

COVID-19 Scientific Advisory Group Rapid Evidence Report

**Evidence of Harm from Mask Use for Specific Populations in the
Community**

May 17, 2021



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Lay Summary

- Wearing a non-medical or cloth face mask is an important part of current public health measures to help reduce community spread of COVID-19. It does not replace physical distancing, hand hygiene, or staying home when you are sick.
- When we make a recommendation that affects all Albertans we consider both the good and bad of that intervention. We know that some people find mask wearing challenging. We explored the science to find out what the possible risks are of wearing masks in the community, for the general public, as well as for specific groups such as those living with chronic respiratory conditions (like asthma, and chronic obstructive pulmonary disease), children, and others.
- In this review we found that the risks of wearing a face mask are not increased for those with chronic respiratory disease. We know that most problems with mask wearing are related to the amount of time a mask is worn (the longer you wear a mask, the more likely you are to have problems). Also, we found you should not use a N95 mask unless it is required, since more problems are reported with N95 masks than non-medical or cloth masks.
- For the general public, mask wearing is very safe. The most common complaints people have about wearing a mask are skin problems (like itch, rash, or flare ups of existing problems like acne or dermatitis) and headache. It is suggested you use preventative therapy (such as moisturizers) if you are prone to skin problems. Some people perceive that they have a harder time breathing, but the science shows us that it does not affect our lung function or oxygen levels, or cause a buildup of carbon dioxide. Most mask related problems can usually be improved with prevention measures.
- Another important step is to ensure your mask fits well and the straps are not too tight. Also, changing your mask frequently (keeping your skin dry) may help your skin. Where possible, take a break from mask wearing (especially when outside, alone and with physical distancing).
- If you have young children, it is important to consider if they can safely wear a mask, put it on and take it off on their own, and avoid touching the mask and their face. Children as young as 2-5 years old may be able to do this, but the role of mask use and the reliability of mask wearing in this age group have not been well studied. Some children may have medical conditions that make it too difficult to wear a mask.
- Mask use is helping us to reduce the spread of COVID-19 in the community. We know some people may experience minor discomforts. If mask wearing is intolerable due to these discomforts, the individual should talk to their doctor for additional ideas on how to improve their symptoms and make mask wearing easier.

Authorship and Committee Members

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Topic: Evidence of Harm from Mask Use for Specific Populations in the Community [Update: May 17, 2021]

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

Context

- The Government of Alberta has issued a provincial requirement that specifies masking for individuals in public spaces. In addition, some Alberta municipalities have created by-laws around mandatory public mask use
- As this review is focused on evidence of harm associated with mask wearing in the community setting (cloth & medical masks), harms associated specifically with N95 are not included, although data from studies where N95 masks were included as part of a study comparing medical or cloth masks have been included. Of note, N95 masks are not currently advocated for use in the community setting.
- Universal masking is not a replacement for physical distancing or hand & cough hygiene, and symptomatic individuals 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. This topic is addressed in a previous review: <https://www.albertahealthservices.ca/assets/info/ppih/if-ppih-covid-19-sag-mask-use-in-community-rapid-review.pdf> and by other public health guidelines.
- Appendix 2 provides an overview of the current local bylaws in the largest municipalities in Alberta. The bylaw documents do not provide evidence-based justifications for the exemptions listed.
- Although not the main focus of this literature review, it should be noted that mask exemptions may be sought by individuals with psychological reactance, a motivational response to rules or regulations that are perceived as threats to one's sense of control, autonomy, or freedom of choice, with individuals asserting their freedom by rejecting rules and regulations (Taylor & Asmundson, 2021). This may be characterized by counter-arguments, anger, and denying the need to wear masks by denying the seriousness of the pandemic. It is acknowledged that this is not a medical reason for mask exemption or an indicator of mask related harm, however possible mitigation strategies from a focused literature search are suggested in the Practical Guidance section, specifically Table 2.

Key Messages from the Evidence Summary

- Several municipalities have created guidelines and policies for masking exemptions for individuals, though little evidence exists to justify specific exemptions, and enforcing these policies has proved challenging.
- There is insufficient evidence to justify standard mask exemptions for specific populations based upon their medical condition, but there is also no evidence against the possibility of exemptions. Individuals who are felt to be unable to wear a mask on a case-by-case assessment basis should ideally AVOID all circumstances where they are unable to appropriately physical distance from others.
- Although evidence to support mask exemptions is limited, many guidelines and recommendations advocate that very young children (usually ranging below an age of 2-

5), children with specific medical diagnoses, individuals with developmental disabilities or cognitive impairment, persons for whom wearing a mask would create a risk to workplace health, safety or job duties, and individuals with facial trauma or recent surgery may be appropriately exempted from mask use.

- 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 CO₂, 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), and possible worsening of skin conditions (such as allergic contact dermatitis, acne, itch and dryness).
- COPD: There is limited specific research in people with underlying lung disease such as COPD, 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. Individuals with COPD have not demonstrated significant physiologic changes in gas exchange measurements after the 6-minute walk test using a surgical mask, as well as during activities of daily living. These patients may also be at higher risk should they contract COVID-19 infection. Chronic respiratory disease is not a reason for an exemption from wearing a mask (no evidence exists to demonstrate a mask may exacerbate a chronic respiratory condition), unless the individual is in acute respiratory distress.
- Children: Wearing a facemask has not been associated with changes in respiratory status or clinical signs of respiratory distress in infants and children. Children with certain diagnoses (e.g. developmental delay, respiratory concerns, tactile aversion, or other conditions) may find that wearing a mask is unsafe or not feasible. Additionally, children with hearing impairments may have difficulty with masking, and very young children wearing masks may touch their faces more often.
- The World Health Organization and UNICEF advocate that children under five years of age should not wear a mask as a form of source control based on child safety concerns, but recognize that children may reach developmental milestones at different ages (World Health Organization, 2020a). For children ages 6-11 years, a risk-based approach should be used. The World Health Organization (2020) guidance, based on expert opinion, suggests wearing of masks may be problematic for children (particularly children with developmental disabilities and communication concerns), 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 Center for Disease Control stipulates that masks should not be worn by children under 2 years of age, a person with a disability who cannot wear a mask, a person who cannot safely wear a mask for reasons related to the disability, or a person for whom wearing a mask would create an occupational risk. When communicating with someone with a hearing impairment, consider a clear mask or a cloth mask with a clear panel, use written communication, closed captioning, or decreasing background noise to improve communication.
- Numerous evidence-informed or expert opinion based guidelines and recommendations have been published and address the challenges of age limitations for mask use for children. Recommendations fluctuate between the age limits of 2-5 years. Those that recommend commencing mask use at older age limits provide rationale that includes child safety, ability to take on and off the mask with minimal support, likelihood of

increased facial touching, and feasibility. All sources advocate for special considerations for children with certain medical diagnoses (such as developmental delay, respiratory concerns, tactile aversions etc.) that may make mask use unfeasible or unsafe.

- Given the potential for some adverse reactions (such as headache for those already prone to headaches, increased sense of dyspnea, skin lesions, irritant dermatitis, worsening of acne, and perceived facial warmth), 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 would be beneficial. Examples include individual health or neurodevelopmental disorders that result in sensory or other issues that render wearing a mask difficult if not impossible.

Recommendations

1. There is no clear evidence to support identification of specific populations that should be routinely exempted from wearing cloth / medical masks in public as a component of the public health 'bundle' of activities recommended to prevent the spread of SARS-CoV-2. *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 <https://www.albertahealthservices.ca/assets/info/ppih/if-ppih-covid-19-sag-mask-use-in-community-rapid-review.pdf>). It should be noted that fit-tested N95 masks are not currently recommended outside of use for AGMP in healthcare settings, and are generally felt to be more difficult to tolerate. 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.
2. There is no current evidence to support specific, routine mask exemptions for individuals based on medical conditions (such as people living with chronic respiratory conditions), and exemptions may be detrimental as people with many chronic medical conditions are at elevated risk of severe COVID-19. Other difficulties may affect an individual's ability to wear a mask (for example neurodevelopmental, psychiatric conditions, cognitive impairment, documented safety considerations, hearing impaired persons in emergent situations that rely on lip reading), and such individuals should preferentially be provided with support (including education, counselling as relevant) to try to address these 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. The World Health Organization (World Health Organization, 2020b) states those with higher risk of severe complications from COVID-19 (individuals > 60 years old and those with underlying conditions such as cardiovascular disease or diabetes mellitus, chronic lung disease, cancer, cerebrovascular disease or immunosuppression) should wear medical masks when physical distancing is not feasible.

Practical Considerations

1. In Alberta, some municipalities have passed local mask bylaws. These municipalities have also created policies to guide mask exemptions for the populations they serve. See Appendix 2 for a selection of current existing bylaws/regulations from Alberta's largest 6 cities. 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).
2. In all circumstances where an individual is not able to wear a mask due to any reason, physical distancing must be maintained.
3. Requiring medical proof of exempt status would create an added burden for health care providers and individuals who identify as requiring exemption, and this burden should be considered along with the potential benefit of an objective standard of verification.
4. The use of non-medical masks for children requires they be able to apply and remove the mask independently, and refrain from repeated touching of the face/mask. Expert opinion varies on advising mask use wearing between ages 2-5, and there is a lack of data on the degree of mask compliance which is feasible, on potential harms (safety, communication, developmental), and on the degree to which masks might reduce transmission in this age group. Children with certain medical conditions (e.g. developmental delay, respiratory concerns, tactile aversions, etc.) may require assessment regarding mask exemption.
5. Strong anti-mask attitudes with psychological reactance (PR) may be a possible cause for seeking a mask exemption. PR is a negative reaction to rules or limitations on freedoms, which may result in anger when beliefs are challenged, with subsequent reinforcement of anti-mask beliefs. Confronting non-mask-wearers is not recommended (CDC). Messaging strategies that emphasize individual choices, and altruism/positive impacts on others and community safety have been proposed (see Table 2).

Research Gaps

Research related to the use of cloth/non-medical mask in the community is evolving rapidly due to the COVID-19 pandemic. While there is an increasing body of knowledge related to mask use, there are several key research gaps to consider. We have limited knowledge of the long-term implications of mask use, particularly for those that wear masks for long duration, and for children. There are significant gaps in overall evidence for efficacy and safety of masks in preschool children. Management of psychologic reactance to public health interventions is also not well studied. There is an increasing interest in the role of mask in environmental waste, plastic creation and waste, and the implications for environmental health. Additionally, many of the reviewed studies have small sample size, are limited to case studies, or rely on individual self-report for data collection. Future research with robust methodology, including randomized controlled trials, would better inform the evidence base on this topic.

Strength of Evidence

In the months since this review was first conducted (August, 2020) there has been an increase in research focusing on the potential adverse outcomes of face masks, both for the general public and specific populations-with particular attention to HCWs. The primary research available is limited to small studies, predominantly observational, cross-over, cohort studies, with only one RCT of note. In addition, much of the data published on adverse reactions has been self-reported survey studies, particularly with HCW populations.

Limitations of this review

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

1. Rapid turnaround time associated with this request for an update resulted in a limited time to conduct a thorough search of the research and grey literature.
2. 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?

Evidence from the primary literature

General Population

Haraf et al. (2021) conducted a focused literature review of the physiological and psychological impact of wearing various types of face coverings at rest and during exercise for healthy subjects and individuals with heart and lung disease. Mask wearing can be impacted by moisture, heat, and humidity that may contribute to perceived comfort and increased work of breathing (Haraf et al., 2021). Exhaled moisture has been demonstrated to have minimal to no effect on breathing resistance in respirators (N95), and there is minimal evidence that wearing a mask inhibits oxygen uptake or exhalation of carbon dioxide (Haraf et al., 2021). In respirator masks (N95), evidence has varied on the basis of workload and duration of use. Studies in healthy individuals identified subjective concerns, including warmth, sweating, itching, and irritation but reported no change in objective measures of oxygenation at rest and low-intensity exercise (Haraf et al., 2021). They concluded the effects of wearing a mask at rest and during exercise are negligible and the perceived impact is greater than the measurable impact (Haraf et al., 2021).

Canadian researchers evaluated 44 individuals randomly allocated to three mask groups of 48 (N95, surgical, no mask) with two exercise subgroups for each mask group (MAX, n = 24; SUB, n = 24) (Ahmadian et al., 2021). Participants in each experimental group were assessed for their hemodynamic and hematologic function at baseline and during exercise recovery. No significant differences were noted for hemodynamic or hematologic function at exercise recovery compared to baseline with regard to mask type ($P > 0.05$). Heart rate (HR) for maximal intensity was significantly greater at 1 min post-exercise in N95 as compared to surgical mask ($P < 0.05$). No differences were noted for hemodynamic and hematologic function with N95 and surgical compared to no mask for either intensity ($P > 0.05$). Thus, they concluded that wearing a face mask (N95/surgical) while exercising has no detrimental effects on hemodynamic/hematologic function in this patient population (Ahmadian et al., 2021).

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 breathe. Almost one quarter of respondents (21.3%) found it warm and felt it 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 an 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).

An observational study of 11 healthy volunteers assessed CO₂ levels during regular breathing while donning 1) no mask, 2) JustAir® powered air purifying respirator (PAPR), 3) KN95 respirator, and 4) valved-respirator; cloth/medical masks were not tested in this research (Rhee et al., 2021). Serial CO₂ measurements were taken at a frequency of 1-Hz for 15 minutes to determine if National Institute for Occupational Safety and Health (NIOSH) limits were breached. Percent mean (SD) changes in CO₂ values for no mask, JustAir® PAPR, KN95 respirator and valve respirator were 0.26 (0.12), 0.59 (0.097), 2.6 (0.14) and 2.4 (0.59), respectively (Rhee et al., 2021). Face mask use (KN95 and valved-respirator) had slight increases in CO₂ concentrations, however the levels still remain within the NIOSH limits for short-term use. The clinical significance remains undetermined and there should not be a concern in their use (Rhee et al., 2021).

In a prospective cross-over study of 12 healthy males, Fikenzer et al. (2020) reported that pulmonary function parameters were significantly lower with mask use (forced expiratory volume: 5.6 ± 1.0 vs 5.3 ± 0.8 vs 6.1 ± 1.0 l/s with surgical mask, N95 mask and no mask, respectively; $p = 0.001$; peak expiratory flow: 8.7 ± 1.4 vs 7.5 ± 1.1 vs 9.7 ± 1.6 l/s; $p < 0.001$). The maximum power was 269 ± 45 , 263 ± 42 and 277 ± 46 W with surgical mask, N95 and no mask, respectively; $p = 0.002$; the ventilation was significantly reduced with both face masks (131 ± 28 vs 114 ± 23 vs 99 ± 19 l/m; $p < 0.001$). It is important to note the findings of this small study have been subject to further debate by Hopkins et al. (2020) and Kampert et al. (2020), challenging the findings as they did not perform pulmonary function testing, data is incompletely listed and fails to support findings, and the model of blood flow redistribution is used inaccurately.

In a systematic review/meta-analysis, Bakhit et al. (2021) 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. Studies suggested that N95 masks were perceived to have greater impact on communication than surgical masks, as well as significant differences in adverse reaction reports including headache, difficulty breathing and pressure on the nose. In comparison between cloth and medical masks, similar rates of discomfort were reported, with discomfort increasing over time (Bakhit et al., 2021).

There is no evidence that masks result in significant physiologic decompensation or that risk compensation and fomite transmission are associated with mask wearing (Czypionka et al., 2021). The psychological effects of masks may include perceived threats to autonomy, social relatedness, and competence. Evidence suggests that the potential benefits of wearing masks likely outweigh the potential harms when SARS-CoV-2 is spreading in a community. In healthy individuals masks do not produce any clinically relevant changes in circulating O₂ or

CO₂ concentrations, and do not seem to impact tidal volume or respiratory rate (Scheid et al., 2020).

Conversely, Tornero-Aguilera & Clemente-Suárez (2021) reported the impact of surgical mask use in cognitive and psychophysiological response of 50 university students. The use of surgical mask during a 150 min university lesson produced an increased heart rate and a decrease in blood oxygen saturation, not significantly affecting the mental fatigue perception, reaction time and time, frequency and nonlinear heart rate variability (Tornero-Aguilera & Clemente-Suárez, 2021). One consistently documented negative impact of wearing a mask for a long period of time is an increase in the development of headaches in people with a history of headaches, more commonly with N95 masks, as well as longer duration of use (Scheid et al., 2020).

Lastly, the exponential increase in face mask production and use across the world has created a new environmental challenge, with plastic particle waste generated from mask disposal (Fadare & Okoffo, 2020). Additionally, mask production may contribute to occupational health concerns such as interstitial lung disease (Kern et al., 1998; Turcotte et al., 2013). This data has raised a possible concern for individuals reusing disposable masks, as it may increase polypropylene inhalation.

Exercise Participants

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).

Among 50 adult volunteers the use of cloth masks and surgical masks were used to assess oxygenation and ventilation at rest and during physical activity (Shein et al., 2021). There were no episodes of hypoxemia or hypercarbia (0%; 95% confidence interval 0–1.9%); there were no statistically significant differences in either CO₂ or SpO₂ between baseline measurements without a mask and those while wearing either kind of mask, both at rest and after activity (Shein et al., 2021). A small cross-over study of 25 older adults self-monitoring SpO₂ before, during and after wearing a mask engaging in regular activities found that wearing a nonmedical face mask was not associated with a decline in oxygen saturation in older participants (Chan et al., 2020).

In contrast, Person et al. (2018) conducted a prospective study on 44 healthy subjects of the six minute walk test with and without a surgical mask. Distance walked was not modified by the mask ($P=0.99$). Dyspnea variation was significantly higher with surgical mask (+5.6 vs. +4.6; $P<0.001$) and the difference was clinically relevant. No difference was found for heart rate or oxygen saturation.

Certain exercise related activities may be higher risk for transmission. Video footage of professional football players was used to assess close body contact and frequency of infection-risky behaviours (Wong et al., 2020). In a 90 min match, the average duration of close contact between professional football players was 19 min and each player performed an average of 52 episodes of infection-risky behaviours. Secondly, they conducted a controlled laboratory, within-subject, repeated measures study of 23 healthy volunteers using treadmill exercise. The heart rate and the rate of perceived exertion (RPE) were recorded. The heart rate and RPE of subjects wearing a facemask was 128 beats per minute and 12.7 respectively. In those without a facemask, the results were a heart rate of 124 beats per minute and a RPE of 10.8 (Wong et al., 2020).

The WHO advocates that adults children should not wear a mask during exercise and should rather focus on other mitigation strategies such as maintaining at least a 1-metre distance from others, limiting the number of children together, and hand hygiene (World Health Organization, 2020b, 2020c). Others suggest masks should be used in any environment considered to be of a high or moderate transmission risk, following an individual assessment and when tolerable for physical activity (Shurlock et al., 2021).

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 (2020) 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 the general public.

A survey of 381 individuals was conducted in Italy to assess adverse reactions to PPE in HCWs and the community (Battista et al., 2021). There were respiratory symptoms in 80.3% of respondents and 68.5% had pressure-related skin lesions. Most of the affected individuals were healthcare staff and manifestations were predicted by wear of more than 6 hours/day. Adverse reactions were higher in the healthcare staff wearing N95/FFP2 respirator masks (Battista et al., 2021). Bhatia et al. (2020) has noted two recent studies from Hubei, China found 97% of HCWs (n=526/542) and 71% of HCWs (n=234/330) reported skin barrier damage. The majority experienced skin dryness/tightness (70.3%) and desquamation (62.2%) commonly occurring on the nasal bridge (83.1%), more prevalent among HCWs wearing N95 masks and goggles for more than 6 hours a day (Bhatia et al., 2020).

Seventy-five HCWs were assessed in a prospective observational cohort study to assess physiological effects of N95 and PPE in critical care setting (Kumar et al., 2020). There is a statistically significant difference in the physiological parameters post-doffing compared with baseline: Heart rate (p < 0.001); oxygen saturation (p < 0.001); PI (p < 0.001). Increased discomfort with continuous use of N95 FFR was reported, although exertion increased only marginally. The major adverse effects noted with PPE use were fogging, headache, tiredness, difficulty in breathing, and mask soakage (Kumar et al., 2020).

A cross sectional study was conducted to evaluate the impact of using facial mask and nitrile gloves on epidermal barrier function and skin homeostasis of 34 HCW (Montero-Vilchez et al., 2021). Transepidermal water loss (22.82 vs 13.69 g·m⁻²·h⁻¹), temperature, and erythema (411.43 vs 335.52 arbitrary units) were significantly increased at the area covered by mask, whereas stratum corneum hydration was lower. Transepidermal water loss was greater at the area covered by a surgical mask than at a filtering respirator mask coded filtering facepiece 2 (27.09 vs 18.02 g·m⁻²·h⁻¹, P = 0.034).

An observational study of 33 HCW in India assessed the prevalence of cheilitis (Singh et al., 2020). The most common symptoms were lip tightness (63.64%) and chapping (57.57%), followed by burning sensation, smarting, and itching. The most common signs were flaking (72.73%), scaling (45.46%), and swelling (39.39%). Generalized lip dryness, that is, cheilitis simplex (n = 21, 63.64%), was the most frequent pattern of cheilitis. Angular cheilitis was seen in 12 patients (36.36%), whereas perioral involvement was seen in 5 patients (15.15%). Cheilitis venenata was observed in 10 patients (30.30%), associated with N95 mask contact (Singh et al., 2020).

Conly et al. (2020) conducted a review of the use of face masks versus particulate respirators. Adverse events related to the use of particulate respirators included facial dermatitis, increased work of breathing, respiratory fatigue, impaired work capacity, increased oxygen debt, early exhaustion at lighter workloads, elevated levels of CO₂, increased nasal resistance, and increased non-compliance events requiring to self-contamination (Conly et al., 2020). These challenges were less important with medical face masks.

A survey of 440 HCWs identified 90.2% of participants self-identified as having skin problems, predominantly dryness, itching, cracking, burning, flaking, peeling and lichenification (Daye et al., 2020). A total of 22.3% (n = 98) stated that the use of PPE increased the severity of their previously diagnosed skin diseases and allergies (P < .01) and problems were higher in those using a mask with metal nose bridge (P: .02 and P: .003, respectively), and increased mask use was associated with acne (P: .02) (Daye et al., 2020). Similarly, a survey of 1156 HCW found 31.6% reported itch (Krajewski et al., 2020). Sensitive skin, allergic predisposition and previous facial dermatoses significantly predisposed users to the development of itch (Krajewski et al., 2020). The type of face mask used most frequently impacted itch; it was most common in those wearing respirators (N95/FFP2) (32.6%). Cloth masks caused itch in 20% of users (p < 0.001), and 26.9% reported itch with surgical mask use (p = 0.158).

A survey conducted of 375 HCWs in Turkey found participants with preexisting headache was 114 (30.4%) (Köseoğlu Toksoy et al., 2021). Participants stated their mask use as: 26 (6.9%) used a filtering mask, 274 (73.1%) used a surgical mask, and 75 (20.0%) participants used a combination of both masks. Of those with pre-existing headache, 77 (67.5%) healthcare workers had reported an aggravation in their headache after mask use. De-novo headache was observed in 116 (30.9%) of participants (Köseoğlu Toksoy et al., 2021). There was a worsening in headache in 7.7% in those who used filtering masks, in 19% of those using surgical masks, and in 30.7% of those who used both in combination. There was a statistically significant worsening in headache in those who used both masks in combination (P = 0.021) (Köseoğlu Toksoy et al., 2021). Another survey of 423 HCW (67% using N95 and 33% wearing surgical masks) found the following adverse reactions of mask use: headache (23%), nasal dryness (22%), eye dryness (19%), acne (12%) (Shubhanshu & Singh, 2021). Yet another survey of 526 HCWs in Turkey found a fivefold increase in acne complaints among those using any mask (Metin et al., 2020). An international survey of 1156 HCW in critical care found adverse effects of PPE were associated with longer shift durations and included heat (1266, 51%), thirst (1174,

47%), pressure areas (1088, 44%), headaches (696, 28%), inability to use the washroom (661, 27%) and extreme exhaustion (492, 20%) (Tabah et al., 2020).

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, individual considerations need to be assessed to determine appropriate mask use for individuals with epilepsy. However, the authors also suggest it is probably inappropriate to suggest a general avoidance of masks for individuals with epilepsy.

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). Chronic respiratory disease is not a reason for exemption from wearing a mask, unless the individual is in acute respiratory distress, at which time they should not be in a public setting (Soriano et al., 2020).

Samannan et al. (2021) conducted a study to assess the changes in end-tidal CO₂ and oxygen saturation as measured by pulse oximetry before and after wearing a surgical mask. 15 house staff physicians without lung conditions (aged 31.1 ± 1.9 yr, 60% male) and 15 veterans with severe chronic obstructive pulmonary disease (COPD) (aged 71.6 ± 8.7 yr, forced expiratory volume in 1 second [FEV₁] 44.0 ± 22.2%, 100% male) completed the study. No significant changes in end-tidal CO₂ or oxygen saturation were found at any time point in either group at rest. Subjects with COPD did not exhibit significant physiologic changes in gas exchange measurements after the 6-minute walk test using a surgical mask, particularly in CO₂ retention.

Surgical masks have no physiological effect on gas exchange (as measured by end-tidal carbon dioxide and oxygen saturation) in healthy individuals and those with COPD at mild to moderate exertion, while some research has demonstrated an impact on level of comfort without evidence of any objective changes in cardiopulmonary response to exercise (including hemodynamic, pulmonary, and metabolic parameters) (Haraf et al., 2021). 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 y (p<0.01) 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.

In the previously described review, individuals with underlying anxiety may be impacted by work performance and efficiency related to perceived comfort (Haraf et al., 2021). The authors stated that underlying anxiety has been shown to be predictive of the probability of experiencing respiratory distress while wearing a mask during exercise. Individuals with Alzheimer's disease may find facial recognition difficult with masking, which may contribute to distress (Gil & Arroyo-Anlló, 2021).

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; severe impairment that may require a mask exception include (Mind, 2021):

- 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.

Interestingly, a survey of 564 respondents prior to facemask requirements and 1476 respondents after facemask requirements found mask use increased the level of perceived self-protection as well as the level of social solidarity and thereby improve mental health wellbeing (Szczesniak et al., 2020). It has been suggested that for individuals living with mental health concerns, or clinicians where the use of a mask is not feasible, other measures such as other protective equipment or limiting external contacts or exposures should be recommended (Ayuso-Mateos et al., 2021). In a review article, Campagne, 2021 suggests that communication stress is a concern with face mask use, however this concern has not been addressed adequately in the literature.

Dermatological Concerns

A randomized cross-over study of 20 health subjects evaluated short term skin reaction to N95 and medical mask use in China (Hua et al., 2020). Skin hydration, transepidermal water loss, and pH increased significantly with wearing masks. There was no significant difference in physiological values between the two types of equipment, however adverse reactions were reported with use of N95 mask and a higher score of discomfort and non-compliance (Hua et al., 2020). A study of 21 healthy subjects in Korea found skin temperature, redness, hydration, and sebum secretion were changed significantly after 1 and 6 hours of wearing a mask (Park et al., 2020).

Case reports and small descriptive studies have been conducted outlining possible skin related concerns with masking. Seven cases of tinea faciei (five patients had pre-existing plaques of tinea) were reported in India (Agarwal et al., 2021). Mean duration of mask use was 6–7 h/day with a mean duration of 6-7 days before washing. Allergic contact dermatitis was reported in a case study (Alpagat et al., 2020). Others have reported itching, redness and/or scaling involving the retroauricular region following the use of ear loop face masks (Bothra et al., 2020), as well as contact dermatitis (Xie et al., 2020). Out of the 14 cases, 5 (35.7%) patients were diagnosed to have irritant contact, 4 (28.5%) patients were diagnosed with allergic contact dermatitis, 3 (21.4%) patients developed sweat dermatitis and 1 patient was diagnosed to have pressure urticarial (Bothra et al., 2020). Facial dermatoses has been associated with mask use due to the damp and warm microenvironment; three case reports were presented (Giacalone et al., 2021). A 74-year-old male developed mild itchy, well defined erythematous, scaly lesion in the left supra-auricular area over a four week period (Mutalik & Inamdar, 2020). The individual had

psoriasis that was in remission, however it was suspected that the ear-loops of the masks resulted in the Köebner phenomenon (Mutalik & Inamdar, 2020).

A survey of 1231 participants found 767 participants (62.3%) complained of 1594 adverse skin events following mask usage (Chaiyabutr et al., 2021). Acne flare-up accounted for 32.2%, pruritus 2.1%, and greasy skin 14.7% (Chaiyabutr et al., 2021). In Thailand a survey of 833 individuals (42.9% identified as HCW) found the prevalence of face mask related adverse skin reactions was 454 cases (54.5%), of which acne was the most frequent (399; 39.9%), followed by rashes on the face (154; 18.4%), and itch symptoms (130; 15.6%) (Techasatian et al., 2020). Wearing a surgical mask showed a higher risk of adverse skin reaction, OR (95% CI) = 1.54 (1.16-2.06). Wearing of more than 4 hours/day and the reuse of masks increased the risk of adverse skin reactions adjusted OR(95% CI) = 1.96 (1.29-2.98), and 1.5 (1.11-2.02) (Techasatian et al., 2020).

An Italian review stated several potential causative allergens have been identified in masks: dibromodicyanobutane, formaldehyde, thiuram, cocospropylenediamin-guanidinium-diacetate, polyurethane, triglycidyl isocyanurate, and bronopol (Di Altobrando et al., 2020). They report up to 97% of HCWs showed skin lesions related to enhanced protection measures with most common symptoms being dryness and tightness. The general population wearing surgical, high-performance filtering and handcrafted masks for prolonged time on a daily basis may be prone to allergic contact dermatitis (Di Altobrando et al., 2020). The above listed agents can contribute to allergic contact dermatitis (Aerts et al., 2020).

Implications for Children

Eberhart et al., 2021 conducted a narrative review of the impact of masking on children. They found two paediatric studies, published in 2019 and 2020 (unspecific to COVID-19). One study (of N95 masks) collected medical parameters, and this did not suggest any harmful effects of gas exchange. Eight adult studies (four specific to COVID-19), reported that face masks commonly used did not impair gas exchange during rest or mild exercise (Eberhart et al., 2021). Interestingly, a survey of over 1 million children and youth in China found a high rate of psychological distress (10.5%), however compared with students who wore a face mask frequently, students who never wore a face mask had increased risk of psychological distress (OR, 2.59 [95% CI, 2.41-2.79]) (Qin et al., 2021).

A cohort study of infants and children wearing face masks was completed in Italy to assess oxygen desaturation and respiratory distress (Lubrano et al., 2021). Participants were monitored every 15 minutes for changes in respiratory parameters for the first 30 minutes while not wearing a surgical face mask and for the next 30 minutes while wearing a face mask. Children aged 24 months and older then participated in a walking test for 12 minutes. Among 47 children, 22 children (46.8%) were aged 24 months or younger (ie, group A), and 25 children (53.2%) were aged older than 24 months to 144 months. During the first 60 minutes of evaluation in the 2 groups, there was no significant change in group A in median (IQR) partial pressure of end-tidal carbon dioxide (Petco₂; 33.0 [32.0-34.0] mm Hg; P for Kruskal Wallis = .59), oxygen saturation (Sao₂; 98.0% [97.0%-99.0%]; P for Kruskal Wallis = .61), pulse rate (PR; 130.0 [115.0-140.0] pulsations/min; P for Kruskal Wallis = .99), or respiratory rate (RR; 30.0 [28.0-33.0] breaths/min; P for Kruskal Wallis = .69) or for group B in median (IQR) Petco₂ (36.0 [34.0-38.0] mm Hg; P for Kruskal Wallis = .97), Sao₂ (98.0% [97.0%-98.0%]; P for Kruskal Wallis = .52), PR (96.0 [84.0-104.5] pulsations/min; P for Kruskal Wallis test = .48), or RR (22.0 [20.0-25.0] breaths/min; P for Kruskal Wallis = .55). After the group B walking test, compared with before the walking test, there was a significant increase in median (IQR) PR (96.0 [84.0-104.5] pulsations/min vs 105.0 [100.0-115.0] pulsations/min; P < .02) and RR (22.0 [20.0-25.0] breaths/min vs 26.0 [24.0-29.0] breaths/min; P < .05). They concluded wearing a face mask was

not associated with changes in respiratory status or clinical signs of respiratory distress (Lubrano et al., 2021).

In an unpublished report researchers evaluated the degree to which children could recognize faces when presented with images where the faces were wearing masks versus not wearing masks (Stajduhar et al., 2021). Face masks reduced the ability of the children to perceive the faces and changed the manner in which the children processed the faces (Stajduhar et al., 2021).

Holland Bloorview Kids Rehabilitation Hospital completed a review of mask wearing for children and individuals with disabilities (Holland Bloorview Kids Rehabilitation Hospital, 2020). They state mask wearing should be feasible, developmentally appropriate, and done safely. Certain diagnoses or medical conditions (e.g., developmental delay, respiratory concerns, tactile aversion, or other conditions) may mean mask use is unsafe or infeasible. They advocate that face masks may be challenging for children with hearing impairments, and for young children wearing a mask may lead to increased face touching (Holland Bloorview Kids Rehabilitation Hospital, 2020).

According to the World Health Organization, children up to five years of age should not wear masks for source control. Children aged six to 11 years should consider a risk-based approach including intensity of SARS-CoV-2 transmission, child's capacity to comply and availability of appropriate supervision, local environment, and specific settings such as households with elderly relatives, or schools. Special considerations are required for immunocompromised children or for paediatric patients with cystic fibrosis or certain other diseases (e.g., cancer), as well as for children with developmental disorders, disabilities or other specific health conditions that might interfere with mask wearing (World Health Organization, 2020b). As stated by SickKids (2020) current evidence is unclear on the ideal approach for mask use with children, and needs to consider student ages, developmental levels, ability to practice physical distancing indoors, and community risk.

Pregnant Women

Roeckner et al., 2020 identified four studies, three cohort studies and one crossover study, comprising 42 women using a filtering facepiece while pregnant. Studies showed no significant increase in maternal heart rate, respiratory rate, oxygen saturation, and fetal heart rate between pregnant and nonpregnant women using N95 (Roeckner et al., 2020). No evidence was provided regarding prolonged use in pregnancy.

A prospective observational study to evaluate the effect of surgical and N95 respiratory mask use on maternal oxygen saturation, vital signs and result on non-stress tests in term pregnancies was conducted with 297 pregnant women (Toprak & Bulut, 2021). Oxygen saturation, systolic, and diastolic arterial blood pressure, pulse, respiratory rate, and temperature of pregnant women using surgical masks and respiratory masks were measured before and after the non-stress test, as well as mask tolerance. The effect of mask type on oxygen saturation before and after the non-stress test was found to be significant (97.1+/-1.8 corresponds to 95.3+/-2.6 for the surgical mask, $p=0.0001$; 97.8+/-1.7 corresponds to 93.7+/-2.0 for the N95, $p=0.0001$). Mask tolerance of patients using N95 was significantly higher than those using surgical masks (mean 8, 1-10, $p=0.0001$) (Toprak & Bulut, 2021).

In contrast, a two-phase controlled clinical study was conducted on 20 healthy pregnant women between 27 to 32 weeks gestation using N95 masks only (Tong et al., 2015). Exercising at 3 metabolic equivalent (MET) with N95 mask reduced mean tidal volume (TV) by 23.0 % (95 % CI -33.5 % to -10.5 %, $p < 0.001$) and lowered minute ventilation (VE) by 25.8 % (95 % CI -34.2 % to -15.8 %, $p < 0.001$), with no significant change in breathing frequency compared to

breathing ambient air. Although there were no changes in the inspired oxygen and carbon dioxide concentrations, N95 mask use during low intensity work (3 MET) reduced expired oxygen concentration by 3.2 % (95 % CI: -4.1 % to -2.2 %, $p < 0.001$), and increased expired carbon dioxide by 8.9 % (95 % CI: 6.9 % to 13.1 %; $p < 0.001$). There were however no changes in the maternal and fetal heart rates, finger-tip capillary lactate levels and oxygen saturation and perceived exertion (Tong et al., 2015).

Sensory Related Concerns

An observational study of 127 individuals with glaucoma found unsuitable face masks can cause either visual field artifacts, which may be interpreted as glaucoma progression or low test reliability (Bayram et al., 2021). The authors suggest taping the face masks' upper edges is an effective technique to prevent visual field artifacts and obtain good test reliability. A case study of six patients with the diagnosis of ocular hypertension, glaucoma suspect, or glaucoma underwent standard automated perimetry (24-2 or 10-2 SITA, Humphrey Field Analyzer) while wearing ear-loop surgical face masks (El-Nimri et al., 2020). Fogging can result in unreliable VF testing with glaucoma-like artifacts. Secure taping of the face mask to the nose bridge may minimize this problem and reduce unnecessary additional testing and follow-up visits (El-Nimri et al., 2020). A case study of a 64-year-old male referred to sudden binocular double vision, without loss of visual acuity (VA) or pain immediately after fitting the FFP2/NK95 presented sudden orbital-subconjunctival-eyelid cutaneous hemorrhage-hematoma with conjunctival protrusion from the palpebral fissure without proptosis (Ruiz-Arranz et al., 2020). A second case study found an improperly fitted face masks as a cause of artifact on standard automated perimetry (Young et al., 2020).

A study of 50 healthy subjects in an observational study demonstrated that the acoustic voice analysis procedure can continue to be performed with the use of a surgical mask for the patient (Cavallaro et al., 2021). A case study of seven subjects evaluated the type of mask and the speech signal (Magee et al., 2020). They observed significant differences in acoustic power distribution across relevant frequency bands for speech in all three mask conditions compared to no mask. The masks did not significantly influence listener-perceived intelligibility or acoustic measures of perturbation (e.g., HNR, CPPS). Measures of speech rate were lower for N95 and surgical masks, possibly as speakers compensate when wearing masks to improve intelligibility (Magee et al., 2020).

A survey of 150 adults found 46 respondents had difficulty wearing hearing aids while wearing a mask (Gaeta, 2020). A survey of 107 health students found a significant proportion experienced the onset of ocular discomfort symptoms that required the use of tear substitutes (Giannaccare et al., 2020). Eleven subjects (10.3%) described appearance or worsening of ocular discomfort symptoms, and 21 (19.6%) reported the need for daily use of tear substitutes (Giannaccare et al., 2020).

Synthesis of the Information Relating to Question 1

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.

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

Evidence from secondary and grey literature

The Canadian Thoracic Society provides guidelines related to the mandatory mask exemption policies. Bhutani et al. (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. A mask does add a slight resistance to airflow, but research suggests that no significant increase in respiratory effort is required. Masks do not appear to change oxygen concentrations or carbon dioxide levels, even in those with significant lung function impairment. However, wearing a mask may cause dyspnea in patients with underlying lung disease. 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 potential disadvantages of mask use by healthy people in the general public include: headache and/or breathing difficulties depending on type of mask used; development of facial skin lesions, irritant dermatitis, worsening acne when used frequently for long hours; difficulty with communicating clearly, especially for persons who are deaf or have poor hearing or use lip reading; discomfort; a false sense of security leading to potentially lower adherence to other critical preventive measures such as physical distancing and hand hygiene; poor compliance with mask wearing in particularly young children; waste management issues; and improper mask disposal leading to increased litter in public places and environmental hazards (World Health Organization, 2020b).

Similarly, the European Centre for Disease Prevention and Control cites the following: perceived anxiety and difficulty in breathing (may be pronounced in people with respiratory disease- although no evidence a mask exacerbates respiratory disease), adverse skin reactions, discomfort and headaches. Masks may also impede communication among people with hearing impairment (European Centre for Disease Prevention and Control, 2021).

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. The Health Information and Quality Authority of Ireland recently (April 2021) addressed the minimum age of mask use for children (Health Information and Quality Authority, 2021) - face masks or face coverings are not recommended for children under the age of 13 - and will continue with this approach. The World Health Organization advises by five years of age, children generally are able to use a mask with minimal assistance (World Health Organization, 2020a). Additionally, they state: if the lower age cut-off of 2-3 years of age is used for mask use, direct line of sight supervision by an adult is required to promote correct use of the mask and to prevent any possible harm (World Health Organization, 2020a). Masks should

not be worn by children or youth who cannot tolerate a cloth mask due to cognitive, sensory or mental health issues (SickKids, 2020).

In the United Kingdom mandatory mask exemption policy includes (but is not limited to):

- “children under the age of 11 (Public Health England does not recommend face coverings for children under the age of 3 for health and safety reasons)
- people who cannot put on, wear or remove a face covering because of a physical or mental illness or impairment, or disability
- where putting on, wearing or removing a face covering will cause you severe distress
- if you are speaking to or providing assistance to someone who relies on lip reading, clear sound or facial expressions to communicate
- to avoid harm or injury, or the risk of harm or injury, to yourself or others – including if it would negatively impact on your ability to exercise or participate in a strenuous activity
- police officers and other emergency workers, given that this may interfere with their ability to serve the public” (Department of Health and Social Care, 2021)

The Centre for Disease Control advises:

“The following categories of people are exempt from the requirement to wear a mask:

- A child under the age of 2 years;
- A person with a disability who cannot wear a mask, or cannot safely wear a mask, for reasons related to the disability;
- A person for whom wearing a mask would create a risk to workplace health, safety, or job duty as determined by the workplace risk assessment.” (CDC, 2021)

The Government of Alberta stipulates that you do not require a mask:

- When you are only with people from your own household
- If you need assistance placing, using or removing a face mask
- If you are unable to wear a facemask due to a mental or physical limitation
- When consuming food or drink
- If engaging in high intensity physical exercise
- When providing or receiving care or assistance where a facemask would hinder that caregiving or assistance
- When alone at a workstation separated by at least 2 metres from other people
- When working in farm operations
- If you are the subject of a workplace hazard assessment in which it is determined that your safety will be at risk if you wear a mask while working
- If you are separated by every other person by a physical barrier that prevents droplet transmission
- If you need to temporarily remove your facemask while in a public place for an emergency or medical purpose or to:
 - receive a service that requires the temporary removal of a facemask
 - establish your identity (Government of Alberta, 2021)

Synthesis of the Information Relating to Question 2

With limited evidence to clearly identify specific populations that require mask exemptions, public policy has focused on groups that may have difficulties with mask use, such as very young children, individuals that require the assistance of others to apply and remove a mask, individuals engaged in occupations that may be unable to wear a mask for safety reasons, and those with physical or mental illness that may impair their ability to wear a mask.

Evolving Evidence

Research on SARS-CoV-2 is continually evolving and as such the evidence will continue to be assessed as new information is provided.

Table 1. Summary of Adverse Reactions to Mask Use in the General Population

Population	Evidence	Guidelines
Children	<ul style="list-style-type: none"> -No harmful effects on gas exchange, respiratory status or signs of respiratory distress -May reduce children’s ability to perceive faces -Children and adolescents that frequently used a mask had a lower psychological distress rating that those that never used a mask 	<ul style="list-style-type: none"> -Mask wearing should be feasible, developmentally appropriate, and done safely -Certain diagnoses or medical conditions (e.g., developmental delay, respiratory concerns, tactile aversion, or other conditions) may mean mask use is unsafe or infeasible. -Face masks may be challenging for children with hearing impairments, and for young children wearing a mask may lead to increased face touching - World Health Organization guidance: children up to five years of age should not wear masks for source control -Risk based approach for children aged six and 11 years should be used
Individuals with Chronic Respiratory Disease	<ul style="list-style-type: none"> -No evidence of impact on gas exchange for individuals with COPD, even with mild-moderate activity - No evidence is presented that suggests wearing a mask will exacerbate a chronic respiratory condition. 	<ul style="list-style-type: none"> - Canadian Thoracic Society advocates that unless an individual is experiencing acute respiratory distress, they should not be exempt from mask use, although respiratory conditions are often listed as possible reason for mask exemption (particularly for children -individuals with chronic respiratory disease may be at risk of poor outcomes if they contract COVID-19 and should be encouraged and counseled on strategies to use masks in addition to hand hygiene and social distancing
Individuals with Sensory Concerns	<ul style="list-style-type: none"> -Unsuitable face masks may visual field artifacts for individuals with glaucoma -N95 fit testing resulted in a case of orbital sub-conjunctival eyelid cutaneous hemorrhage-hematoma -mask wearing may contribute to challenges with acoustic voice analysis and difficulty with hearing aid use 	<ul style="list-style-type: none"> -The CDC suggests that individuals with hearing impairments, particularly those that use lip reading for communication may be adversely impacted by mask use.
Those Living with Mental Health Conditions	<ul style="list-style-type: none"> -Mask use has been identified as contributing to a sense of isolation, but also increase level of perceived self-protection -Underlying anxiety is predictive of the probability of experiencing respiratory distress while wearing a mask and exercising 	<ul style="list-style-type: none"> Individuals with severe/uncontrolled impairments that may have difficulty wearing a mask include (Mind, 2021): •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.
Individuals with Skin Related Concerns	<ul style="list-style-type: none"> -Reported cases of dermatitis with the suspected cause of mask wearing -Skin hydration, transepidermal water loss, skin temperature, redness, sebum secretion, acne flare up, itch and pH increases have been documented with mask use. -Causative allergens have been identified in disposable masks 	<ul style="list-style-type: none"> -While skin complications are noted as possible adverse reaction, no specific exclusions are listed in the guidelines
Pregnant Women	<ul style="list-style-type: none"> -Studies show mask type (surgical vs. N95) impacts oxygen saturation, with surgical mask being superior -a review of N95 mask use during pregnancy states: N95 mask use of limited duration during pregnancy is not likely to harm the pregnant women or the fetus 	<ul style="list-style-type: none"> -No exclusions for pregnant women noted in the guidelines

Table 2. Possible Mitigation Strategies for Adverse Reactions to Mask Use by Specific Populations

Population	Guidelines
Children & Individuals with Some Disabilities	<p>When determining if children and people with disabilities should wear a mask, assess their ability to:</p> <ul style="list-style-type: none"> • Use a mask correctly • Avoid frequent touching of the mask and their face • Limit sucking, drooling, or having excess saliva on the mask • Remove the mask without assistance (CDC, 2021)
Individuals with Hearing Impairments	<p>Individuals that rely on lip reading may be challenged by others wearing masks. If you communicate with someone with this difficulty you could:</p> <ul style="list-style-type: none"> • Wear a clear mask or a cloth mask with a clear panel • Use written communication, closed captioning, and decrease background noise (CDC, 2021)
Individuals with Chronic Respiratory Conditions	<ul style="list-style-type: none"> • Evidence shows wearing a mask should not impact breathing function for individuals with chronic respiratory disease with mild-moderate activity. • If a patient has difficulty breathing wearing a mask they should seek medical care for possible worsening of disease/symptoms (Bhutani et al., 2020)
Outdoor Workers	<ul style="list-style-type: none"> • Consider temperature extremes may make mask wearing more challenging. • In cold weather, wear masks under scarves and ski masks. If masks become wet, replace often (CDC, 2021) • Prioritize mask wearing indoors, however outdoor regulations do need to be followed • Complete a work risk assessment as necessary to assess for possible safety risk of mask wearing in the work setting (CDC, 2021)
Individuals with Glasses	<ul style="list-style-type: none"> • Use masks that fit tightly over the nose, or consider masks with wire • If the problem persists, anti-fogging spray on glasses may be beneficial
Those experiencing Skin Problems related to mask use	<ul style="list-style-type: none"> • Where possible use preventative strategies-apply moisturizer to areas prone to dry skin (including a barrier for dry lips), • Change masks often, particularly with prolonged use • Individuals prone to acne may consider using preventative medication, cleansers and ensuring adequate skin cleansing regularly • Do not reuse masks-should be washed daily • If skin lesions, rashes or other concerns arise seek medical care
Individuals that Experience Headaches	<ul style="list-style-type: none"> • Mask wearing can contribute to dehydration (as individuals tend to drink/eat less while wearing masks) –encourage regular water breaks • Ensure masks fit appropriately • Do not use N95 masks when they are not required
Those Living with Mental Health Concerns	<ul style="list-style-type: none"> • Individuals with Alzheimers Disease may find facial recognition difficult with masking. Strategies to promote recognition may include, wearing photographs of face, use of clear masks, or frequent introductions and reminders (Gil & Arroyo-Anlló, 2021) • Mask related anxiety may causes symptoms similar to anxiety-suggest relaxation strategies, trying different kinds of masks for comfort, practice wearing masks in familiar setting, and if necessary speak to a health care provider
Exercise Participants	<ul style="list-style-type: none"> • WHO advises that people should not wear masks during vigorous intensity physical activity • Physical distancing is the most important mitigation measure during exercise, and outdoors settings and individual activities are preferred
Pregnant Women	<ul style="list-style-type: none"> • Wearing a mask is thought to be safe during pregnancy (Scheid et al., 2020) • Shortness of breath may occur during pregnancy, and if exacerbated by mask wearing, discuss with physician
Individuals with Epilepsy	<ul style="list-style-type: none"> • Consider trialing face masks at home to identify the most comfortable design
Individuals with possible psychologic reactance (strong anti-mask sentiments)	<p>Confrontation is not advised (CDC). Examples of proposed messaging(Taylor & Asmundson, 2021) include:</p> <ul style="list-style-type: none"> • <i>Please do your part in managing the pandemic by wearing a mask. The choice is yours.</i> • <i>Choosing to wear a mask shows that you care about your community</i> • <i>Some people think they're giving up freedom by wearing a mask, but wearing a mask is a way of freeing ourselves from the pandemic.</i> • <i>You have a right to wear a mask to stay safe. Don't let anyone take away your right.</i> <p>The efficacy of the above-mentioned messaging strategies for improving mask adherence is theory based but has not been tested.</p>

Appendix 1

Methods

Literature Search

A literature search was conducted by Joycelyn Jaca, Nicole Loroff, and Rachel Zhao from Knowledge Resources Services (KRS) within the Knowledge Management Department of Alberta Health Services. KRS searched databases for articles published from [state dates of publications of interest], and included: [databases/websites utilized in the search]. Briefly, the search strategy involved combinations of keywords and subject headings including:

Ovid MEDLINE(R) and In-Process, In-Data-Review & Other Non-Indexed Citations and Daily

- 1 exp Masks/ (10645)
- 2 mask.mp. (31977)
- 3 (face adj2 cover*).mp. (383)
- 4 (face adj2 mask*).mp. (4336)
- 5 or/1-4 (36750)
- 6 cloth.mp. (3547)
- 7 exp Textiles/ (6829)
- 8 fabric.mp. (6999)
- 9 homemade.mp. (3268)
- 10 "home made".mp. (2253)
- 11 handcraft*.mp. (467)
- 12 "hand craft*".mp. (464)
- 13 non-medical.mp. (6283)
- 14 nonmedical.mp. (5893)
- 15 medical.mp. (1700883)
- 16 surgical.mp. (1393613)
- 17 or/6-16 (2952011)
- 18 "adverse event*".mp. (171931)
- 19 "adverse effect*".mp. (1909362)
- 20 "adverse outcome*".mp. (30839)
- 21 danger*.mp. (68862)
- 22 harm*.mp. (195225)
- 23 exempt.mp. (2929)
- 24 or/18-22 (2250853)
- 25 exp Coronavirus/ or exp Coronavirus Infections/ or ("corona viru*" or ncov* or n-cov* or "novel cov*" or COVID-19 or COVID19 or COVID-2019 or COVID2019 or SARS-COV-2 or SarsCOV-2 or sarscov2 or sarscov19 or
- 26 exp Middle East Respiratory Syndrome Coronavirus/ (1591)
- 27 "middle east respiratory syndrome".mp. (3305)
- 28 mers.mp. (6162)
- 29 mers-cov.mp. (2675)
- 30 exp SARS Virus/ (3858)
- 31 exp Severe Acute Respiratory Syndrome/ (5538)
- 32 SARS.mp. (83953)
- 33 sars-cov.mp. (76438)
- 34 or/25-33 (133051)
- 35 5 and 17 and 24 and 34 (86)
- 36 limit 35 to (english language and yr="2020 -Current") (79)

Articles identified by KRS in their search were initially screened by title against the inclusion/exclusion criteria listed in Table 1 below. 147 articles (and 30 grey literature documents) were identified by KRS with references and abstracts provided for further review. 78 excluded from the review in accordance with the inclusion/exclusion criteria stated below.

Table 1. Inclusion and exclusion criteria for results of the literature search

Inclusion Criteria	Exclusion Criteria
<p>[numerated list of inclusion criteria]</p> <ul style="list-style-type: none"> - Research that addresses non-medical, cloth or surgical type mask use in a community setting - Studies of all sub-population groups including children, individuals living with chronic health conditions and special populations - As this was an update, research was focused on the last two years - All research methods were included to ensure a comprehensive scope including case studies and review - English language only - Published literature was included, as well as guideline/recommendation documents 	<ul style="list-style-type: none"> - Article is not from a credible source - Article does not have a clear research question or issue - Presented data/evidence is not sufficient to address the research questions - Research focused on use of masks outside of the community setting (such as hospital use) - Research conducted focusing on only N95 masks or devices other than non-medical/surgical masks

Critical Evaluation of the Evidence

Exclusion criteria for study quality were adapted from the Mixed Methods Appraisal Tool (MMAT) (Hong et al., 2018). Potential articles were evaluated on three criteria: 1) Peer reviewed or from a reputable source; 2) Clear research question or issue; 3) Whether the presented data/evidence is appropriate to address the research question. Preprints and non peer-reviewed literature (such as commentaries and letters from credible journals) are not excluded out of hand due to the novelty of COVID-19 and the speed with which new evidence is available.

Table 2 below is a narrative summary of the body of evidence included in this review. The categories, format, and suggested information for inclusion were adapted from the Oxford Centre for Evidence-Based Medicine, the Cochrane Library, and the AGREE Trust (Urwin, Gavinder & Graziadio, 2020; Viswanathan et al, 2012; Wynants et al., 2020; Brouwers et al., 2010).

Table 2. Narrative overview of the literature included in this review.

	Description
Volume	6 reviews, 39 cohort based studies, 4 observational studies, 9 cases studies, 10 commentaries and 11 guidelines from reputable sources were included.
Quality	<p>Study quality varied significantly</p> <p>-In general samples of most research that involved measurement of clinical outcomes were small. Survey research samples were more robust with one study reporting over 1 million participants (children and youth in China).</p> <p>-Guideline documents were typically based on expert opinion, however there was inclusion of evidence-informed decision making. Additionally, some guidelines/recommendations identified topics that were contentious or agreement could not be reached by the committee (SickKids, 2020).</p>
Applicability	In general, the research was specific to COVID-19 mask policies and research. Some additional studies (prior to 2019) were included due to their applicability.
Consistency	There is general consistency across guidelines and recommendations, with a few notable exceptions-there is variability in the recommendations for young children and masking-related to possible adverse events (Benefit/risk), as well as the guidance provided related to the impact of mask use on exercise participants.

Search Strategy

Search Strategies

Ovid MEDLINE(R) and In-Process, In-Data-Review & Other Non-Indexed Citations and Daily

- 1 exp Masks/ (10645)
- 2 mask.mp. (31977)
- 3 (face adj2 cover*).mp. (383)
- 4 (face adj2 mask*).mp. (4336)
- 5 or/1-4 (36750)
- 6 cloth.mp. (3547)
- 7 exp Textiles/ (6829)
- 8 fabric.mp. (6999)
- 9 homemade.mp. (3268)
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- 13 non-medical.mp. (6283)
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- 15 medical.mp. (1700883)
- 16 surgical.mp. (1393613)
- 17 or/6-16 (2952011)
- 18 "adverse event*".mp. (171931)
- 19 "adverse effect*".mp. (1909362)
- 20 "adverse outcome*".mp. (30839)
- 21 danger*.mp. (68862)
- 22 harm*.mp. (195225)
- 23 exempt.mp. (2929)
- 24 or/18-22 (2250853)
- 25 exp Coronavirus/ or exp Coronavirus Infections/ or ("corona viru*" or ncov* or n-cov* or "novel cov*" or COVID-19 or COVID19 or COVID-2019 or COVID2019 or SARS-COV-2 or SarsCOV-2 or sarscov2 or sarscov19 or SARS-COV-19 or SARSCOV-19 or Sars-cov-2019 or sarscov2019 or sarscov-2019 or "severe acute respiratory syndrome coranaviru*" or "severe acute respiratory syndrome cov 2" or "severe acute respiratory syndrome" or "severe acute respiratory disease" or 2019ncov or "2019 ncov").mp. (127071)
- 26 exp Middle East Respiratory Syndrome Coronavirus/ (1591)
- 27 "middle east respiratory syndrome".mp. (3305)
- 28 mers.mp. (6162)

- 29 mers-cov.mp. (2675)
- 30 exp SARS Virus/ (3858)
- 31 exp Severe Acute Respiratory Syndrome/ (5538)
- 32 SARS.mp. (83953)
- 33 sars-cov.mp. (76438)
- 34 or/25-33 (133051)
- 35 5 and 17 and 24 and 34 (86)
- 36 limit 35 to (english language and yr="2020 -Current") (79)

CINAHL

- S1 (MH "Coronavirus+") OR (MH "Coronavirus Infections+") OR coronaviru* OR "corona virus" OR ncov* OR n-cov* OR (COVID-19 OR COVID19 OR COVID-2019 OR COVID2019) OR (SARS-COV-2 OR SARSCOV-2 OR SARSCOV2 OR SARSCOV19 OR SARS-COV-19 OR SARSCOV-19 OR SARSCOV2019 OR SARS-COV-2019 OR SARSCOV-2019) OR ("severe acute respiratory syndrome cov 2" OR "severe acute respiratory syndrome coronavirus*")
- S2 (MH "Middle East Respiratory Syndrome Coronavirus")
- S3 (MH "Disease Outbreaks")
- S4 pandemic*
- S5 (MH "Middle East Respiratory Syndrome")
- S6 "middle east respiratory syndrome" OR MERS-COV OR MERS
- S7 (MH "SARS Virus")
- S8 (MH "Severe Acute Respiratory Syndrome")
- S9 "severe acute respiratory syndrome" OR SARS OR SARS-COV
- S10 S1 OR S2 OR S3 OR S4 OR S5 OR S6 OR S7 OR S8 OR S9
- S11 (MH "Masks")
- S12 mask OR face N2 cover* OR face N2 mask* OR facemask OR "face mask"
- S13 (MH "Textiles")
- S14 cloth OR fabric OR homemade OR "home made" OR handcraft* OR "hand craft*" OR non-medical OR nonmedical OR medical OR surgical
- S15 "adverse event" OR "adverse effect*" OR "adverse outcome*" OR danger* OR harm* OR adverse OR exempt*
- S16 S11 OR S12
- S17 S13 OR S14
- S18 S10 AND S15 AND S16 AND S17

TRIP

(covid-19 OR coronavirus OR "corona virus" OR "severe acute respiratory syndrome" OR "severe acute respiratory disease" OR sars-cov-2 OR SARS OR MERS OR "middle east respiratory disease") AND (mask OR masking OR "face cover" OR "face covering" OR "face mask" OR facemask) AND (cloth OR medical OR surgical OR fabric OR

nonmedical OR non-medical OR homemade OR "home made" OR handcraft OR hand-craft) AND (adverse OR "adverse effects" OR "adverse events" OR "adverse outcomes" OR harm OR harmful OR danger OR dangerous OR exempt) from:2015

(covid-19 OR coronavirus OR "corona virus" OR "severe acute respiratory syndrome" OR "severe acute respiratory disease" OR sars-cov-2 OR SARS OR MERS OR "middle east respiratory disease") AND (mask OR masking OR "face cover" OR "face covering" OR "face mask" OR facemask) AND (cloth OR medical OR surgical OR fabric OR nonmedical OR non-medical OR homemade OR "home made" OR handcraft OR hand-craft) AND ("medical condition" OR illness OR disease) from:2015

WHO Database/Google Advanced/CEBM/Covidevidence/CDC/FDA/ECDC

(covid-19 OR coronavirus OR sars OR mers) AND (mask OR masking OR "face cover" OR "face covering") AND ("adverse events" OR "adverse outcomes" OR "adverse effects" OR harm OR danger)

(covid-19 OR coronavirus OR sars OR mers) AND (mask OR masking OR "face cover" OR "face covering") AND ("medical condition" OR "chronic disease" OR illness OR exemption OR exempt)

(mask OR masking OR "face cover" OR "face covering" OR "face mask" OR facemask) AND (adverse OR "adverse effects" OR "adverse events" OR "adverse outcomes" OR harm OR harmful OR danger OR dangerous OR exempt OR "medical condition" OR exemption OR "chronic disease")

"mask exemption" OR "mask medical exemption" OR "masking exemption" OR "medical reasons to not wear mask" OR "mandatory mask exemption"

(mask OR facemask OR "face covering") AND (exempt OR exemption) AND ("medical condition" OR "chronic condition" OR "chronic disease" OR illness) AND (guideline OR "public health" OR healthcare)

(list OR approved OR accepted OR authorized OR permitted) AND (health or medical) AND conditions AND (exempt OR "not required" OR exemption) AND mask

Appendix 2. Face Mask Regulations and By-Laws for Major Alberta Centres as of May 10, 2021

Government of Alberta

(<https://www.alberta.ca/masks.aspx#:~:text=Albertans%20are%20encouraged%20to%20wear,the%20spread%20of%20COVID%2D19.>)

When to use a mask

- When mask use is mandatory:
 - Indoor public places
 - Indoor workspaces
 - Places of worship
 - [K-12 schools when required](#)
 - Municipalities, if bylaws are in place
- When you might come within 2 metres of people from outside your household

When not to use a mask

- If the mask:
 - is dirty or damaged in any way
 - has gaps or doesn't fit well
 - has been used by another person
- Children under 2 years of age
- You qualify for [an exception](#)

Masks are mandatory in all indoor workplaces and facilities outside the home, except:

- when working alone in an office or a safely distanced cubicle or a barrier is in place
- rental accommodations used solely for the purposes of a private residence
- farm operations (exempt)

This requirement:

- applies to all employees, customers, visitors, delivery personnel and contractors
- includes any location where employees are present in-person
- includes all workplace locations where masks won't pose a safety risk
- does not change current student mask requirements in schools

-Private businesses may set their own policies as long as they also meet the minimum provincial requirements. This can include requiring individuals to wear masks while attending their business.

-Businesses and public places are encouraged to provide alternatives for patrons unable to wear masks, such as offering online orders, delivery or curbside pickup.

Exceptions where mask requirements do not apply:

- When you are only with people from your own household
- If you need assistance placing, using or removing a face mask
- If you are unable to wear a facemask due to a mental or physical limitation
- When consuming food or drink
- If engaging in high intensity physical exercise
- When providing or receiving care or assistance where a facemask would hinder that caregiving or assistance
- When alone at a workstation separated by at least 2 metres from other people
- When working in farm operations

- If you are the subject of a workplace hazard assessment in which it is determined that your safety will be at risk if you wear a mask while working
- If you are separated by every other person by a physical barrier that prevents droplet transmission
- If you need to temporarily remove your facemask while in a public place for an emergency or medical purpose or to:
 - receive a service that requires the temporary removal of a facemask
 - establish your identity

If you qualify for an exception:

- you don't need to provide proof
- consider contacting businesses before you visit them to learn more about options and requirements
- you must follow all other public health measures, such as keeping 2 metres apart from other people

Edmonton

(https://www.edmonton.ca/programs_services/emergency_preparedness/masks.aspx)

Wearing a mask or face covering is mandatory in all indoor public places and public vehicles. We have adjusted City services to [provincial restrictions](#). We continue to communicate these changes to Edmontonians throughout our website, on social media and directly.

Wearing a proper face covering is an important factor in preventing the spread of COVID-19 and it's a simple but powerful action everyone can take to protect their family and friends.

City Council has renewed the bylaw requiring the use of face coverings in **all indoor places and public vehicles** until **December 31, 2021**. City Council can vote to repeal the bylaw at any time should conditions warrant that action.

The bylaw applies to the publicly accessible areas of businesses/retail and includes transit, transit centres and LRT platforms.

- **Face coverings** refer to any medical or non-medical mask or other covering that fully covers the nose, mouth and chin.
- **Indoor public places** means any property, whether publicly or privately owned that members of the public can access. This includes retail stores, entertainment venues, recreation centres, restaurants and transit stations. Business owners can decide for themselves if they wish to refuse service to patrons not wearing face coverings. The bylaw does not apply to schools, health care facilities, hospitals, child care facilities or common areas of residential buildings.
- **Public vehicles** refers to buses, LRT vehicles, taxis and other vehicles for hire. The fine is \$100.

Face coverings can be removed when consuming food as part of a ceremony, or in another designated space. They can also be removed in spaces where physical barriers have been installed between the employee and patrons.

Exceptions

There are exceptions to who must wear a face covering in public places. They include:

- Those who cannot put one on or remove it without assistance
- Children under two years of age

- People who are unable to wear a face covering because of mental or physical concerns or protected reasons under the Alberta Human Rights Act
- People providing care or assistance to a person with a disability when wearing a face covering would affect that service
- People engaging in services that require the temporary removal of a face covering

Wearing Masks in Businesses

- Our bylaw and the provincial health order require masks to be worn inside businesses, with exceptions for those that are unable to wear a mask. It is up to businesses to determine how to manage those exceptions and set policies regarding providing service to persons not wearing a mask.
- Businesses have the right to refuse service to anyone who does not follow their policy. If you disagree with a business' policy, you should contact them directly to discuss your concerns and potential options and alternatives.
- As part of the community effort we encourage Edmontonians to wear a mask and follow other public health recommendations when at a business.
- Under no circumstances should Edmontonians be confrontational with business owners and employees about the mask bylaw or other public health recommendations. Concerns regarding compliance should be reported to the appropriate authority.

Calgary (<https://www.calgary.ca/csps/abs/bylaws-by-topic/face-covering-bylaw.html>)

Temporary Face Coverings Bylaw

For the safety and protection of our community, the City of Calgary requires people to wear face coverings or masks in indoor public areas and public vehicles, with few exceptions.

The Face Coverings Bylaw came into effect on August 1, 2020 and will remain in effect through December 2021.

To see all of our COVID-19 information and updates, visit [City of Calgary COVID-19](#).

Effective November 24, 2020, masks are mandatory in workplaces under enhanced provincial public health measures

The Temporary Face Coverings Bylaw mandates that face coverings be worn on public transit and public vehicles (for hire) and in all indoor public spaces, including City of Calgary buildings. The bylaw includes all indoor areas that are open to the public in businesses, stores, as well as any indoor space that is open or accessible to members of the public.

In addition to The City of Calgary face coverings bylaw, the Province of Alberta has made face coverings mandatory in all indoor workplaces in Calgary, except when a person is working alone in an office or a safely distanced cubicle or there is an appropriate barrier in place. For more information visit Alberta.ca.

Penalties and Enforcement

The City of Calgary's primary focus is educating Calgarians on the importance of wearing face coverings in indoor public spaces and public vehicles, rather than enforcement.

Failure to wear a face covering where required can result in a **penalty of \$100** and failure to display prescribed signage can result in a **penalty of \$200**.

Subsequent offences within a 12-month period will result in higher penalties.

Exceptions to the Temporary 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
- People who have temporarily removed their face covering where doing so is necessary to provide or receive a service (for example, a visit to the dentist)

Information for businesses

The bylaw was created in consultation with over 2000 local businesses as well as with input from City of Calgary operations.

Under the bylaw, **business operators or owners are required to display signage with bylaw messaging in public entryways of the business or vehicle**. The City of Calgary has provided signage you can utilize. [Download signage for businesses and vehicles](#) (English and translated copies are available).

Businesses are not expected to deny services as not everyone is required to wear a face covering.

A guide to help inform businesses about the bylaw has been updated and is [available for download](#).

Transit/Public Transport

Transit ridership is increasing. We know physical distancing is not possible on public transit and we know the importance of people feeling safe on transit. Customers report that they are more comfortable riding transit if they see other customers wearing face coverings. A majority of transit riders have asked to mandate the use of face coverings for passengers to help them feel safe onboard a transit vehicle.

Wearing face coverings on all transit vehicles will be mandatory effective August 1, 2020.

Red Deer

<https://www.reddeer.ca/media/reddeerca/city-government/bylaws/3656-2020-Face-Coverings-In-Indoor-Places-and-Public-Vehicles.pdf>

*is a 7 page bylaw document and therefore not appended here.

Lethbridge

<https://www.lethbridge.ca/City-Government/Bylaws/Pages/Face-Covering-Bylaw.aspx#heading-1>

Temporary Mandatory Face Covering Bylaw

In general, this new bylaw states that a person must wear a face covering at all times while in an indoor, enclosed, or substantially enclosed public place or in a public vehicle.

[View Bylaw](#)

Places	Examples
City of Lethbridge Facilities	City Hall, Galt Museum, Fort Whoop Up, Helen Schuler Nature Centre, Lethbridge Regional Park 'n' Ride Transit Terminal, Lethbridge Airport Terminal, Lethbridge Public Library (Downtown and Crossings branches), ice arenas, swimming pools.
Public Vehicles	Buses, Access-a-Ride, Taxi, Rideshare Service
Public indoor spaces	Malls, grocery stores, retail businesses, churches.

Exemptions

We understand that there are many different scenarios and situations that might limit someone's ability to wear a face covering and several exemptions have been created within the bylaw to address this. Individuals will not be required to show proof of their exemption and businesses will not be expected to deny service to anyone because of this. We ask that everyone be respectful of their fellow residents and understand that there will be situations where masks are not required.

> **Proof not required for exemptions to Bylaw 6239**

Bylaw exemptions:

- A person under the age of 2;
- persons unable to place, use, or remove a face covering without assistance;
- persons unable to wear a face covering by reason of an underlying medical condition or disability or other protected ground under the Alberta Human Rights Act;

- persons consuming food or drink in designated areas or as part of a religious or spiritual ceremony;
- persons engaged in aquatic activities or physical exercise;
- persons providing care or assistance to a person with a disability where a face covering would hinder that caregiving or assistance;
- persons engaging in services that require the temporary removal of a face covering;
- a person who is sleeping or in bed at a homeless shelter,
- A child who is older than two (2) years of age but is younger than five (5) years of age chronologically or developmentally and who refuses to wear a face covering and cannot be persuaded to do so by their caregiver.
- An individual leading in worship, provided physical distancing of at least two metres is possible.

The City of Lethbridge bylaw does not apply to:

- Schools and other educational facilities
- Hospitals and health care facilities
- Child care facilities
- Areas exclusively accessed or used by the public place's employees or a public vehicle operator provided that physical barriers or physical distancing practices are implemented between any person not required to wear a face covering by operation of this exception and any other person

Information for Businesses

To help our business community manage the changes outlined in the new Temporary Mandatory Face Covering Bylaw and answer some frequently asked questions, a [Guide for Businesses](#) is available.

[Guide for Businesses](#)
[Signage](#)

Resources

[Alberta Health information on masking including:](#)

- Why use a mask
- How to use a mask
- How to care for mask
- How to make or buy a mask

Enforcement

The City of Lethbridge's focus will be on education and encouraging residents to wear a face covering as an additional method of helping to reduce the spread of COVID-19. This will ensure we can continue to safely reopen our City to the events and activities we enjoy.

We hope that the community will follow this guidance and we can avoid having to ticket however, violations to this bylaw could result in a \$100 fine.

Medicine Hat

Face Coverings

Public orders issued by the Chief Medical Officer of Health require the wearing of face coverings in public spaces and buildings. For more information about Provincial Orders, please visit the [Alberta website](#).

Grande Prairie

Similar to Medicine Hat, has allowed city bylaw to expire and instead refers to provincial guidance.

Peace River

<https://peacriver.ca/wp-content/uploads/2020/11/2076-Face-Coverings-Bylaw.pdf>

*Is a 7 page document and therefore the link is provided here

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