can actually be harmful. The majority of the public choose to wear cloth masks for reasons of comfort and reusability but these are not only ineffective but potentially dangerous. A cloth mask has very large pores that the virus can pass through quite easily. As mentioned, COVID-19 measures about 0.1 micron (about 100X smaller than a bacteria). To put things in perspective, an N95 mask, which is amongst the highest grade of mask available is rated to block up to 95% of particles measuring 0.3 microns or

bigger. Even the highest grade of protection available officially is 3x too big for the COVID-19 virion. One study in 2015 looked at cloth masks (A cluster randomised trial of cloth masks compared with medical masks in healthcare workers | BMJ Open) and concluded:

> "This study is the first RCT of cloth masks, and the results caution against the use of cloth masks. This is an important finding to inform occupational health and safety. Moisture retention, reuse of cloth masks and poor filtration may result in increased risk of infection."

This study also showed further risks such as viruses may survive on the masks themselves and self contamination was possible due to incorrect donning and offing of masks, which is almost universally seen in the general population.

If we now go to the present time and look at the research available specifically on COVID-19 and masks we find little true objective data. Most is anecdotal, observational and has been politicised on both sides of the field. There has only been one randomised controlled trial that dared take this matter up, the DANMASK-19 study (Effectiveness of Adding a Mask Recommendation to Other Public Health Measures to Prevent SARS-CoV-2 Infection in Danish Mask Wearers: A Randomized Controlled Trial: Annals of Internal Medicine: Vol 174, No 3 (acpjournals.org) looked at this and despite desperately wanting to find objective evidence that masks works, they could not. Mask mandate supporters in the media tried to spin that data as somehow actually supporting mask use but the data in it clearly showed there was no benefit of wearing masks. Not surprisingly there has been no further randomized controlled studies being done for fear of further showing lack of effectiveness. Even many of the manufacturers of medical and disposable grade masks now specifically mention on the box that their masks are not rated and do not protect the wearer from COVID-19 or other viral infections.

Even the observational data in the world must lead an objective viewer to question the value of mandatory masks. A comparison of two large states in the USA, California and Florida, is instructive. Both are amongst the largest and most populous states but with very different approaches to COVID-19. California has the most draconian mask laws and lock down rules whereas Florida is essentially open and back to normal. The infections and death rates in California have been considerably higher than Florida.

There are those who say even if there's no definite evidence that masks work, they still say we should wear one. They argue we should do everything possible to try to curb this virus and transmission and it is better than doing nothing so why not do it? However, if we accept this premise, we could argue almost any restrictive measures on the population without good evidence (unfortunately, that is what we are seeing anyways with other measures) and we are subject to the arbitrary whims of those in charge. In addition, wearing a mask in public is not harmless. It's clear that we are designed to breathe through our nose and mouth without any obstructions. This is simple biology and is meant for the best health of the individual. We only obstruct our airways when there is true benefit and even then, only temporarily and for the shortest time possible (eg. wearing a carbon filter mask while in an industrial setting is hard to do but will protect the wearer from damage to the lungs). Having the public wear masks, most of which are often wet, dirty,

reused, and incorrectly worn, can lead to health problems and inhaling pollutions and secretions over and over.

There is also the harm of giving the public an illusion that if they wear masks they will be protected and will not get COVID-19. This may give those at highest risk (the elderly and immunocompromised) a sense of false security. They may then expose themselves to risky situations thinking their mask will protect them. Personally, I have seen many patients (including health care workers) both in the hospital and in my clinic, whom had active COVID-19 infection or have recovered from it. I would have to say that the vast majority have diligently worn their masks as directed by the health authorities. This is seen also in every province with the waves of cases we are seeing. Despite almost universal mandatory mask policies and varying forms of lockdowns in Canada the cases have risen far higher than when COVID-19 began in the spring of 2020 prior to any mask mandates. The failure of masks to clearly curb cases illustrates their ineffectiveness in the real world setting.

The Association of American Physicians and Surgeons have set up a comprehensive webpage, (Mask Facts - AAPS | Association of American Physicians and Surgeons (aapsonline.org), discussing the properties of various classes of masks, the nature of how COVID-19 infection can occur (droplet and aerosolised), and have given a very detailed overview of relevant studies over the decades looking at masks and their usefulness in infection control. The website is objective and references the peer reviewed literature extensively. A review of the resources there shows some salient key points:

1. COVID-19 viral particles are smaller than any of the mask ratings including N95 masks.
2. Cloth masks have virtually zero efficiency in blocking COVID-19 particles.
3. Mask wearing technique in the general public was abysmal with about 10% success.
4. Dozens upon dozens of studies and reviews over the decades looking at various masks and their effectiveness at reducing viral infections show the preponderance of studies do not show any benefits.
5. Real world data from various countries show that cases increased after mask mandates were enacted and countries that had no mask mandates (eg. Sweden) did just as well or better than countries with mask mandates
6. Physiological studies show potential harms of masks including decreased paO2 (ie. Oxygen levels in blood), headaches, self contamination due to moisture retention. Some of these are referenced directly from the World Health Organization. Whether these potential harms are of clinical significance is certainly debatable but must be considered when deciding if masks should be mandatory. If no definite benefit can be demonstrated from masking then it is not reasonable to potentially subject the population to these potential harms.

For governments to impose infection control measures on the population they need to demonstrate their measures are reasonable, safe, and most of all effective. Mandatory masking meets none of those criteria. They are not reasonable as they restrict a patient's face, identity, and breathing for

significant portions of the day. They place an unreasonable expectation that the population will wear the "correct" types of masks, put on the masks and leave the masks on correctly. They are not safe since they are not worn correctly by the vast majority of the population leading to risks of self contamination, airway obstruction, and leading to a false sense of security. They have not ever been proven to be effective in control of viral infection either in the current situation or in the previous decades. For all these reasons, there is no justifiable reason that masking should be imposed and forced upon anyone.

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[redacted], MD, FRCPC
Internal Medicine and Respirology
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