COVID-19 Scientific Advisory Group Rapid Evidence Report

Topic: Evidence of Harm from Mask Use for Specific Populations

- 1. Is there evidence of harm arising from mask use (medical or cloth) in specific patient populations, including people with medical conditions?
- 2. Are there guidelines to inform mandatory mask exemption policies?

Context

- Alberta municipalities have created by-laws guiding their policy of mandatory public mask use. Appendix 1 provides an overview of the individual by-laws in Alberta- NOTE: while most acknowledge exemptions, they provide limited evidence based justification for the exemptions listed
- Universal masking is not a replacement for social distancing, hand & cough hygiene and symptomatic individuals who should remain in self-isolation
- This rapid review does not address general guidelines for the use of masking in the community as a preventative strategy for the spread of SARS-CoV-2 as it is addressed in a previous review: Effectiveness of Wearing Masks to Reduce Spread of COVID-19 in the Community

Key Messages from the Evidence Summary

- Several municipalities have created guidelines and policy for masking exemptions for individuals, though little evidence exist to justify specific population's exemption status and policing such policies have proved challenging.
- There is insufficient evidence to justify mask exemptions for specific populations based upon their medical condition. However, individuals that are unable to wear a mask due to their exemption status should AVOID all circumstances where they are unable to appropriately physical distance from others.
- In a systematic review, Bakhit and colleagues (2020) found insufficient data to quantify any of the identified potential adverse effects that might reduce the acceptability, adherence, and effectiveness of face masks to prevent the spread of SARS-CoV-2.
- The limited research available indicates that the adverse experiences of wearing a mask may include a perceived increased work of breathing; possible clinically insignificant increases in C02, possible increase in risk of headaches in those with a baseline history of headache (though this was observed in health care workers wearing N95 masks). There is a lack of specific research in people with underlying lung issues however extant data and experience are reassuring: the Canadian Thoracic Society suggests individuals with chronic respiratory conditions should NOT be exempt as a population from wearing masks where physical distancing may not be achieved. This group of patients may also be at higher risk should they contract COVID-19 infection.
- Given the small potential for adverse reactions (such as headache for those prone to headaches, increased sense of dyspnea, etc.) providing education to the general population on how to mitigate these challenges, as well as how to address possible population specific difficulties with mask wearing (such as individuals health or neurodevelopmental disorders that result in sensory or other issues that render wearing a mask difficult if not impossible) would be beneficial

Recommendations

1. There is no clear evidence to identify specific populations that should be exempt from wearing masks in public to prevent the spread of SARS-CoV-2. Individuals that self-identify as being exempt from wearing masks in public settings should refrain from visiting public settings where physical distancing is not possible.



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Last Updated: 08/20/20 ECC Approved: 08/21/20 Rationale: Current public health guidance is that masks should be worn in situations where it is not possible to physically distance, so in situations where a mask cannot be worn, then physical distancing must be maintained. Cloth masks and medical masks may both be recommended in community use (with medical masks preferred for individuals with elevated risk of severe COVID-19 infection - see Effectiveness of Wearing Masks to Reduce Spread of COVID-19 in the Community. It should be noted that fit tested N95 masks are not felt to add benefit outside use for AGMP in healthcare settings and are more difficult to tolerate.

2. There is no current evidence to support specific, standard mask exemptions based on medical conditions (such as people living with chronic respiratory conditions), and exemptions may be detrimental. Other difficulties may affect an individual's ability to wear a mask (for example neurodevelopmental or psychiatric conditions) and such individuals should preferentially be provided with support (including education, counselling as relevant) to try to address the challenges before exemption is considered.

Rationale: The Canadian Thoracic Society advises that individuals with chronic respiratory conditions (not experiencing an acute exacerbation) should follow masking guidelines, as they may be more prone to coughing. In the event they are unable to wear a mask, they should avoid all settings where physical distancing is not feasible.

Practical Considerations

- 1. The World Health Organization (2020) guidance, based on expert opinion, suggests wearing of masks may be problematic for children, developmentally challenged individuals, those living with mental illness, elderly individuals with cognitive impairment, persons with chronic respiratory or breathing problems (such as asthma/COPD), individuals who have had facial trauma or recent oral maxillofacial surgery, as well as individuals residing in hot and humid environments. The Canadian Thoracic Society suggests individuals with chronic respiratory conditions should not, as a population, be exempt from wearing masks on clinical grounds.
- 2. In Alberta, where some municipalities have passed local mask bylaws, they have also created policies to guide mask exemptions for the populations they serve (see Appendix 1 for an overview of current existing by-laws/regulations). While there is a lack of evidence to identify populations that should automatically be exempt from wearing masks in public spaces there are common groups identified for possible exemption from wearing masks across the province. These guidelines are in general agreement with the WHO recommendations and also provide specific caveats for circumstances where all individuals may be exempt from wearing masks (such as eating, drinking or swimming).
- 3. In all circumstances where an individual is not able to wear a mask due to any reason, physical distancing must be maintained.
- 4. It is likely not feasible to require medical proof of exempt status, and doing so would create a significant burden for health care providers and individuals who identify as requiring exemption.

Limitations of this review

Due to the nature of a rapid review the following limitations apply:

-Rapid turnaround time resulted in a limited time to conduct a thorough search of the research and grey literature.

-Given the limited research on this topic and rapidly developing body of evidence, several of the included research studies are pre-prints (not yet peer reviewed) and studies presented include small sample sizes.

Summary of Evidence

Research Question 1: Is there evidence of harm arising from mask use (medical or cloth) in specific patient populations, including people with medical conditions?

There is no evidence that clearly identifies specific populations that are at risk of adverse outcomes/harms related to the use of masks (medical or cloth) in public spaces.

General Population

Dorfman and Raz (2020) state that clinicians must make the determination whether an individual should be exempt from wearing a mask in public spaces. They advocate that children with sensory processing disorders may be unable to wear masks, as well as those with facial deformities that impact the individual's ability to wear a mask. In the United States, a medically necessary exemption from wearing a mask is a disability modification under the Americans with Disabilities Act (ADA) that is legally protected (Dorfman & Raz, 2020).

A survey of young adults in Poland (Matusiak et al, 2020) found of the 876 respondents, 35.9% self-reported that wearing a mask made it difficult to breath. Almost one quarter of respondents (21.3%) found it both warm, and contributed to fogging up of glasses. Only 3.1% indicated no discomfort with wearing a mask. Those surveyed used cloth masks, surgical masks and a variety of respirators. It is hypothesized that these results may have been affected by the variety of masks used.

A study by Chen and colleagues (2016) of 15 subjects wearing a respiratory monitor determined that compared with no respirator, wearing N95 mask increased respiratory amplitude, muscle activity and fatigue of abdominal, and fatigue of scalene. However the researchers state the physiological responses to breathing resistance of wearing a N95 mask for five minutes in sitting and walking are relatively minor and should be typically well tolerated by healthy individuals (Chen, 2016).

A study of twenty subjects that participated in exercise on a treadmill at a pace of 5.6 km/h for 1h with and without wearing a surgical mask found the surgical masks increased respiratory rate by 1.6 breaths/minute (p=0.02), heart rate by 9.5 beats/minute (p<0.001), and transcutaneous CO2 levels of 2.2 mmHg (p<0.001) (Roberge et al., 2012). The researchers concluded that the use of surgical masks for one hour at a typical activity level is not associated with clinically significant physiological impact or significant subjective perceptions of exertion or heat. Persons et al (2017) evaluated the effect of wearing a surgical mask during six minute walk test (6MWT) in 44 healthy subjects. They determined distance traveled was not impacted by wearing a mask (P=0.99); however dyspnea perception (measured with a visual analog scale) was significantly higher while wearing a surgical mask (+5.6 vs. +4.6; P<0.001), no other differences were found (Persons et al., 2017). Lee and Wang (2011) assessed the impact of wearing N95 face masks on breathing resistance (measured by nasal airflow resistance during inspiration and expiration) in 14 healthy participants. The study demonstrated a mean increment of 126 and 122% in inspiratory and expiratory flow resistances, and an average reduction of 37% in air exchange volume with the use of N95 respirators (Lee & Wang, 2011).

In a pre-print systematic review/meta-analysis Bakhit and colleagues (2020) reviewed literature addressing the downsides of wearing facemasks in any setting. A total of 40 articles, representing 37 studies were included in the review (qualitative analysis) and 11 studies were included in the meta-analysis. They found insufficient data to quantify all of the adverse effects that might reduce the acceptability, adherence, and effectiveness of face masks. The qualitative analysis suggested that communication while wearing a mask is a concern for HCWs, however studies of communication using telephones and in occupational settings did not demonstrate any differences with and without masks.

Health Care Workers

Elisheva (2020) studied 343 health care workers (HCWs) working in settings treating individuals with COVID-19. Of the respondents, 314 indicated they experienced adverse effects from prolonged mask use with headaches being most common (n = 245). Additionally, acne was described by 182 participants and skin breakdown was cited by 175 participants. Impaired cognition was reported in 81 respondents. However, previous history of headaches (n = 98), skin sensitivity (n = 164), and acne (n = 121) were identified in participants. Ong and colleagues studied the experience of headaches in 158 HCWs. Pre-existing primary headache diagnosis was present in 46/158 (29.1% of participants. A total of 128 (81.0%) respondents developed PPE-associated headaches. A pre-existing primary headache diagnosis (OR = 4.20, 95% CI 1.48-15.40; P = .030) and combined PPE usage for >4 hours per day (OR 3.91, 95% CI 1.35-11.31; P = .012) were associated with the experience of headaches. Of note, both of these studies occurred with HCWs that would have been wearing PPE (rather than non-medical masks) for extended periods of time in a healthcare setting and results should be cautiously applied to other settings-such as general public.

Individuals with Epilepsy

Asadi-Pooya & Cross (2020) state there is no direct evidence in the literature to address whether individuals living with epilepsy should be exempt from wearing masks. Hyperventilation (which may be simulated by wearing a mask) may cause seizure activation. Thus, it may be inappropriate to suggest all individuals with epilepsy be required to wear masks. However, the authors also suggest it is probably not reasonable to suggest avoid wearing masks for individuals with epilepsy under any circumstances.

Individuals with Chronic Respiratory Illness

Individuals living with chronic respiratory illness that are not experiencing an acute exacerbation are advocated to wear masks in public spaces, as per local regulations (Bhutani, 2020). An individual with a chronic respiratory illness may be at higher risk for severe disease or complications of SARS-CoV-2 and may be at higher risk for spreading the virus due to the higher likelihood of a pre-existing chronic cough (Dorfman & Raz, 2020). No evidence is presented that suggests wearing a mask will exacerbate a chronic respiratory condition.

Mental Health Implications

In a survey of 2001 HCWs exploring the psychosocial implications associated with working in a hospital during the SARS outbreak reasons masks were found to be bothersome included: physical discomfort (93%); difficulty communicating (47%), challenges recognizing individuals (24%) and sense of isolation (13%) (Nickell et al., 2004).

A Polish study of 564 individuals before public masking regulations and 1476 individuals after masking regulation were implemented found face mask regulations increased the level of perceived self-protection as well as the level of social solidarity ($p\leq0.01$) and thereby improve mental health wellbeing of respondents (Szczesniak et al., 2020).

Brand et al (2011) found of 46 individuals in military training with a protective mask phobia that attended an intensive course, 44 (95.7%) participants reported they no longer suffered the phobia after 15 weeks and that they were fully symptom-free. This study demonstrates promising preliminary results that mask phobia may be treated through intensive intervention.

There is a lack of evidence to clearly identify the required exemptions for individuals living with mental illness. Advocacy organizations suggest each individual is the expert in their own experiences, one agency suggests severe impairment resulting in mask exemption may include (https://www.mind.org.uk/information-support/coronavirus/mask-anxiety-face-coverings-and-mental-health/#DoIHaveToWearAMask):

If wearing a mask triggers acute symptoms of a mental health condition such as:

•panic attacks, flashbacks or other severe anxiety symptoms

•paranoia or hearing voices

•dissociating, or switching alters (something that happens to people with dissociative identity disorder) •thoughts of self-harm or suicide.

Research Question 2: Are there guidelines to inform mandatory mask exemption policies?

The Canadian Thoracic Society provides guidelines related to the mandatory mask exemption policies (2020). Bhutani and colleagues (2020) state individuals with underlying lung disease should follow masking recommendation to reduce the risk of spreading the SARS-CoV-2 virus. In the event that an individual is unable to tolerate mask wearing the CTS suggest they avoid settings where physical distancing is not feasible. There is no evidence that the wearing of a mask will exacerbate any chronic lung conditions, however wearing a mask may require additional breathing effort. Where individuals experience shortness of breath from the mask, they should remove it and if necessary follow their usual approach for managing acute symptoms. Additionally, the CTS document indicates there is no evidence that wearing a mask will lead to prolonged symptoms or symptom worsening for those that have an underlying lung condition. If wearing a mask remains challenging they suggest individuals avoid settings where physical distancing is not feasible. The World Health Organization (2020) suggests wearing of masks may be problematic for children, developmentally challenged individuals, those living with mental illness, elderly individuals with cognitive impairment, persons with chronic respiratory or breathing problems (such as asthma/COPD), individuals who have had facial trauma or recent oral maxillofacial surgery, as well as individuals residing in hot and humid environments.

The Public Health Agency of Canada (2020) and The Centre for Disease Control (2020) both state masks should not be required for young children under age 2, anyone who has a breathing disorder, or is unconscious, incapacitated or otherwise unable to remove the mask without assistance.

Evolving Evidence

As noted, many of the SARS-CoV-2 research regarding self-collection of samples for diagnostic testing is new, requiring further research with larger study samples. The evidence will continue to be assessed as new information is provided.

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(If applicable) Date of re-assessment:

Authorship and Committee Members

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Appendix A

COVID-19 mask bylaws

City/Area Bylaws

Edmonton:

Effective August 1st, the city bylaw states that a person must wear a face covered at all time whilst in an indoor, enclosed, or substantially enclosed public place or in a public vehicle. Violation of these bylaws results in a fine of \$100. This does not apply to:

- Person's under the age of 2
- Persons who are unable to place, use, or remove a face covering without assistance
- Persons unable to wear a face covering due to mental or physical concern or limitation, or protected ground under the *Alberta Human Rights Act*
- Persons consuming food or drink in designated seating areas or as part of religious or spiritual ceremony
- Persons engage in water activities or physical exercise
- Persons providing care or assistance to a person with a disability where a face covering would hinder that caregiving or assistants
- Persons engaging in services that require the temporary removal of a face covering

The city has launched a mask exemption card scheme where the public can receive a card stating they are exempt. Those who need an exemption card are not required to give proof for why it is needed. Mask exemption cards are available at various recreation centres and leisure centres in Edmonton. *Calgary:*

From the 1st of August, failure to wear a face covering where required can result in a penalty of \$50. Proof is not required if someone has an exception. Businesses are also not expected to deny services as not everyone is required to wear a face covering. The bylaw mandates that face coverings be worn in the following places:

Places	Examples
Public transit	Buses, shuttles and CTrains
Public vehicles for hire	Taxis, Ridesharing businesses, Vehicles for hire
Public indoor spaces	Malls, grocery stores, retail businesses, churches
City of Calgary facilities	Recreation centres, City Hall, City of Calgary buildings

Exceptions to the face coverings bylaw include:

- Children under 2 years of age
- People with underlying medical conditions or disabilities inhibiting their ability to wear a face covering
- People who are unable to place, use or remove a face covering safely without assistance
- People who are eating or drinking at a public premises that offers food or beverage services
- People engaging in an athletic or fitness activity
- People who are caregiving for or accompanying a person with a disability where wearing a face covering would hinder the accommodation of the person's disability (for example, the ability to lip read)
- People who have temporarily removed their face covering where doing so is necessary to

Lethbridge:

On Monday, July 28, City Council decided:

- 1. Face coverings will be mandatory on Lethbridge Transit starting Aug 4.
- 2. Face coverings will be mandatory in City of Lethbridge facilities starting Aug 7 (e.g. libraries, airport, museum, city hall etc.)
- 3. City administration shall prepare a bylaw for Council's consideration to mandate face-coverings for citywide indoor public spaces. This was presented to Council Aug 10 for first and second reading. Third reading is scheduled for Aug 24.

Some mask exemptions will be allowed, including:

• Children under 2



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- People with underlying medical conditions or disabilities that prevent them from safely wearing a face covering and those who cannot wear or remove one without assistance
- People eating or drinking inside public spaces that offer food or beverages
- People who are exercising or engaging in athletic activities
- Caregivers or those accompanying someone with a disability

• People who need to temporarily remove their face covering to provide or receive a service *Banff:*

In an effort to contain the COVID-19 spread and protect the health, safety and well-being of residents and visitors to the Town of Banff, non-medical masks will be mandatory within enclosed public spaces as well as within the Town's pedestrian zone of the 100 and 200 Blocks of Banff Avenue and Caribou Street effective noon on July 31, 2020. To ensure compliance within the Town, bylaw officers will be monitoring, and anyone found not wearing a mask in the required areas may be subject to a \$150 fine. This Bylaw does not apply to:

a) A child who is younger than two (2) years of age, or a child who is under five (5) years of age chronologically or developmentally and who refuses to wear a Mask and cannot be persuaded to do so by their caregiver;

b) A Person with a medical condition, including breathing or cognitive difficulties, or a disability, that prevents them from safely wearing a Mask;

c) A Person who is unable to put on or remove their Mask without the assistance of another Person;

d) A Person who is hearing impaired, or communicating with a Person who is hearing impaired, where the ability to see the mouth is essential for communication;

e) A Person who needs to temporarily remove their Mask, provided they are able to maintain a distance of at least six feet from any Persons who are not members of the same household or Cohort, for the purposes of: i. Receiving services that require the removal of their Mask;

ii. Actively engaging in athletic or fitness activity in an Establishment such as a sports facility, sports club, gym, yoga studio, or other similar Establishments;

iii. Consuming food or drink; or

iv. An emergency or medical purpose.

f) Those outdoor spaces not included in the Pedestrian Zone as depicted in Schedule A of this Bylaw. *Canmore:*

The Mandatory Mask Bylaw compels residents, visitors, and businesses to wear a mask or face covering in all public indoor settings (some exceptions apply). This bylaw is intended to be temporary. It will come into effect as of August 7, 2020, at 12:00 p.m. The bylaw mandates that face coverings be worn in the following places or a \$100 fine will be given:

Place	Example
Public transit	Roam Transit
Public vehicles for hire	Taxis, shuttles
Public indoor spaces	Malls, grocery stores, retail businesses, churches
Town of Canmore facilities	Canmore Recreation Centre, Elevation Place, Civic Centre

Exemptions include:

- children under 2 years of age;
- persons with an underlying medical condition or disability which inhibits their ability to wear a face-covering;

• persons who are unable to place, use or remove a face covering safely without assistance;

• persons who are eating or drinking at a public premise that offers food or beverage services in designated seating areas;

• persons engaging in an athletic, fitness or water activity, the latter being an activity where their face may be submerged in water, including but not limited to persons employed as a lifeguard;

• persons who are caregiving for or accompanying a person with a disability where wearing a face covering would hinder the accommodation of the person's disability; or

• persons who have temporarily removed their face covering where doing so is necessary to provide or receive a service.

Jasper:

As of August 4, face masks, or face coverings, are required on Jasper's downtown sidewalks and in all public indoor spaces. Face coverings are required:

- On the west side of Connaught Drive between Hazel Avenue and Aspen Avenue;
- On Patricia Street between Hazel Avenue and Pyramid Lake Road;
- On all connecting public sidewalks between those streets;
- On all public sidewalks where a 2 metre distance cannot be maintained; and
- In all public indoor spaces, including all businesses, facilities, patios and indoor areas that are open to the public.

There are several exceptions to the rule, including:

- 4.1.1 children under the age of 2 years;
- 4.1.2 persons with medical conditions, disabilities, including cognitive disabilities, which prevent, limit or restrict the person's ability to wear a face covering;
- 4.1.3 persons who are unable to place, use or remove a face covering without assistance;
- 4.1.4 persons who are hearing impaired or who are communicating with a person who is hearing impaired, where the ability to see the mouth is essential for communication;
- 4.1.5 persons who are consuming food or drink at assigned seating within the indoor public place from which the person obtained the food or drink;
- 4.1.6 persons who have temporarily removed their face covering in order to receive or provide a service, including an emergency medical service.

St Albert

St. Albert city council passed a bylaw requiring face coverings inside public spaces on Tuesday, Aug. 4. Masks or face coverings will be mandatory beginning on Aug. 8. As of Aug. 1, people in St. Albert had already been required to wear face coverings on St. Albert Transit and inside city facilities that provide services to the public, including St. Albert Place, Servus Place and St. Albert Public Library.

Face coverings must be worn by everyone, unless you fall under one of the following exceptions.

- Children under 10 years of age
- People who cannot put on, use or remove a face covering without assistance
- People who are unable to wear a face covering due to a mental or physical condition, disability or limitations or because of one of the grounds on which discrimination is prohibited under the Alberta Human Rights Act
- People who are eating or drinking while seated in a designated food and drink seating area or as part of a religious or spiritual ceremony
- Those engaged in swimming or other water activities, or engaged in physical exercise or other physical activities, within designated areas
- People providing or receiving care or assistance for a mental or physical condition, disability or limitation and a face covering would hinder providing or receiving that caregiving or assistance
- People providing or receiving a service that requires personal consultation if that activity occurs in a closed office or meeting room and all participants in the personal consultation at all times maintain physical separation of at least 2 metres from each other
- A participant in a dance, theatrical or musical public performance, if all participants in the performance maintain at least 2 metres physical distance from each other and do not enter the area where the public is viewing the performance
- A transit operator, if barriers are in place to create physical distancing between the transit operator and passengers in the transit vehicle

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Spruce Grove

Effective Aug. 1, the City of Spruce Grove will require the use of face coverings on all transit routes (both commuter and local routes). This aligns with a recent decision by the City of Edmonton to make face coverings mandatory on public transit. Spruce Grove Transit is linked with Edmonton's transit system and this allows for a consistent approach. A limited supply of disposable masks will be available on Spruce Grove Transit local routes (Route 568) for those who board without one.

Young children (under the age of two) and those with underlying health conditions will not be required to wear a face covering.

Strathcona County

Similar to Spruce Grove, from August 4 masks are mandatory on all transit routes. This is aligns with Edmonton policies.

Beaumont

In order to help prevent the spread of COVID-19 and avoid business closures, city council approved a bylaw requiring face coverings to be worn in all publicly-accessible indoor places and public vehicles, effective Friday, August 14. Bylaw exemptions include:

- children under two or a child under five (chronologically or developmentally) who refuses to wear a face covering and cannot be persuaded to do so by their caregiver
- people with a medical condition or disability that prevents them from wearing a face covering
- people seated in a restaurant, bar or other premises where food or drink is served, or
- people engaging in physical activity
- schools and child care facilities

Cochrane & Airdrie

No bylaws relating to masks, however both councils have stated that should they have 10 or more active cases then bylaws would be introduced.

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List of Abbreviations

AHS: Alberta Health Services COVID-19: Coronavirus Disease-2019 SAG: Scientific Advisory Group KRS: Knowledge Resource Services HCW: Health Care Worker