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EVIDENCE BRIEF

(ARCHIVED) Use of Face Masks in Non-Health Care Workplace Settings to Mitigate the Spread of COVID-19

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Key Messages

- The overall risk of becoming infected with SARS-CoV-2 in the workplaces is influenced by the type of work and the workplace setting. Risk factors within the work setting include the nature of interactions (close contact, close prolonged face-to-face interactions), the environment, and the likelihood of contact with probable or confirmed Coronavirus Disease 2019 (COVID-19) cases. Consistent with guidance for health care-related workplaces, it is also necessary to incorporate layers of controls in non-health care workplace settings to mitigate SARS-CoV-2 transmission.

- The evidence from a range of non-health care workplace settings supports layered infection prevention strategies being more impactful than any individual infection prevention strategy alone (e.g., vaccination, distancing, masking, hand washing). Mask-wearing in public has been effectively used for source control during the pandemic as one of these layers.

- The hierarchy of controls for occupational hazards as applied to SARS-CoV-2 includes, from the top: elimination (e.g., facilitating remote work, ensuring staff with symptoms do not attend work); engineering controls (e.g., increasing ventilation with fresh air, facilitating physical distancing and barriers; access to hygiene supplies and no-touch technology where feasible); administrative controls (e.g., education and training, limiting or staggering occupancy, screening workers and visitors, cleaning and disinfection); and personal protective equipment (PPE). PPE is the lowest in the hierarchy and should be used in combination with other measures in the hierarchy.

- Overall, the evidence suggests that mask-wearing in the workplace and policies requiring staff to wear masks for source control likely reduce SARS-CoV-2 transmission, although the literature is

limited. Few studies investigated respirator or medical mask use in workplaces for preventing SARS-COV-2 spread, and many studies did not specify mask types.

- Optimizing fit, filtration and adherence to wearing a mask for the duration of a work shift is important, particularly in environments where it is not possible to strengthen other key mitigation measures (e.g., nature of work precludes physical distancing, high occupancy in closed indoor settings). Fit and filtration can be optimized by wearing a non-fit tested respirator (N95, KN95) or a well-fitted medical mask. For a non-medical (e.g., cloth) mask, 3 layers optimizes filtration.

Background

The Omicron (B.1.1.529) variant, first detected in South Africa was designated a variant of concern (VOC) by the World Health Organization (WHO) on November 26, 2021, and is the dominant SARS-CoV-2 variant in Ontario.[1,2] Current evidence points to overall increased transmissibility of Omicron, although the relative contributions of increased transmissibility inherent in the Omicron variant and immune evasion (due to Omicron mutations and waning immunity), is yet to be fully established. Lower vaccine effectiveness has also been observed, which suggests that for a given exposure, there is a greater likelihood of infection.[2]

For those unable to work from home, the workplace can contribute to the overall risk of becoming infected with SARS-CoV-2. Risk factors within the work setting include close contact with others, close face-to-face interactions, and contact with probable or confirmed COVID-19 cases.[3] One study in the United States (US) demonstrated approximately 10% of workers are employed in occupations where self-reported exposure to any disease or infection occurs at least once per week.[4] More than 75% of health practitioner and health care support occupations were exposed more than once per week, and other notable occupations with frequent exposure included protective services (e.g., police, firefighters), personal care and services (e.g., childcare, personal care aides), and community and social services (e.g., probation officers, community health and social workers).[4] Occupational risk depends on the potential for contact with infected individuals, characteristics of the work environment (e.g., ventilation), and implemented public health or mitigation measures (e.g., vaccination policies, paid sick leave, ability for distancing, masking). Those working in jobs in close proximity to the general public, including security guards or taxi drivers, were identified to have higher mortality rates during the first weeks of COVID-19 in England.[5]

In Ontario, some workplace settings and sectors have been particularly susceptible to outbreaks prior to the Omicron variant and prior to widespread vaccine availability.

- In an analysis of workplace outbreaks in Ontario by industry sector during the first wave of the pandemic, Murti et al. (2020) identified 199 outbreaks with 1,245 cases between January and June, 2020.[6] After excluding hospital, congregate living and education/childcare settings, 68% of the outbreaks and 80% of cases belonged to manufacturing, agriculture, forestry, fishing, hunting, and transportation and warehousing (denominator data by industry were not available).[6]

- In a population-based cross-sectional study of workplace outbreaks and associated cases in Ontario, 12% of COVID-19 cases identified between April 1, 2020 and March 31, 2021 in the working age population (15-69 years) in the province were attributed to workplace outbreaks.[7] The five industries reporting the highest incidence rates were agriculture, health care and social assistance, food manufacturing, educational services, and transportation and warehousing.[7]

- Further, in Ontario between February 16, 2020 and June 12, 2021, there were 92,665 confirmed COVID-19 cases associated with 10,669 reported outbreaks. Of these outbreak-associated cases, 43.0% were in congregate care settings (e.g., long-term care homes, retirement homes, hospitals), 10.3% were in congregate living settings, 11.3% were in education settings, and 35.4% were in "other settings."[8] Within "other settings," workplaces (including many industrial sectors such as construction, manufacturing, food processing, logistics, etc.) accounted for the majority (74.8%) of outbreak-associated cases compared to settings such as bars and restaurants, personal services, and recreational fitness settings (though these settings were closed for some of the time period between February 2020 and June 2021). Of the workplaces, manufacturing, food processing and logistics (e.g., warehouses, transportation, shipping or postal services) reported high numbers of cases per outbreak. [8]

- Between July 4, 2021 and December 25, 2021, there were 1,437 outbreaks in schools (elementary, elementary/secondary and secondary), with a cumulative 6,949 outbreak-associated cases in students (65.8%) and staff (5.6%) (28.6% unknown) reported to public health.[9]

- An analysis of Statistics Canada's Labour Force Survey in July through September 2020 assessed prevalence of workplace infection control practices. Males, those with lower levels of education, shorter job tenure, non-permanent work, those in agricultural, construction, transportation and warehousing, and education industries reported fewer workplace infection control practices. Respondents not covered by a union or collective bargaining agreement reported higher prevalence of physical distancing, but lower prevalence of PPE. Respondents in non-food manufacturing and wholesale trade reported higher prevalence of physical distancing (compared to health care and social assistance) but lower prevalence of PPE and cleaning protocols.[10]

Optimization and adherence to all layers of infection prevention and control (IPAC) measures is needed to reduce the risk of transmission in the workplace. A hierarchy of hazard controls is a standard framework used in workplaces including health care settings.[3,11,12] In response to the increase in Omicron transmissibility, Ontario recommendations on IPAC measures for health care workers (HCWs) have been updated, with an interim recommendation for fit-tested N95 respirators when providing direct care to patients with suspect or confirmed COVID-19 in addition to all other measures under the hierarchy of controls.[13]

A recent PHO review found mask-wearing in community settings is an effective means of source control with an overall reduction in transmission risk when both source and contact are appropriately wearing masks. Experimental data supported masks such as multilayer non-medical masks, medical masks and respirators as providing superior filtering efficiency but limited real-world evidence was found on the mask type best for general community use.[14] Given the likelihood of increased transmissibility of the Omicron variant, recommendations to optimize masks in community settings (which often are also non-health care workplaces) have also been provided.[15] Along with other preventive layers, this included a precautionary recommendation to select a mask that optimizes fit and filtration and can be worn correctly and comfortably for long periods in public settings.[15] Mask fit and filtration can be optimized by wearing a non-fit tested respirator (N95, KN95) or a well-fitted medical mask; alternatively, a high quality 3-layer non-medical mask (i.e., cloth mask) is appropriate if it enables adherence which is critical for any masking. Guidance from the Public Health Agency of Canada states "In general, while non-medical masks can help prevent the spread of COVID-19, medical masks and respirators provide better protection. Fit is important for all types of masks."[16] The Ontario government's measures for resumption of in-person learning (December 30, 2021) includes the provision of non-fit-tested N95 respirators for staff in schools and licensed childcare settings as an optional alternative to medical or surgical masks, and supply of high-quality three-ply cloth masks that are strongly encouraged and free for students and children.[17]

Purpose of This Document

The primary goal of this Evidence Brief is to summarize recent literature on masking in non-health care workplace settings. Secondary aims include summarizing literature related to other PPE and layered mitigation measures in non-health care workplaces. Non-health care workplace settings in-scope for this document include but are not limited to: schools, correctional facilities, police services, retail settings, warehouses and other workplaces. The effectiveness of mask use among employees and workers in these settings is in scope, however, the use of masks among patrons, customers or students is out of scope.

This Evidence Brief will focus on recommendations for masking although mask recommendations alone are not sufficient to protect workers from a pandemic with substantial community transmission. Masks are one layer in a comprehensive strategy against SARS-CoV-2 transmission and must be implemented with vaccination and other protective measures.

Research Question

The main research question for this Evidence Brief is: What is the effectiveness of masks for source control in non-health care workplace settings and mitigating the spread of SARS-CoV-2?

Related to this question but not reviewed in detail in this document are recent PHO publications related to community and health care settings:

- For guidance (December 15, 2021) on IPAC practices in health care settings, please refer to PHO's Interim IPAC recommendations for use of personal protective equipment for care of individuals with suspect or confirmed COVID 19.[13]
- For guidance (December 15, 2021) on mask wearing in general community settings, please refer to SARS-CoV-2 Omicron Variant and Community Masking.[15]
- For a mask wearing fact sheet (December 24, 2021), please refer to: Optimizing the Use of Masks Against COVID-19.[18]

Methods

On December 24, 2021, Public Health Ontario (PHO) Library services conducted searches of literature from 2021-current date limit, using three databases: Embase, MEDLINE and National Institutes of Health COVID-19 Portfolio (preprints). Search strategies are available upon request.

A total of 916 records from the library search were retrieved. Only English-language peer-reviewed and non-peer-reviewed records that focused on PPE or mask effectiveness for workers in their respective workplace (non-health) setting were reviewed. Specifically, we sought to include articles that described the effectiveness of masks or respirators in mitigating the transmission of SARS-CoV-2 in non-health care workplace settings. Modelling studies relevant to the research question were included.

We excluded articles that were commentaries and articles focused on masking generally in the context of COVID-19 (e.g., degradation or soiling of masks, modifying masks). We also excluded work settings that were closely related to health care (e.g., hospital services areas, dental, diagnostic laboratory services, forensics). The title and abstract screening was completed by three authors, two of the three then reviewed the full text of potential articles.

Main Findings

There is limited available evidence related to the impact of infection control measures in non-health care workplace settings, and no studies investigating mitigation measures in non-health care workplace settings in the context of the Omicron VOC were identified in the literature searches. Additionally, many of the identified studies were conducted prior to the emergence of the Delta and Omicron VOCs, and before populations reached widespread vaccination coverage. Results must be interpreted with caution due to these key differences from the current state of the pandemic in Ontario.

Evidence Related to Respirators (N95/KN95)

Two modelling studies were identified that investigated the impact of wearing respirators (i.e., N95, KN95, FFP2) in non-health care workplace settings through experimental and modelling methods.[19,20] These studies generally suggest that in scenarios with limited physical distancing (i.e., less than 2 metres [m]) and respiratory activity such as speaking or coughing, respirators worn by both infectious and susceptible individuals reduced infection risk to a greater degree than surgical masks and in turn, surgical masks reduced risk to a greater degree than non-medical/cloth masks. These modelling studies assumed masks were worn correctly; therefore, limiting direct application to real-life scenarios where human error and lack of training or education may impair mask fit.[19,20] One additional study was included which explored the impact of respirator fit for the wearer's protection; however, did not investigate or address the impact of fit on source control.[21]

Sobolik et al. (2021) used a quantitative risk assessment model to characterize the impact of various strategies for controlling SARS-CoV-2 transmission among workers in an indoor fresh fruit market and vegetable manufacturing facility, including the impact of N95 respirators and surgical and cloth masks.[19] Authors estimated that universal mask use (by the infected and the susceptible workers) reduced infection risk by 52-88%, depending on the mask type: cloth masks worn at 1 m distance during 8 hours of cumulative exposure with a coughing infected worker reduced infection risk by 52%, 64% when surgical masks were worn, 88% when double masks (surgical plus cloth) were worn and 99% when N95 respirators were worn, all relative to no masks. It was noted that mask effectiveness is dependent on adherence to correct mask use.[19]

Hejazi et al. (2021) (preprint) experimentally simulated aerosol transmission by releasing and measuring spread of dust particles in a large hardware store.[20] Experimental data were then used to model the impact of wearing surgical and FFP2 respirators on infection risk in a close proximity scenario (i.e., 1.5 m). The authors posited an unmasked susceptible individual in the exhalation cloud of an unmasked infectious individual who is speaking results in 90% risk of infection after four minutes of exposure. Both source and receptor wearing surgical masks reduced the infection risk to approximately 5%, and both wearing FFP2 respirators further reduced the risk of infection to 0.05% for an exposure duration of 20 minutes.[20]

In a small experimental study by O'Kelly et al. (2021) involving seven participants, various masks and respirators were compared and the importance of fit-testing respirators to achieve optimal protection for the wearer was explored.[21] Overall, authors found that N95 respirators offered higher degrees of protection than other devices tested (KN95, medical mask, non-medical cloth mask), but most N95 respirators failed to achieve adequate fit when measured with a quantitative fit test tool. Poorly fitted N95 respirators did offer a degree of protection to the wearer, as measured by the amount of particles that infiltrated into the mask during the experiment, and were comparable to medical and cloth masks in some cases. It is important to note that this study did not assess mask-wearing as source control.[21]

Evidence Related to Medical or Non-medical Masks

Six observational studies investigated the impact of mask-wearing in workplace settings including homeless shelters, a police department, manufacturing facilities and schools.[22-27] Most studies did not specify the type of masks required or worn by the study subjects. Overall, the evidence suggests that mask wearing in the workplace and policies requiring staff to wear masks are beneficial for minimizing SARS-CoV-2 infection risk. A limitation to note, it is unclear in some studies if and what types of other measures were also in place in workplaces, and whether other measures contributed to mitigating COVID-19 outcomes observed in the results.

An observational study of K-12 schools in rural Wisconsin with mask requirements for all staff and students found that schools had reduced COVID-19 case rates compared to the surrounding community (3,453 cases/100,000 people and 5,466 cases/100,000 people, respectively).[22] In another observational study of US K-12 schools, implementation of mask requirements for school staff was assessed as a factor impacting transmission.[23] Although all confounders could not be accounted for, they found mask mandates for school staff were associated with fewer COVID-19 cases and deaths when compared to no mask mandates, for both in-person learning and hybrid model learning.[23] A third US school-based study investigated associations between K-12 school mask policies and school-associated COVID-19 (Delta) outbreaks in two Arizona counties (999 schools) in July to August, 2021.[24] Schools with no mask requirements were associated with greater odds of school-associated outbreaks compared to schools with early or late introduction of mask requirements (OR=3.5; 95% CI: 1.8–6.9). The authors recommended that given high transmissibility (of Delta), universal masking should be considered in addition to other measures (including vaccination of all eligible students, staff, and faculty).[24]

Workers from Italian industrial factories were studied in June 2020, prior to COVID-19 vaccination (and Delta and Omicron).[25] Workplaces with mask requirements maintained low seropositivity to SARS-CoV-2 among those attending work on-site during periods of high COVID-19 incidence in the community. The authors suggest the use of face masks was effective in reducing transmission in factories.[25]

A cross-sectional study examined SARS-CoV-2 seroprevalence among a police cohort in Switzerland and factors associated with seropositivity.[26] Masks were mandated in October 2020, and there was 100% self-reported compliance with mask wearing by participants. Both surgical masks and cloth masks (certified by a material sciences and technology institute) were provided. Seroprevalence was assessed from February to March 2021 and was found to be 12.9%. Since seroprevalence of the police cohort was comparable to the general population, the authors suggested that infection control measures of the police were effective, and household contacts were the main cause of transmission. Staff reportedly adhered to quarantine and isolation policies as directed due to infection or contact with infected persons; however, no other workplace mitigation measures aside from masking are described in this study.[26]

A cross-sectional study of 106 homeless shelter workers in the US was conducted from June to August of 2020.[27] 43.4% of workers reported frequent close contact with clients, 81% of whom reported wearing a mask most or all of the time. Of the 15% of participants who reported testing positive for SARS-CoV-2 during the study period, 80% were believed to have been infected at work – frequent close contact with clients was significantly associated with testing positive. Wearing masks and maintaining social distance were significantly associated with decreased risk of testing positive.[27]

Evidence Related to Layered Infection Prevention Measures

Two systematic reviews,[28,29] and eight primary studies (six observational studies and two modelling studies)[19,30-35] assessed the impact of layered infection prevention measures in workplaces. Overall,

evidence consistently supports multiple layered prevention measures being associated with greater protection from SARS-CoV-2 spread in workplaces compared to protection from any individual measure implemented alone (e.g., masking, distancing, testing, hand hygiene, physical barriers, etc.).

Talic et al.'s systematic review and meta-analysis reported a reduction in incidence of COVID-19 associated with handwashing, mask-wearing and physical distancing, but they included health and non-health care workplaces.[28] For a detailed summary of the systematic review by Talic et al. (2021), please see the PHO synopsis *of "Effectiveness of Public Health Measures in Reducing the Incidence of COVID-19, SARS-CoV-2 transmission, and COVID-19 Mortality: Systematic Review and Meta-analysis*".[36]

The systematic review and meta-analysis by Ingram et al. (2021) included a range of workplace settings from health care, nursing home, meatpacking, manufacturing and office settings, with 280,000 employees based in Europe, Asia and North America.[29] From 61 studies, they found that combined IPAC measures resulted in lower employee COVID-19 positivity rates (0.2% positivity) compared to single measures such as asymptomatic polymerase chain reaction (PCR) testing (1.7%) and universal masking (24%). Modelling studies within the review found that combinations of: (1) timely and widespread contact tracing and isolation; (2) facilitating smaller worker cohorts; and (3) effective use of PPE, can reduce workplace transmission. Only five of the 61 studies were carried out in non-health care related workplace settings, and only two of those five looked at PPE. One (Bontadi) described measures in manufacturing workplaces; however, the full text was not available in English. The second (Herstein) examined the effectiveness of COVID-19 mitigation measures among workers at a meat processing facility in Nebraska and is described in more detail below.[29]

Sobolik et al. (2021) conducted risk assessment modelling for workers at an indoor fresh fruit market and vegetable manufacturing facility.[19] While individual interventions of physical distancing, mask use (described in more detail in respirator section above) and full vaccination had the largest reductions in risk to the food workers compared to other individual measures, the combination of all these strategies with hand-washing and surface disinfection reduced infection risk to <1%. Results also indicate that vaccination was the key measure in the combination to achieve an estimated infection risk of <1%.[19]

A retrospective observational study by Sarti et al. (2021) investigated a COVID-19 cluster among six office employees working full time in the same office space in Italy. The outbreak occurred between November 30 and December 3, 2020.[30] Office prevention measures included distancing desks 1 m or more apart, plexiglass panels, hand sanitizing and use of face masks (surgical or non-medical masks), though masks were not worn while sitting at desks (i.e., prolonged periods during the work day). The index case transmitted SARS-CoV-2 to four of the five co-workers, suggesting that the prevention measures in place were insufficient for the closed office space with poor ventilation. Authors suggested that distancing more than 1 m and constant mask use while sitting at desks may better support COVID-19 prevention, and emphasized the importance of multiple prevention measures being in place.[30]

Volpp et al. (2021) reported results of a comprehensive COVID-19 mitigation strategy (universal masking, testing, upgraded equipment to improve ventilation, physical distancing >6 feet, contact tracing and quarantine/isolation protocols) at a New Jersey boarding school.[31] Between August 20 and November 27, 2020, all staff and students were required to complete PCR testing twice per week; during this time, 5% of faculty and staff and 1% of students tested positive for SARS-CoV-2. Only two of the cases were plausibly caused through secondary transmission on campus. This study suggested the comprehensive mitigation strategy was effective in preventing in-school transmission at a boarding school with on- and off-campus interactions, in the context of high surrounding community transmission.[31]

van den Berg et al. (2021) examined cases of SARS-CoV-2 in students and staff in Massachusetts public schools in districts with different physical distancing requirements (comparing 3 versus 6 feet) during the study period September 24, 2020 to January 27, 2021.[32] All schools mandated masking for school staff and students in at least grades 2 and higher, and the majority (69.7%) of schools required universal masking for all ages. Case rates were not significantly different in students or staff between the districts with 3 versus 6 feet distancing requirements, and the authors' conclusions suggest that with masking requirements in place in schools, physical distancing at 6 feet may not be necessary. While authors controlled for community incidence, it was unclear if other public health measures (i.e., cohorting students, enhanced disinfection protocols and ventilation) were controlled for in the analysis.[32]

Suh et al. (2021) surveyed 486 on-site camps across the US about non-pharmaceutical interventions implemented during the summer of 2020 (e.g., including reduced camper interactions, staff face coverings, cleaning, hand hygiene and camper face coverings).[33] 15% of camps reported one or more confirmed COVID-19 cases in campers or staff, while three camps reported an outbreak. The risk was lowest when campers were required to wear face coverings, which was the least common intervention across participating camps (33% required face coverings on campers). Constant use of staff face coverings and targeted physical distancing measures also reduced the risk of COVID-19.[33]

Herstein et al. (2021) studied the effectiveness of COVID-19 mitigation measures (e.g., universal mask policy, physical barriers between work stations) among workers at meat processing facilities in Nebraska.[34] Authors found significant reductions in COVID-19 incidence in 62% of facilities 10 days after implementing both universal masking and physical barrier interventions. While not formally analyzed, other potential mitigation measures included engineering controls (enhancing ventilation, physical barriers between workers on production line and in cafeterias), administrative controls (cohorting, education, environmental cleaning and disinfection policies), and PPE (not described).[34]

Haigh and Gandi (2021) examined the multiple non-pharmaceutical interventions implemented in essential workplace settings in the US during the study period March to August of 2020.[35] Early measures included increased sick leave, overtime pay, emergency support funds, paid isolation/quarantine periods, travel restrictions, mandatory work-from-home policy for those that did not to have be on-site, adjusted schedules to increase spacing, physical distancing by at least 6 feet, frequent hand hygiene, use of surgical masks, exposure protocols and enhanced cleaning protocols. The second phase of mitigation measures included one-way walking paths, no-touch hardware in restrooms and on doors, increased airflow via HEPA filters and plexiglass shields between workbenches, and strong encouragement of face masks at all facilities and during non-work activities and distribution of KN95 masks. Among the 586 employees tested, only four (1.5%) developed severe illness, 44 had positive PCR results that were likely infectious, and 61 had results with low-level viral loads, consistent with community prevalence at the time. Of all employees with positive tests, 99% were asymptomatic. This study demonstrated that layered prevention measures likely mitigated severe COVID-19 illness. [35]

A modelling study by Chapman et al. (2021) investigated five individual infection prevention measures and a combination of measures (symptom-based screening, routine PCR testing of residents and staff, universal mask wearing, relocation of high-risk individuals to single hotel rooms) in the setting of US homeless shelters.[37] Results showed that combined measures had the highest probability of avoiding an outbreak compared to any individual measure. Probability of avoiding an outbreak was impacted by transmission rates within the shelter and community (i.e., decreased probability in the context of high transmission rates), however combined measures remained consistently more protective then individual measures.

Other important layered prevention measure noted in the included studies exploring non-health care workplace settings echo many of those listed in the Public Health Agency of Canada's general COVID-19

Prevention and Risks guidance: vaccination, stay home when sick, improve ventilation, wear a high quality mask, practice physical distancing, use additional caution in closed and crowded spaces, practice hand hygiene and respiratory etiquette, clean and disinfect surface and objects, and follow all travel-related measures.[16]

Implications for Practice

- Mask-wearing in public has been effectively used for source control during the pandemic as one of multiple preventive measures to mitigate SARS-CoV-2 transmission. Limited real-world data are available on the best type of mask for general community settings, and similarly there is limited evidence on the effectiveness of masks or respirators in non-health care workplace settings to prevent transmission SARS CoV-2. The use of masks or respirators as PPE for protection against transmission of SARS-CoV-2 is generally only required for the provision of health care-related activities, and should be implemented as part of an organizational infection control program including education and auditing surrounding the appropriate choice and use of PPE. Workplaces may already use PPE for hazards unrelated to COVID-19, with associated training and administrative supports, and these should continue independent of COVID-19-related precautions.

- The hierarchy of controls for controlling occupational hazards is premised on the idea that methods at the top of the hierarchy are likely more effective and protective than those at the bottom. Every layer is important but the preference for systemic and broadly applied controls normally leads to inherently safer systems. While the efficacy of PPE where needed can be good at an individual level, it is lowest in the hierarchy as a broad strategy, since it is reliant on the individual for selection and appropriate and consistent use and care.[38,39]

- Most studies that have evaluated workplace infection control interventions have demonstrated the importance of a layered approach to mitigate SARS-CoV-2 transmission. These include vaccination, isolating when sick, ventilation, physical distancing, masking, environmental cleaning and hand hygiene. Examples of specific workplace strategies are policies on vaccination, offering on-site vaccination clinics or paid time for employees to receive vaccines during regular work hours. Reducing contact with others can be achieved through paid sick leave and flexible options to work from home and/or accommodate childcare needs. Compliance with screening, self-isolation, masking for source control, hand hygiene and ensuring that ventilation systems are well-functioning are also important. Finally, in addition to source control, masking may also have a protective effect which is difficult to quantify due to limited evidence and given the additional mitigation layers in place.

- Where masking was examined in the reviewed studies, the universal nature of the policies suggest that workers were primarily using masks for source control. Some also note the importance of user adherence in masking and the importance of a well-fitting mask.

- Even in health care settings where respiratory protection programs support proper use of respirators by employees, clinical outcome evidence on infection prevention does not currently demonstrate a significant protective effect of N95 respirator use over medical masks when caring for patients with suspect or confirmed COVID-19, based on studies conducted prior to the emergence of the Omicron variant.[13]

- Organizational requirements for the administration of an effective respiratory protection program in the workplace per Canadian Standards Association standard CAN/CSA-Z94.4 takes

considerable institutional resources.[40] Program components involve respirator selection, training, fit-testing, proper user implementation, as well as other administrative activities to ensure that the intended benefits are consistently achieved. Establishing comparable respiratory protection programs in non-health care workplace settings may not be realistic or feasible.

- In the current context, universal masking in most indoor spaces including workplaces will broadly achieve source control. Source control masking has been a key pandemic strategy to mitigate transmission, irrespective of the personal protective benefits the same masks may provide the wearer. However, mask fit, filtration and adherence are all important to optimize. For optimization of mask fit and filtration, a non-fit tested respirator (N95s, KN95s) or well-fitted medical mask may be useful. Respirators are designed to closely fit and seal to the face, so the fit may be improved even if fit-testing is not done. However without fit-testing, N95s and KN95s cannot be assumed to reduce the wearer's risk of exposure to hazardous agents as specified by the manufacturer (i.e., respiratory protection). For a non-medical (e.g., cloth) mask, 3 layers optimizes filtration. Whichever mask is worn, it must be worn appropriately for the duration of work hours to be effective.

- A recent standard from the American Society for Testing and Materials F3502-21 also provides specifications for masks used for source control.[41]

- Workplace guidelines and policies contribute to higher compliance with hand hygiene, mask-wearing, and physical distancing.[42] It is important for employers to provide clear and appropriate guidelines that encourage health behaviours, provide transparent information, and make infection control materials accessible throughout the workplace.

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