



# Special Focus: Acquisition exposures of COVID-19

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## Introduction

To look more closely at the impact of Stage 3 reopening on the spread of virus, Ottawa Public Health analyzed the data we collect from Ottawa residents who test positive for COVID-19 as part of our investigations to find sources of infection and chains of transmission in our community. As of October 30, Ottawa has reported 4,699 people who tested positive since Stage 3 re-opening, out of 7,000 total cumulative cases.

In this report we provide an analysis of where people who have tested positive for COVID-19 may have been exposed to or were able to transmit the virus to others (referred to in this report as ‘exposures’). Analysis is limited to Ottawa residents with symptom onset (or specimen collection date if the person was asymptomatic) between July 17 – September 30, 2020 and extracted October 10, 2020 at 1:30pm from the COVID-19 Ottawa Database (COD). The COD is a dynamic disease reporting system that allows for ongoing updates; data represent a snapshot at the time of extraction and may differ from previous or subsequent reports.

In reading this report it is important to be aware that different settings for transmission have differing implications for the control of COVID-19. For example, an infection picked up in a public setting (where masking and physical distancing ought to have taken place) can lead to several more infections within a person’s household that would be much more difficult to avoid because of the prolonged, close, mask-less exposures common to most households. As such, even if transmissions in any particular non-household setting form only a small percentage of the various risk settings, their importance as seeds of further transmission can be disproportionately larger.

## Methods & Limitations

There were 2,683 people who tested positive in Ottawa during the time period analyzed (July 17 – September 30, 2020) and some exposure information was available for 2,234 (83%). Multiple data fields in the COD were included in the analysis and string-matching was utilized to improve ascertainment of exposures. The level of detail captured in the COD varies, but rather than varying randomly, the detail captured may be affected by interviewer time limitations and/or preferences or other directional biases. Additionally, people who test positive may report several types of situations and locations where they may have been exposed to the virus, so sometimes it is not possible to know the true circumstances in which the virus was transmitted. Furthermore, people may be hesitant to report exposures that are known to carry a higher risk.

This analysis does not ascertain the initial exposure that introduced COVID-19 into a household or institution (e.g., how a social gathering leads to an outbreak being declared in a school setting or a long term care home), nor does it report on all subsequent transmissions linked to the people who tested positive (e.g., further transmission to household or other contacts), which means it underestimates the full impact of many exposure settings (e.g., such as restaurants and bars). Standardized provincial outbreak definitions and protocols for certain institutions like hospitals, long-term care homes (LTCH)/retirement homes (RH), congregate settings, schools, and child care settings may lead to over-representation of these settings being identified as exposures compared to those that occur in the community (e.g., social gatherings at home or in restaurants). There is an ongoing effort to improve the systematic collection of data related to various exposure settings to help inform future analyses.



## Highlights

Among Ottawa residents who tested positive for COVID-19 between July 17 – September 30, 2020 for whom exposure information was available:

- Half of the cases in this analysis reported household contact with another person who tested positive.
- The other half of cases reported non-household close contact (e.g. indoor gatherings), outbreak close contact (e.g. LTCH resident) or lived in a neighbourhood with a high rate of COVID-19.
- Non-household close contact is often what introduces COVID-19 into a household and where there is the most potential for preventing transmission.

When we look specifically at exposures in restaurants, bars, gyms, and sports teams, among those who reported non-household contact we found:

- 83 (8%) had been to a bar or restaurant and 15 (1.5%) had been to a gym prior to developing symptoms or while they were able to transmit the virus, resulting in over 1,100 high risk contacts from just 98 people.
- 16 (1.6%) had been to or played a sport such as soccer, basketball, or hockey prior to developing symptoms or while they were able to transmit the virus.
- Sports played indoors have been associated with seven outbreaks since September 30, 2020.

Common risk factors identified across the exposure settings analyzed in this report include:

1. Socializing outside of one's own household where talking, eating and drinking was involved – whether that occurred in homes, bars and restaurants, patios or parks. This finding is consistent with a recent case-control [study](#) by the U.S. Centers for Disease Control and Prevention (CDC) that found people who tested positive for the virus were more than twice as likely to have reported dining at a restaurant (including indoor, patio, and outdoor seating) than those who tested negative.
2. Close contact in small spaces during social and workplace settings – indoors at home and in sports venues, small poorly ventilated spaces such as locker rooms, cars, meeting rooms, and break rooms.
3. Inadequate/inconsistent mask use when interacting with people outside of one's own household in crowded environments and where physical distancing is not maintained – when socializing, coaching, teaching or caring for friends, family, students or clients.

These locally identified risk factors align with what the World Health Organization has identified as the '[Three Cs](#)' where COVID-19 spreads more easily, particularly when all three overlap: 1) crowded places with many people nearby, 2) close contact setting with close-range conversations, and 3) confined and enclosed spaces with poor ventilation.



## Hierarchy of Exposures

We developed a mutually exclusive hierarchy of exposures to categorize people who tested positive for COVID-19 according to the most likely acquisition exposure. This was based on the duration, proximity and frequency of contact, with household contact categorized as the most likely source of infection, followed by non-household close contact. Non-household contact was further subdivided into indoor and outdoor exposures or unknown if no data were available on the location of the non-household contact. In the absence of an identified and recorded household or non-household contact, any person associated with an outbreak was categorized as having an exposure in an outbreak setting. For people who did not have a documented household contact, non-household contact, or outbreak exposure, an analysis was conducted to determine if they lived in a neighborhood where higher rates of COVID-19 have been observed (referred to as a “neighbourhood cluster”). It is important to note that COVID-19 is present in every community in Ottawa and living in a particular neighbourhood does not necessarily reflect where the people may have “caught” or been exposed to the virus. Exposure to COVID-19 can occur anywhere people are interacting or gathering, such as at workplaces or services open to the public. For more information on COVID-19 in Ottawa neighbourhoods, please visit: <https://www.neighbourhoodstudy.ca/covid-19-in-ottawa-neighbourhoods/>. Lastly 17% of cases had documented unknown acquisition or were missing exposure information in the COD. The findings of the analysis are shown in Table 1.

- Among those with known exposures, household contact with another person who tested positive accounted for half of people who tested positive. This proportion is slightly higher for those aged 0 to 39 years (55%) compared to adults aged 40 and older (41%), indicative of parent to child transmission.
- Nearly one-in-five people who tested positive was categorized as having a non-household close contact (19%).
- Exposure to an outbreak setting was identified for 11% of people who tested positive who did not have either a known household or non-household close contact.
- For people who did not have a documented household or non-household close contact, or link to an outbreak setting, 19% were living in neighborhood with a higher rate of COVID-19.
- Among people who reported exposure to COVID-19 through non-household close contacts, exposure through indoor contact was most common.
- Adults aged 40 and older were more likely to have an identified exposure to COVID-19 from an outbreak setting (27%) than those aged 0 to 39 years (3%) during this time period. Many represented in this category are residents of long-term care homes.



Table 1. Hierarchy of exposures among Ottawa residents infected with COVID-19, July 17-September 30, 2020

Exposure location	Age 0 to 39 years	Age 40 years and older	Total
1. Household	817 (55%)	310 (41%)	1127 (50%)
2. Non-household	302 (20%)	120 (16%)	422 (19%)
<i>Indoor</i>	162 (11%)	72 (10%)	234 (10%)
<i>Outdoor</i>	25(2%)	5(1%)	30 (1%)
<i>Unknown</i>	115(8%)	43(6%)	158 (7%)
3. Outbreak	49 (3%)	204 (27%)	253 (11%)
4. Unknown but lives in neighbourhood cluster	308 (21%)	124 (16%)	432 (19%)
<b>TOTAL WITH IDENTIFIED EXPOSURE</b>	<b>1476</b>	<b>758</b>	<b>2234</b>
Unknown/missing exposure setting	302 (17%)	145 (19%)	449(17%)

**Notes:**

1. Indoor, outdoor and unknown are subcategories of non-household contact.
2. Outbreaks include those in healthcare institutions (e.g. long-term care home), in childcare and educational establishments (e.g. school) and in the community (e.g. workplace).
3. 'Unknown but lives in a neighbourhood cluster' includes people who test positive with a residential address that falls within a neighbourhood with a statistically higher than expected per capita rate of infections but for whom no exposure setting is identified. Despite not having identified exposures, when community prevalence is high there is greater risk of acquisition.
4. Data on people who test positive are from the COD as of 1:30 p.m. on October 10, 2020.
5. Confirmed cases are those with a confirmed COVID-19 laboratory result as per the Ministry of Health Public health management of cases and contacts of COVID-19 in Ontario. June 23, 2020 version 8.0.

## All Exposures

When we consider multiple exposure categories and remove the hierarchy, we can see details of the non-household contacts as provided in Table 2 (indoor gatherings – 6%, bars & restaurants – 4%, workplaces – 4% and domestic travel – 3%). Among people who test positive with a **non-household contact** (n=1009) we found:

- 83 (8.2%) people who tested positive identified they had been to a bar or restaurant in the time prior to developing symptoms or while they were able to transmit the virus. 15 (1.5%) people who tested positive reported they had been to a gym in that time.
- As a result, there were 1165 high risk contacts of the 98 people who tested positive who had been to a bar, restaurant or gym. Clusters have been identified related to social gatherings such as birthdays celebrated at restaurants where more than one household interacts at one table.
- Four workplace outbreaks involving 16 restaurant staff who tested positive were identified in September 2020. Note, it has not been OPH practice to open outbreaks (i.e., label and report as an outbreak) when they involve bar and restaurant patrons (and not staff) because they do not fall under Ministry setting-specific outbreak definitions and opening outbreaks for these gatherings would not have changed the management of cases, contacts or communication with the associated businesses. Our experience locally is that restaurants often voluntarily close for 14 days when a single staff member tests positive to prevent further spread.



- 16 (1.6%) people who tested positive identified they had been to or played a sport such as soccer, basketball, or hockey prior to developing symptoms or while they were communicable.

Table 2. List of potential acquisition exposures among Ottawa residents infected with COVID-19, July 17-September 30, 2020

Category	Age 0 to 39 years (n=1778)	Age 40 years + (n=903)	Total (n=2681)
Overall			
<i>Household</i>	817 (55%)	310 (41%)	1127 (50%)
<i>Non-household</i>	727 (49%)	282 (37%)	1009 (45%)
LTCH/RH Outbreak			
<i>LTCH Outbreak</i>	37 (3%)	157 (21%)	194 (9%)
<i>RH Outbreak</i>	16 (1%)	42 (6%)	58 (3%)
Hospital/Medical Clinic	45 (3%)	65 (9%)	110 (5%)
<i>Hospital Outbreak</i>	27 (2%)	50 (7%)	77 (3%)
School	120 (8%)	26 (3%)	146 (7%)
<i>School Outbreak</i>	46 (3%)	12 (2%)	58 (3%)
Social Gathering			
<i>Indoor Gathering</i>	114 (8%)	29 (4%)	143 (6%)
<i>Outdoor Gathering</i>	43 (3%)	12 (2%)	55 (2%)
Child Care	52 (4%)	23 (3%)	75 (3%)
<i>Child Care Outbreak</i>	40 (3%)	15 (2%)	55 (2%)
Bar/Restaurant	71 (5%)	12 (2%)	83 (4%)
Workplace	45 (3%)	38 (5%)	83 (4%)
Domestic Travel	60 (4%)	17 (2%)	77 (3%)
Travel to Quebec	58 (4%)	17 (2%)	75 (3%)
Retail	28 (2%)	20 (3%)	48 (2%)
Community Outbreak	24 (2%)	23 (3%)	47 (2%)
<b>TOTAL KNOWN</b>	1476	758	2234
MISSING	302 (17%)	145 (16%)	447 (17%)

**Notes:**

1. Data on cases are from the COD as of 1:30 p.m. on October 10, 2020.
2. Cases may report more than one possible acquisition exposure and fall into more than one category. Outbreak categories are a subset of the main category (e.g. school outbreaks are a subset of school cases).
3. Community outbreaks include outbreaks in workplaces, a religious/spiritual organization and a multi-unit dwelling.
4. Confirmed cases are those with a confirmed COVID-19 laboratory result as per the Ministry of Health Public health management of cases and contacts of COVID-19 in Ontario. June 23, 2020 version 8.0



## Addendum

Since the end of the analysis period on September 30, 2020, indoor sports and recreation emerged as important sources of exposure and transmission that declined again after Ottawa implemented additional Stage 2 public health measures on October 9, 2020. There have been seven confirmed sports and recreation outbreaks of COVID-19 directly involving 54 people who tested positive and these resulted in secondary transmission in households (including a death), schools (including links to 4 school outbreaks and 1 daycare outbreak) and workplaces (including a LTCH outbreak), and over 700 high risk contacts. Even in the absence of an outbreak, when a teammate tests positive, typically the entire team has been identified as high-risk contacts requiring 14 days of self-isolation.

A recent [report](#) published by the U.S. CDC described a high rate of transmission from an indoor sporting event that involved intense physical activity, and the important role that asymptomatic transmission can have in an outbreak setting.

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**For further information about COVID-19 in Ottawa,** visit [ottawapublichealth.ca](https://ottawapublichealth.ca).

