

Pandemic Planning in Homeless Shelters: A pilot study of a COVID-19 testing and support program to mitigate the risk of COVID-19 outbreaks in congregate settings

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Abstract: We tested 104 residents and 141 staff for COVID-19 who failed daily symptom screening in homeless shelters in Hamilton, Canada. We detected one resident (1%), seven staff (5%) and one case of secondary spread. Shelter restructuring to allow physical distancing, testing and isolation can decrease outbreaks in shelters.

Keywords: coronavirus, homeless, shelter, surveillance, outbreak

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Introduction:

SARS-CoV-2, the novel coronavirus responsible for causing COVID-19, has particularly affected those in congregate settings such as nursing homes, prisons and homeless shelters (1,2). In Canada, there have been several outbreaks documented in homeless shelters (3,4).

Preventing and minimizing outbreaks in shelter settings using limited resources protects residents and staff within shelters as well as those they may interact with in the broader community. Furthermore, the higher prevalence of comorbidities amongst shelter residents places them at higher risk of severe COVID-19 disease (5). Preventing transmission in this population may have a greater impact on reducing hospital admissions and burden on critical care resources.

The objective of this report is to describe our experience with shelter facility restructuring, daily symptom screening and rapid testing to mitigate the risk of COVID-19 in the homeless shelter setting in Hamilton, Ontario, Canada.

Methods:

The homeless shelter system in the city of Hamilton is operated as a partnership between the municipality and social service agencies. Healthcare within the shelters is provided by the Hamilton Shelter Health Network, a group of physicians (Family Medicine, Internal Medicine and Psychiatry), nurse practitioners, nurses and midwives who are funded through an alternate funding plan by the Provincial Government of Ontario.

At the start of the pandemic, there were approximately 341 shelter beds across eight shelters in Hamilton. Collaboration between the local public health unit, municipal government, shelter operators and the Shelter Health Network began in March of 2020. The collaboration allowed an increase from 341 to 395 shelter beds spread across the pre-existing shelters, three additional hotel sites and one additional temporary men's shelter. This enabled increased physical spacing between shelter beds and lower density within each shelter. Furthermore, a temporary isolation center (from a repurposed recreation center) was created for COVID-19 positive homeless individuals.

Through a partnership with the Hamilton Regional Laboratory Medicine Program (HRLMP) we were able to access COVID-19 testing with rapid turnaround time. This allowed us to use existing spaces within shelters for short-term isolation while awaiting COVID-19 testing results and to immediately arrange two-week isolation for those who tested positive.

Between March 17 and April 30, 2020, COVID-19 testing was performed on all shelter residents and staff who failed daily screening for potential COVID-19 related symptoms as well as staff and residents identified as close contacts of positive cases. Symptom screening was conducted according to direction given by the local public health unit, and was updated as new information regarding potential symptoms of COVID-19 were uncovered (e.g. anosmia). Nasopharyngeal swabs (NPS) were performed by trained nurses, paramedics and physicians. Between March 19 and April 16, testing was done using a laboratory-developed BD Max Multiplex Real-Time Polymerase Chain Reaction (RT-PCR) for COVID-19 (using 5'-Untranslated region, or 5'-UTR), Influenza A, Influenza B, Respiratory Syncytial Virus (RSV), Metapneumovirus, Parainfluenza 1, Adenovirus and Rhinovirus/Enterovirus. After April 17,

testing exclusively for COVID-19 was undertaken in order to streamline result times and tests were considered positive if RT-PCR was positive for COVID-19 5'-UTR or Envelope genes.

Residents awaiting results were isolated within their shelter in single room areas. Residents who tested positive for COVID-19 and did not require hospitalization were transferred to our prepared isolation center for further monitoring. Transportation was organized by the City of Hamilton and involved the use of a dedicated transportation vehicle with enhanced infection control measures including a barrier between patient and driver and surgical mask, face shield, gloves and gown for the driver. Isolation continued for a total duration of fourteen days, with the ultimate decision to end isolation made in conjunction with our local public health unit. Nurses performing tests and shelter staff caring for isolated residents wore a disposable gown, surgical mask, face shield and disposable gloves. Staff who tested positive were excluded from work and provided with information related to self-isolation and symptom monitoring. All positive results were reported to the local public health unit for appropriate case management and contact tracing.

For context, the provincial government declared a state of emergency on March 17, limiting public gatherings to 50 people or less, and subsequently closed non-essential businesses on March 23. Gatherings were further limited to five people on March 28. No specific limitations were imposed upon shelter residents during the study period although movement between shelters was discouraged. Universal masking within common areas in the shelter system was initiated on April 18.

Results:

Between March 19 and April 30, a total of 245 NPS were obtained from 141 staff and 104 residents (Figures 1a and 1b). Of the 88 total tests (59 residents and 29 staff) completed on the multiplex PCR platform prior to April 17, 12 (13.6%) were positive for a viral pathogen. Ten of 59 residents (16.9%) were diagnosed with rhinovirus/enterovirus infection and two of 29 staff (6.8%) were diagnosed with COVID-19 infection. A total of 157 (44 residents and 113 staff) tests performed after April 17 were tested exclusively for COVID-19; of these 1 resident (2.3%) and 5 staff (4.4%) tested positive. Overall during our study period, 1 of 104 residents (1.0%) and 7 of 141 staff (5.0%) were diagnosed with COVID-19 infection, and a total of 17 tests (6.9%) identified a viral pathogen. All positive cases were detected only through the daily symptomatic screening protocol or contact tracing.

Follow up contact tracing and testing revealed no secondary spread linked to the one positive shelter resident. Of the seven staff diagnosed with COVID-19, four were part of a cluster that was cohabiting at the same location distant from the shelter and were presumed to be community acquired. The remaining three staff worked at two separate shelter sites. During the time period of our study, one additional shelter resident was diagnosed with COVID-19 after presentation to a local emergency room (outside of our surveillance protocol).

For comparison, during the study time period, the City of Hamilton reported 422 patients with COVID-19 and a positivity rate of approximately 5-7%. Approximately 10% of the cases

were in congregate settings (mainly long term care homes). In the province of Ontario, there were 15973 reported COVID-19 infections and 1080 deaths during our study period.

Test turnaround time throughout our study period averaged 14 hours from time of specimen arrival in the lab to time of reported results and 89 per cent of results were reported within 24 hours.

Discussion:

We have thus far been successful in preventing large outbreaks in the shelter setting despite identifying positive cases in both staff and residents. Our results emphasize the importance of taking a proactive, aggressive approach to outbreak mitigation in high risk settings. While there has certainly been some random chance, we postulate that four factors have been particularly important in increasing our chances of success:

1. Increased capacity of shelter space by opening surge shelters and hotel rooms, allowing for more effective physical distancing in congregate shelters;
2. Access to rapid assessment and testing on site when symptomatic residents or staff are identified through active screening;
3. Restructuring of physical spaces to accommodate isolation of residents with confirmed COVID-19 and those awaiting test results; and
4. Rapid turnaround of test results through collaboration with our regional laboratory program allowing triage of individuals into isolation spaces without exceeding available capacity.

There are several limitations which should be taken into account in interpreting our data. Our testing program provided evaluation of those staff and residents who were identified as symptomatic through active screening within the shelters. We are aware of instances where shelter residents and staff have presented to other settings where testing has been performed, and is not captured in our data. Secondly the test characteristics of a NPS can be influenced by testing technique, and as such the sensitivity of our test in the real world setting of a mobile testing unit has not been clearly established. However, the lack of large scale outbreaks in area shelters suggests that we have not had a large number of false negative tests thus far.

Efforts to mitigate the risk of outbreaks of COVID-19 in high risk congregate settings such as long term care facilities, homeless shelters, and prisons are essential in moving towards the broader goal of managing COVID-19 risk in the general community. Our group has recently initiated a cluster randomized control trial to examine the effectiveness and acceptability of various surveillance testing strategies of asymptomatic individuals within our shelter system in an ongoing effort to enhance our ability to rapidly detect and isolate COVID-19 infected individuals. However, such efforts should be conceptualized as secondary prevention. There is also a pressing need to consider primary prevention - that is, upstream actions to end homelessness.

Our study demonstrates that accessible shelter housing that allows for rapid testing, isolation and physical distance is imperative to outbreak prevention in the shelter setting. The strategy presented here should be considered as part of the COVID-19 pandemic response alongside other homelessness prevention and reduction interventions.

Acknowledgements:

We thank the Hamilton Regional Laboratory Medicine Program (HRLMP), Hamilton Public Health, City of Hamilton and staff working within the Hamilton Shelter Health Network.

None of the authors has any potential conflicts of interest to disclose.

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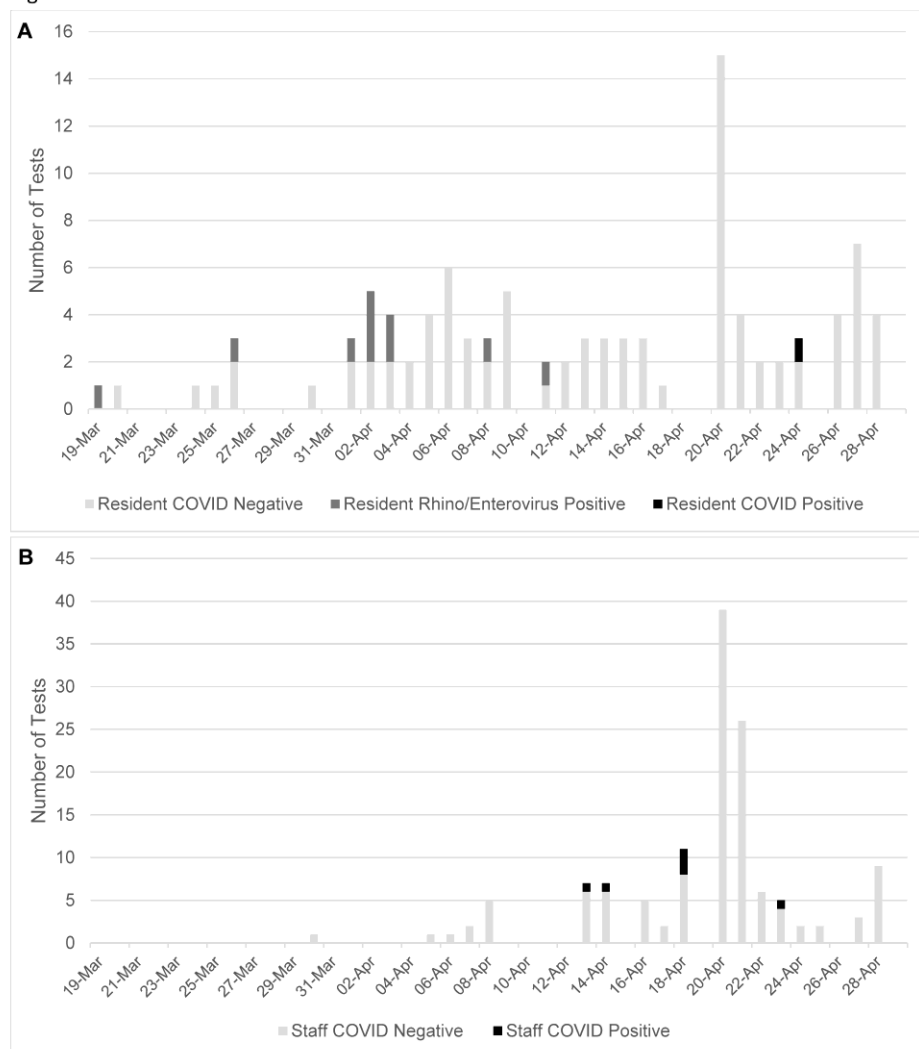
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Figure 1 legend

Number of daily tests and test results in residents (A) and staff (B).

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Figure 1



Number of daily tests and test results in residents (A) and staff (B).