McMaster University | HEALTH FORUM

RISE Rapid-Improvement Support and Exchange

COVID-19 Rapid Evidence Profile #2 (20 April 2020)

Question

What is known about the spread and management of COVID-19 in non-health workplaces, including workplaces where light-touch services are offered, such as government administration offices (e.g., Service Canada or Service Ontario) and social services (e.g., group homes for high-needs individuals)?

What we found

We identified no guidelines developed using robust processes and no highly relevant synthesized research evidence. We did identify two partially relevant systematic reviews, however, both were conducted prior to the COVID-19 pandemic and relate to other infectious diseases, as well as one rapid review focused on COVID-19. We also identified seven examples of highly relevant guidance that was developed using either synthesized evidence or expert opinion (none of which had abstracts that could be reproduced in an appendix), as well as six highly relevant primary studies (the abstracts for five of which can be found in Appendix 1).

Spread of COVID-19 in non-health workplaces

One partially relevant, high-quality review addressing the spread of COVID-19 in non-health workplaces.

- Spread of influenza and coronaviruses through transportation and transport hubs

Management of COVID-19 in non-health workplaces

One partially relevant, high-quality review and one medium-quality rapid review addressing the management of COVID-19 in non-health workplaces.

- Physical interventions to interrupt or reduce the spread of respiratory viruses
- School closure and management practices during COVID-19

Box 1: Our approach

We identified evidence addressing the question by searching the guide to COVID-19 evidence sources on 20 April 2020 (www.mcmasterforum.org/find-evidence/guide-to-covid-19-evidence-sources).

We searched for guidelines that were developed using a robust process (e.g., GRADE), full systematic reviews (or review-derived products such as overviews of systematic reviews), rapid reviews, protocols for systematic reviews, and titles/questions for systematic reviews or rapid reviews that have been identified as either being conducted or prioritized to be conducted. Single studies were only included if no relevant systematic reviews were identified.

We appraised the methodological quality of full systematic reviews and rapid reviews using AMSTAR. Note that quality appraisal scores for rapid reviews are often lower because of the methodological shortcuts that need to be taken to accommodate compressed timeframes. AMSTAR rates overall quality on a scale of 0 to 11, where 11/11 represents a review of the highest quality. It is important to note that the AMSTAR tool was developed to assess reviews focused on clinical interventions, so not all criteria apply to systematic reviews pertaining to delivery, financial or governance arrangements within health systems.

This rapid evidence response was prepared in three hours or less to inform next steps in evidence synthesis, guideline development and/or decision-making related to the question that was posed.

We provide in Table 1 (below) an overview of the type and number of documents that were identified. In addition, we provide in Table 2 a listing of each of the documents (organized by document type and sorted by relevance to the question and COVID-19), with the colour gradient used to reflect high (darkest blue) to low (lightest blue) relevance to the question and to COVID-19. We provide in Appendix 2 a list of documents excluded at the final stage of reviewing.

Table 1: Overview of type and number of documents that were identified

Type of document	Spread of COVID-19 in non-health workplaces	Management of COVID-19 in non-health workplaces
Guidelines developed using a robust process (e.g., GRADE)	0	0
Full systematic reviews	1	1
Rapid reviews	0	1
Guidelines developed using some type of evidence synthesis and/or expert opinion	4	7
Protocols for reviews that are underway	0	0
Titles/questions for reviews that are being planned	1	1
Single studies in areas where no reviews were identified	7	9

Table 2: Documents that address the question, organized by document type and sorted by relevance to the question and COVID-19

Type of document	Relevance to question	Focus	Recency or status
Guidelines developed using a robust process (e.g., GRADE)		No guidelines developed using robust processes were found	
Full systematic reviews	• Spread of COVID-19 in non-health workplaces	Spread of influenza and coronaviruses through transportation and transport hubs (AMSTAR rating 9/10)	Last searched 14 April 2016
	• Management of COVID-19 in non-health workplaces	Physical interventions to interrupt or reduce the spread of respiratory viruses (AMSTAR rating 9/10)	Last searched October 2010
Rapid reviews	• Management of COVID-19 in non-health workplaces	School closure and management practices during COVID-19 (AMSTAR rating 5/9)	Last searched 9 March 2020

Guidance developed using some type of evidence synthesis and/or expert opinion	• Spread of COVID-19 in non-health workplaces • Management of COVID-19 in non-health workplaces	Risk-informed decision-making guidelines for workplaces and businesses during the COVID-19 pandemic	Last updated 17 April 2020
	• Spread of COVID-19 in non-health workplaces • Management of COVID-19 in non-health workplaces	INSPQ Interim recommendations on occupational health	Last updated 2020
	• Management of COVID-19 in non-health workplaces	CDC guidance on communities, schools, workplaces and events	Last updated 17 April 2020
	• Management of COVID-19 in non-health workplaces	OHSA/HHS guidance on Preparing Workplaces for COVID-19	Last updated March 2020
	• Spread of COVID-19 in non-health workplaces • Management of COVID-19 in non-health workplaces	Public Health England guidance on cleaning in non-healthcare settings	Last updated 26 March 2020
	• Management of COVID-19 in non-health workplaces	Sector-specific guidance for social distancing in the workplace	Last updated 7 April 2020
	• Spread of COVID-19 in non-health workplaces • Management of COVID-19 in non-health workplaces	WHO COVID-19 technical guidance for schools, workplaces and institutions	Last updated April 2020
Protocols for reviews that are underway		No protocols for reviews that are underway were found	
Titles/questions for reviews that are being planned	• Spread of COVID-19 in non-health workplaces	Efficacy of chemical disinfectants on the concentration of human-associated coronaviruses SARS, MERS, and SARS-CoV-2 on stainless steel surfaces	Question under review
	• Management of COVID-19 in non-health workplaces	Infection control practices in non-healthcare settings relevant to primary care	Question under review
	• Management of COVID-19 in non-health workplaces	Supporting staff resilience and well-being during the COVID-19 outbreak	Question under refinement

Single studies in areas where no reviews were identified	• Spread of COVID-19 in non-health workplaces	Modelling COVID-19 outbreak risk in air travel	Pending publication
	• Spread of COVID-19 in non-health workplaces	Importance of monitoring workplace outbreaks given potential for clustering and spread of COVID-19	Published 28 March 2020
	• Spread of COVID-19 in non-health workplaces	Interventions to mitigate early spread of SARS-CoV-2 in Singapore	Published 23 March 2020
	• Spread of COVID-19 in non-health workplaces	Tackling COVID-19 transmission in workplaces	Published 18 March 2020
	• Spread of COVID-19 in non-health workplaces	Estimating the burden of United States workers exposed to infection or disease: A key factor in containing risk of COVID-19 infection	Published 6 March 2020
	• Spread of COVID-19 in non-health workplaces	Risks for COVID-19 across a range of occupations	Published 28 February 2020
	• Management of COVID-19 in non-health workplaces	Promotion for preventive measures to reduce spread of influenza in public nursery schools	Published 2 November 2016
	• Spread of COVID-19 in non-health workplaces	Effects of school closure on transmission of influenza and parental employment	Published 23 April 2013
	• Management of COVID-19 in non-health workplaces	Teachers' risk perception and needs in addressing infectious disease outbreaks	Published 18 June 2010

Waddell K, Gauvin FP, Wilson MG, Moat KA, Mansilla C, Lavis JN. COVID-19 rapid evidence profile # 2: What is known about the spread and management of COVID-19 in non-health workplaces? Hamilton: McMaster Health Forum, 20 April 2020.

The McMaster Health Forum is one of the three co-leads of RISE, which is supported by a grant from the Ontario Ministry of Health to the McMaster Health Forum. To help Ontario Health Team partners and other health- and social-system leaders as they respond to unprecedented challenges related to the COVID-19 pandemic, the Forum is preparing rapid evidence responses like this one. The opinions, results and conclusions are those of the McMaster Health Forum and are independent of the ministry. No endorsement by the ministry is intended or should be inferred.

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Appendix 1. Abstracts for highly relevant documents

Note that the table below only includes the abstracts for the documents that we identified on page 1 as being highly relevant to the question.

Type of document	Relevance to question	Abstract and link to full text
Single studies in areas where no reviews were identified	Spread of COVID-19 in non-health workplaces	Modelling COVID-19 outbreak risk in air travel Background: COVID-19 has spread rapidly across the globe during the first several months of 2020, creating a pandemic. Substantial, non-discriminatory limitations have been imposed on air travel to inhibit this spread. As the disease prevalence and incidence will decrease, more specific control measures will be sought so that commercial air travel can continue to operate yet not impose a high threat of COVID-19 resurgence. Methods: We use modelled global air travel data and population-density estimates to analyze the risk posed by 1,364 airports to initiate a COVID-19 outbreak. We calculate the risk using a probabilistic approach that considers the volume of air travellers between airports and the R_0 of each location, scaled by population density. This exercise is performed globally as well as specifically for two potentially vulnerable locations: Africa and India. Results: We show that globally, many of the airports posing the highest risk are in China and India. An outbreak of COVID-19 in Africa is most likely to originate in a passenger travelling from Europe. On the other hand, the highest risk to India is from domestic travellers. Our results are robust to changes in the underlying epidemiological assumptions. Conclusions: Variation in flight volumes and destinations creates a non-uniform distribution of the risk different airports pose to resurgence of a COVID-19 outbreak. We suggest the method presented here as a tool for the estimation of this risk. Our method can be used to inform efficient allocation of resources, such as tests identifying infected passengers, so that they could be differentially deployed in various locations.
	Spread of COVID-19 in non-health workplaces	Importance of monitoring workplace outbreaks given potential for clustering and spread of COVID-19 Objective: To understand the characteristics of clusters of COVID-19 cases in Tianjin, and provide epidemiological evidence for the prevention and control of COVID-19. Methods: The

Type of document	Relevance to question	Abstract and link to full text
		data of all the cluster cases of COVID-19 in Tianjin reported as 22 February 2020 were collected to analyze the characteristics of different types of the clusters. Results: A total of 115 COVID-19 cases were reported in 33 clusters in Tianjin. Clusters can be classified as follows: 28 familial clusters (71 cases); 1 workplace cluster (10 cases); 3 transport-vehicle clusters (8 cases); and 1 public-place cluster (26 cases). Fourteen familial clusters were caused by the cases from the workplace or public-place clusters. Numbers of secondary cases of family clusters were 1-7, and the median number was 7. The interval from onset to diagnosis for the first case was longer than those of other cases in the familial clusters (Z=-2.406, P= 0.016). The median of incubation period of the public-place clusters was two days. The intervals from onset to diagnosis were significantly different among the family, workplace and public-place clusters (H=8.843, , P=0.012) , and there were also significant differences in onset time among the secondary cases (H=16.607, P=0.000). Conclusions: In the surveillance of COVID-19 epidemic, special attention should be paid to the cases from same family, same workplace, or other places where clustering is prone to occur, and the epidemiological investigation should be carried out in a timely manner to confirm the cluster. To prevent the transmission of COVID-19, the close contacts of the patients should be transferred to an assigned observation place in time for single-room isolation. The awareness of COVID-19 prevention is low in some rural areas, reflected by many mass-gathering activities and delayed medical-care seeking after onset. It is necessary to strengthen the health education and take control measures in the early period of an epidemic.
	Spread of COVID-19 in non-health workplaces	Interventions to mitigate early spread of SARS-CoV-2 in Singapore

		Background: Since the coronavirus disease 2019 outbreak began in the Chinese city of Wuhan on Dec. 31, 2019, 68 imported cases and 175 locally acquired infections have been reported in Singapore. We aimed to investigate options for early intervention in Singapore should local containment (e.g., preventing disease spread through contact tracing efforts) be unsuccessful. Methods: We adapted an influenza-epidemic simulation model to estimate the likelihood of human-to-human transmission of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) in a simulated Singaporean population. Using this model, we estimated the cumulative number of SARS-CoV-2 infections at 80 days, after detection of 100 cases of community transmission, under three infectivity scenarios (basic reproduction number [R_0] of 1·5, 2·0, or 2·5), and assuming 7.5% of infections are asymptomatic. We first ran the model assuming no intervention was in place (baseline scenario), and then assessed the effect of four intervention scenarios compared with a baseline scenario on the size and progression of the outbreak for each R_0 value. These scenarios included: isolation measures for infected individuals and quarantining of family members (hereafter referred to as quarantine); quarantine plus school closure; quarantine plus workplace distancing; and quarantine, school closure, and workplace distancing (hereafter referred to as the combined intervention). We also did sensitivity analyses by altering the asymptomatic fraction of infections (22.7%, 30.0%, 40.0%, and 50.0%) to compare outbreak sizes under the same control measures. Findings: For the baseline scenario, when R_0 was 1.5, the median cumulative number of infections at day 80 was 279,000 (IQR 245,000 – 320,000), corresponding to 7.4% (IQR 6.5 – 8.5) of the resident population of Singapore. The median number of infections increased with higher infectivity: 727,000 cases (670,000 – 776,000) when R_0 was 2.0, corresponding to 19.3% (17.8 – 20.6%) of the Singaporean population, and 1,207,000 cases (1,164,000 – 1,249,000) when R_0 was 2.5, corresponding to 32% (30.9 – 33.1%) of the Singaporean population. Compared with the baseline scenario, the combined intervention was the most effective, reducing the estimated median number of infections by 99.3% (IQR 92.6 – 99.9%) when R_0 was 1.5, by 93.0% (81·5 – 99.7%) when R_0 was 2.0, and by 78.2% (59.0 − 94.4%) when R_0 was 2.5. Assuming increasing asymptomatic fractions up to 50.0%, up to 277,000 infections were estimated to occur at day 80 with the combined intervention relative to 1,800 for the baseline at R_0 of 1.5. Interpretation: Implementing the combined intervention of quarantining infected individuals and their family members, workplace distancing, and school closure once community transmission has been detected, could substantially reduce the number of SARS-CoV-2 infections. We therefore recommend immediate deployment of this strategy if local secondary transmission is confirmed within

Type of document	Relevance to question	Abstract and link to full text
		Singapore. However, quarantine and workplace distancing should be prioritized over school closure because at this early stage, symptomatic children have higher withdrawal rates from school than do symptomatic adults from work. At higher asymptomatic proportions, intervention effectiveness might be substantially reduced requiring the need for effective case management and treatments, and preventive measures such as vaccines.
	Spread of COVID-19 in non-health workplaces	Tackling COVID-19 transmission in workplaces Coronaviruses are zoonotic viruses, and six species of coronaviruses are known to cause human disease such as the common cold, severe acute respiratory syndrome and the Middle East Respiratory Syndrome In January 2020, scientists in Wuhan, China isolated a novel coronavirus (SARS-CoV-2), responsible for an outbreak of unknown pneumonia that had not been previously reported among humans This virus spreads from person to person, through respiratory droplets, close contact, and by touching surfaces or objects contaminated by the virus The incubation period varies from two days to 14 days. Symptoms usually include fever, cough, difficulty breathing, pneumonia, and severe acute respiratory syndrome. Older age and co-morbid conditions increase the fatality rate. Any person with a history of travel to and from COVID-19 affected countries in the past 14 days, or any person who has had close contact with a laboratory confirmed COVID-19 case are suspect cases and need evaluation. Currently no vaccine is available and treatment is mainly supportive. Measures at workplace should include avoiding non-essential travel, identifying and isolating sick employees at the earliest, hand hygiene, respiratory hygiene, environmental hygiene and social distancing.
	Spread of COVID-19 in non-health workplaces	Estimating the burden of United States workers exposed to infection or disease: A key factor in containing risk of COVID-19 infection Introduction: With the global spread of COVID-19 there is a compelling public-health interest in quantifying who is at increased risk of disease. Occupational characteristics, such as interfacing with the public and being in close quarters with other workers, not only put workers at high risk for disease, but also make them a nexus of disease transmission to the community. This can further be exacerbated through presenteeism, the term used to describe the act of coming to work despite being symptomatic for disease. Understanding which occupational groups are exposed to infection and disease in the workplace can help to inform public-health risk response and management for COVID-19, and subsequent infectious-disease outbreaks. Methods: To estimate the burden of United States workers exposed to

Type of document	Relevance to question	Abstract and link to full text
		infection and disease in the workplace, national employment data (by Standard Occupational Classification) maintained by the Bureau of Labor Statistics (BLS) was merged with BLS O*NET survey data, which ranks occupations with particular physical, ergonomic and structural exposures. For this analysis, occupations reporting exposure to infection or disease more than once a month were the focus. Results: Based on our analyses, approximately 10% (14.4 M) of U.S. workers are employed in occupations where exposure to disease or infection occurs at least once per week. Approximately 18.4% (26.7 M) of all U.S. workers are employed in occupations where exposure to disease or infection occurs at least once per month. While the majority of exposed workers are employed in healthcare sectors, other occupational sectors also have high proportions of exposed workers. These include protective-service occupations (e.g., police officers, correctional officers, firefighters), office and administrative support occupations (e.g., couriers and messengers, patient-service representatives), education occupations (e.g., preschool and daycare teachers), community and social-services occupations (community health workers, social workers, counsellors), and even construction and extraction occupations (e.g., plumbers, septic tank installers, elevator repair). Conclusions: The large number of persons employed in a wide variety of occupations with frequent exposure to infection and disease underscore the importance of all workplaces developing risk response plans for COVID-19. This work also serves as an important reminder that the workplace is a key locus for public health interventions, which could protect both workers and the communities they serve.
	Spread of COVID-19 in non-health workplaces	Risks for COVID-19 across a range of occupations No abstract available

Appendix 2: Documents excluded at the final stages of reviewing

Type of document	Focus
Full systematic reviews	Implications of resource use for physical interventions to interrupt or reduce the spread of respiratory viruses
Guidance developed using some type of evidence synthesis and/or expert opinion	Staff isolation or quarantine after COVID-19 exposure
Titles/questions for reviews that are being planned	Evidence about soap and water as compared to soap and emollient for preventing COVID-19
	Community prevention interventions for COVID-19
	Recommended quarantine time for those who have had contact with infected people, or visited a community broadcast area, region and/or country
	Communication strategies that can be used to change behaviour of communities and reduce the transmission of the virus
	Cloth masks for community compared to medical grade masks or nothing to prevent spread of respiratory viruses