

Expert Report on effectiveness of masking for the Alberta College & Association of Chiropractors

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Purpose

The purpose of this report is to demonstrate the scientific and medical benefit of the current SARS-CoV-2 (the virus that causes COVID-19) guidance on masking and its benefits in reducing transmission of the SARS-CoV-2 virus. Ultimately, there is an overwhelming body of evidence suggesting that masking can reduce the transmission of COVID-19, particularly in a healthcare setting when medical-grade masks are used and worn appropriately.

Introduction

As vaccination rates increase and COVID-19 cases decrease across Canada and globally, it is important to examine the mechanisms playing a role in mitigating COVID-19. Mask wearing, among other measures such as physical distancing, were clearly and demonstrably effective in reducing the transmission of COVID-19.

Masks are a form of protective device, designed to protect the person wearing the mask and protect those in their immediate surroundings. Mask use dates back to the 1600s, however, of notable interest is the work of Wu Lien Teh, a Malaysian physician. In the early 1900's he helped curb the spread of the Manchurian Plague. His work in controlling this plague has been deemed as “a milestone in the systematic practice of epidemiological principles in disease control”, in which Wu identified the cloth mask as ‘the principal means of personal protection.’”¹

The use of masks and other non-pharmaceutical interventions was recommended by the World Health Organization (WHO) as an important control measure, and have often been used during periods of infection in a variety of settings (SARS, influenza).² For example, A Cochrane review conducted in 2011 examined the use of masks on the spread of respiratory viruses in 2011. The review included 67 randomized control trials and observational studies. The results indicated that “masks were the best performing intervention across populations, settings and threats.”^{1,3} The data collected during those times contributed to the implementation of the current mandatory mask by-laws. This data was further strengthened as a result of the current pandemic, proving the efficacy of mask use and contributing greatly to the academic literature.

Methods

Literature was gathered from databases such as PubMed, JSTOR, Cochrane Library (databases that contain different types of high-quality, peer-reviewed evidence to inform healthcare decision-making),⁴ McMaster's Health Evidence (Database with quality-rated systematic reviews),⁵ JAMA, among other highly reputable sources and databases. A vast majority of

literature is from the years 2020-2021 with emphasis on literature published in 2021, as it is the most up-to-date and evidence informed.

Benefits of masking

As the pandemic progressed, high-quality, reliable data and evidence was published detailing the many challenges surfaced by COVID-19. The vast majority of evidence presented was by credible, academic sources indicating mask use does reduce the rate of transmission in both clinical and laboratory settings. Below are multiple studies detailing the effectiveness of mask use in response to the statements made by Dr. Thomas Warren, Dr. Bao Dang and Dr. Byram Bridle.

COVID-19 is highly transmissible and is spread through respiratory droplets that travel from an infected person to a non-infected person. In areas with poor ventilation and no mask use, these droplets have an easier time moving freely and infecting others.⁶

The use of mask-wearing as a form of protection was implemented early in the pandemic in an attempt to curb the rapidly transmitting virus and respiratory droplets. To reduce transmission and spread to others, studies indicate that physical distancing in conjunction with measures such as mask-wearing can reduce the probability of droplet spread.¹

To further prove this point, a 2021 study indicated that mask use can block the virus from being expelled into the air and thereby significantly reducing the transmission and exposure of COVID-19 from an infected person (asymptomatic and symptomatic) to those in their general surroundings.⁶ A laboratory experiment examining the effectiveness of different types of masks was conducted and revealed that the use of multilayer cloth masks can block 50%-70% of COVID-19 droplets. These cloth masks form a protective barrier and reduce the droplets from leaving the masks and landing on uninfected individuals.⁶

A large outbreak of COVID-19 occurred on the USS Theodore Roosevelt. Data indicates that those on board wearing a mask were at a 70% lower risk of testing positive for COVID-19.⁶ Many real-world studies indicate the effectiveness of mask use, for example: a systematic review conducted by Ayouni et al. indicated that non-pharmaceutical control measures such as mask use, were indeed successful in reducing COVID-19 transmission.⁷ MacIntyre & Chughtai conducted a rapid systematic review on the efficacy of face masks.⁸ The review suggests that mask-wearing could be beneficial during a COVID-19 outbreak in the community and health care settings. Liang et al. conducted a systematic review and meta-analysis showing that mask-wearing by health workers and non-health workers and in the general community is efficient in preventing the infection.⁹ Zeng et al. showed that wearing masks in public is crucial as a preventive measure to ensure a significant reduction in the daily infected cases.¹⁰ The World Health Organization

sponsored a systematic review by Chu et al., proving that “face mask use could result in a large reduction in risk of infection.”¹¹

The Public Health Agency of Canada produced a COVID-19 brief titled: *Does wearing a mask in public decrease the transmission of COVID-19?* The brief is summarized below.¹² Results from 15 observational studies showed decreased transmission with mask use. A longitudinal study conducted in the United States found that with every 10% increase in the use of masks, transmission control was much more likely. Of importance, a study was conducted with two hairstylists in the United States, each who had tested positive for COVID-19. Each stylist wore masks consistently throughout the day while unknowingly positive for the virus. Due to their mask use, no clients (n=139) tested positive despite being in close contact. In 27 ecological studies, n=26/27 (96%) of these studies demonstrated that face mask policies were associated with a decrease in COVID-19 infections and deaths.¹²

A study conducted in Ontario examining mask policies showed a 25%-31% weekly reduction in COVID-19 cases. Similarly, three studies examined the mandated mask policies in the workplace and found that COVID-19 infections and death decreased.¹²

A recent systematic review with a high AMSTAR rating concluded that the use of masks did reduce the risk of contracting and transmitting COVID-19. Overall, the Public Health Agency of Canada brief, using evidence-informed data, concludes that mask use decreases transmission in the community.¹²

Masking for healthcare workers

Healthcare workers have an increased probability of contracting COVID-19. In a prospective cohort study using a COVID-19 Symptom Study app, HCWs on the front line had a ‘threefold increased risk of reporting a positive COVID-19 test and predicted COVID-19 infection, compared with the general community, even after accounting for other risk factors.’¹⁴

According to the Canadian Chiropractic association “the chiropractic profession in Canada today is best described as a regulated, primary health care profession with particular expertise in the care of the spine and extremity articulations.”¹³ This statement indicates that chiropractors are a health care worker (HCW), and must adhere to proper health and safety protocols mandated by their designated association and government. Mask use by all healthcare workers was mandatory since the beginning of the pandemic. Failure to wear a mask when with patients, increases the transmissibility of COVID-19.

Evidence of the importance of mask use among HCWs is very robust, and indeed there is a rather overwhelming body of evidence supporting the use of masking in healthcare settings to reduce the transmission of SARS CoV-2.

One study indicated that the “universal masking of health care workers (HCWs) and patients can help reduce transmission of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infections.”¹⁵ This study was conducted in Massachusetts in one of the largest healthcare systems and published in the Journal of the American Medical Association (JAMA), one of the world’s leading medical journals. Upwards of 75,000 employees were subject to routine COVID-19 screening and testing in conjunction with a mask policy for all employees and patients. Data from this hospital indicates that masking was indeed successful in mitigating COVID-19 transmission and infection. Prior to the mandatory mask policy at this hospital, infections among the HCWs increased dramatically “from 0% to 21.3% (a mean increase of 1.16% per day).” After the mask policy was implemented, “the proportion of symptomatic HCWs with positive test results steadily declined, from 14.7% to 11.5% (a mean decrease of 0.49% per day).”^{15,16} It is important to note that throughout the implementation of the mask policy, the number of COVID-19 positive cases in Massachusetts was increasing, further proving that the use of mask are effective.

The scientific evidence for masking was reinforced in a systematic review and meta-analysis published in The Lancet (one of the world’s most reputable medical journals)¹⁷. This review assessed 172 different studies of various measures used to reduce SARS-CoV-2 transmission in healthcare settings, including masking, eye protection, and physical distancing. 44 studies were included in a meta-analysis, which found an adjusted odds ratio of 0.15 (95% CI 0.07-0.35) for transmission events when wearing a mask. In essence, the odds of transmission were 85% lower when wearing a mask. This is one of the world’s most comprehensive studies to date on the effectiveness of masking in reducing healthcare setting transmission.

If we look closer to home in Alberta, there is clear evidence of benefit to mask wearing in healthcare settings. During the pandemic number of COVID-19 inpatient units were established at major hospitals across the province. These units only admitted patients with COVID-19 who were actively infectious. Until vaccine was available in early 2021, the primary protection healthcare workers had was personal protective equipment which was primarily in the form of medical-grade masks. The AHS recommendations for much of the pandemic were for healthcare workers to engage in continuous masking when seeing these patients. Over tens of thousands of interactions between COVID-19 infectious patients and healthcare workers, there were only a handful of transmission events to healthcare workers. This evidence is so compelling since these healthcare workers were working in the highest possible risk setting - one where every patient they interacted with was COVID-19 positive and infectious.

Due to the overwhelming body of evidence supporting masking in the healthcare worker setting, every major public health and healthcare organization, ranging from AHS to PHAC to the US CDC recommended masking in healthcare settings.

Summary

The evidence for masking in healthcare settings, and indeed even in community settings (e.g., indoor public places) to help reduce the transmission of SARS-CoV-2 is simply overwhelming. While there does exist “anti-masking movements” in Alberta, Canada, and all across the world, even these groups tend to focus on masking in the community as opposed to the healthcare setting. There are virtually no healthcare workers, public health experts, epidemiologists, or scientists who would argue against masking in a healthcare setting, particularly when the prevalence of COVID-19 is relatively high as it has been for Alberta for most of 2020 and the first half of 2021.

Response to statements by other experts

Below are excerpts of statements made by Dr. Thomas Warren, Dr. Bao Dang and Dr. Byram Bridle. Each statement has been responded to with evidence-informed responses in favour of COVID-19 measures and masking in specific.

Dr. Thomas Warren states that:

“The risk of death due to COVID-19 in persons under 60 is very small. In Canada, there have been 1,010 COVID-19 related deaths in persons < 60 years old as of April 16, 2021. In Canada in 2018 there were 1,191 motor vehicle fatalities in persons under 55.45 So, the risk of death due to COVID-19 in persons < 60 is less than the risk of death due to a motor vehicle fatality.”

However, as of June 29, 2021, there have been 1,475 COVID-19 related deaths <60 years old in Canada. Therefore, the risk of death due to COVID-19 is still high, higher in fact than deaths from motor vehicle fatalities. In Canada, there have been 26, 273 deaths related to COVID-19.^{18,19}

Notwithstanding the factual error, it is fallacious and unscientific to equate death rates by age in the context of a global pandemic with those of car accidents. At a minimum, it is a false dichotomy no scientist, physician, epidemiologist or public health official with a basic understanding of disease patterns would make. As demonstrated by how public health agencies and governments across the world reacted, a population health issue of this magnitude required a systematic and national response which protected all citizens, regardless of their level of vulnerability.

Dr. Warren continues to state that:

“Asymptomatic transmission does occur but the rates of transmission from asymptomatic persons is substantially less than from symptomatic persons and does not warrant being considered a significant contributor to the overall transmission burden.”

Using decision analytic modeling examining asymptomatic individuals with COVID-19 and their infectious periods, the CDC released a report in 2021 indicating that nearly 60% of all COVID-19 cases are a result from people who are carrying the COVID-19 virus, but who exhibit no symptoms. This contradicts the previous statement made by Dr. Warren - asymptomatic transmission is high and does contribute to the transmission burden.¹⁹

Similarly, Dr. Byram Bridle states:

“Testing of asymptomatic people for the presence of portions of the SARS-CoV-2 genome does not make medical nor economic sense. Positive test results cannot be interpreted in a clinically meaningful way. Also, there is no substantial evidence to suggest that people who are

asymptomatic represent a substantial risk of causing COVID-19-related hospitalizations or deaths in others”

As stated above, asymptomatic individuals do cause a substantial risk of increased COVID-19 transmission, making asymptomatic testing extremely important from a medical and economic sense. This statement by Dr. Bridle has no scientific evidence and proves a lack of understanding of asymptomatic transmission and its deadly effects on the community.

Beyond the factual errors of the above statements contained within these expert reports about the severity of COVID-19, rates of transmission among asymptomatic infected individuals, testing, etc., - none are actually salient to the question at hand around whether or not masks provide benefit in a healthcare setting. With respect to masking, the experts make a number of factually incorrect statements.

With respect to the evidence for effectiveness of masking, Dr. Warren states that:

“In the absence of evidence from randomized controlled trials [RCTs] and meta-analyses, the WHO report on masking from December 1, 2020 references a number of other types of studies... these studies have significant limitations that need to be considered”

While it is correct that there are few RCTs on masking, there is an overwhelming burden of evidence from other studies showing the benefits of masking. Furthermore, it is not ethical to do RCTs on masking given its significant benefit - an analogy would be while there are no RCTs on the benefits of using a parachute when jumping out of plane, this doesn't mean that there is no evidence that parachutes stop being from dying when jumping out of a plane.

Dr Bridle argues that masking is not helpful given the aerosol route of transmission:

“masking lacks rationale in the context of SARS-CoV-2 spreading via aerosols”.

With respect to the transmission of SARS-CoV-2, while we know that aerosol transmission (e.g., transmission beyond the typical 2 metre range for contact & droplet transmission) does occur. However, most transmission does occur via contact & droplet spread. Even with aerosol transmission, masks do appear to provide protection.

Dr Bridle's critique of how well masks fit and mask pore size being too large to screen out SARS-CoV-2 in no way negate the huge body of real-world ecological evidence that masks reduce transmission as we describe in our report. We are not arguing that masks are 100% perfect at preventing transmission, but it is clear they provide significant amounts of protection and dramatically reduce transmission of the virus, especially in healthcare settings.

Dr. Bao Dang asserts a false causation between masking mandates and population level of transmission:

“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”

This statement is false and has not been backed up by any evidence. The use of masks has **decreased** the transmission of COVID-19 across every country that has imposed them. It is incorrect to assume there is a direct cause and effect relationship between a national mask-use policy and rates of infection. As Dr. Dang must know, there are multiple variables determining the impact of a mask policy: level of adherence to public health measures, effectiveness of enforcement mechanisms, effectiveness of contact tracing and outbreak control measures, population composition, political milieu, and credibility of public health institutions, to name a few. While the efficacy of mask-wearing on disease transmission is beyond doubt, how entire nations deploy a mask mandate is complex and can't be reduced to a simplistic “look what happened in Sweden” argument.

Lastly, both Dr Dang and Dr Bridle make unsubstantiated claims that there are “numerous harms associated with masking”. There are no known harms associated with masking and public health guidance early in the pandemic highlighting the possibility of self-inoculation by donning and doffing masks is now recognized to be incorrect. Indeed, public health experts including Dr Theresa Tam have walked back any statements alluding to the potential harms and increased infection risks of masking.

Summary

The vast majority of the expert reports focus on trying to downplay the seriousness of COVID-19 and various public health approaches we have used to contain the pandemic. Notwithstanding the fact that these statements are generally inaccurate, they do not address the question at hand around the evidence of masking in reducing viral transmission. When these experts do comment on the evidence for masking, they rely on older studies for non SARS-CoV-2 viruses and tend to comment on some of the imperfections of mask wearing. What they do not do is account for the overwhelming body of evidence that has emerged on the benefits of masking in reducing SARS-CoV-2 transmission.

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