Special Focus: COVID-19 in Schools

February 2021

Key Messages

- There is evidence of limited transmission of COVID-19 within schools, which peaked in early October and then declined. Infection rates in schools are similar to that in the community. As community rates of COVID-19 increase, it is especially important for staff, students, and parents to continue following public health recommendations to prevent COVID-19 transmission within schools.

- There were 888 cases of COVID-19 identified among school attendees. Most (85%) got their infection outside of school.

- There were 55 outbreaks of COVID-19 identified in schools. More than half involved only two cases, where infection spread from one person to only one other person.

- There may be more spread of COVID-19 within schools, as in other settings, that isn't detected because people don't get tested. It is important for individuals identified as a high-risk contact to follow public health guidance with respect to testing.

- Almost half of school outbreaks began with a student or staff member who was a household contact of a confirmed case. One quarter of these source cases did not have symptoms of COVID-19. For this reason, it is critical that individuals isolate when other members of the household have symptoms and are waiting for test results or are known to be infected with COVID-19.

- When deciding whether to enroll children in online or in-person school, parents weighed concerns about the risk of exposure to COVID-19 if attending in-person and isolation and lack of school supports if they did not attend in-person.

Introduction

On July 30, 2020, the Ontario government announced that publicly funded schools in Ontario should provide both in-person and remote learning options for all students in the fall. Following this announcement, each school prepared for a school start in August or September.

Preparation for a safer return to school took place at many levels. Schools put in place many safeguards for staff and students, including requirements for mask wearing, cohorting and physical distancing, and encouraging daily screening for symptoms. Provincial testing guidelines were changed to allow affected families easier access to testing.[1] In addition, Ottawa Public Health (OPH), based on provincial guidance,[2] developed protocols for responding to one or more cases of COVID-19 in a school, including decision tools for testing and school exclusion, templated letters for communicating with affected families and school communities, and a process for notifying schools of staff or students who were under isolation and should not be

attending school in person. Also, OPH and schools developed communication channels in order to monitor COVID-19 activity on a daily basis. This included ongoing support, including guidance on personal protective equipment, cleaning and disinfection, site-visits and site-specific prevention guidance.

The purpose of this report is to describe COVID-19 activity in schools during the first three months (September – November, 2020) of opening after declaration of the pandemic. Specifically, it describes the burden of COVID-19 infections in schools and the likely source of acquisition (in school versus in the community). The report is intended to assist public health and school boards in planning for the spring term and to allow all stakeholders to put into perspective the accomplishments and challenges of re-opening schools during a pandemic. More information is available from the OPH Daily COVID-19 Dashboard and from the Ministry of Education.

Data Sources & Limitations

Data on parental mental health and concerns come from a bilingual, population-level online survey of Ottawa residents conducted by EKOS, on behalf of OPH, during October 2020.

The data presented on individuals diagnosed with confirmed COVID-19 or identified as having been a close contact of someone diagnosed with COVID-19 (referred to as "cases" and "contacts" in this report) come from a number of sources. The OPH COVID-19 School Support Team (CSST) logs cases who attended school prior to diagnosis, including the cases' periods of communicability (POC). The POC is the range of time during which an infected person can spread their infection to others, which is operationally defined to be two days prior, to 14 days after, symptom onset. (In December, the definition of the POC was changed to be two days prior, to only 10 days after, symptom onset.) For an asymptomatic person, the date of testing is used as a proxy for symptom onset date.

Information about cases and contacts, including which contacts became cases after their exposure in school, was extracted from the COVID-19 Ottawa Database (The COD) on December 16, 2020. The COD is a dynamic disease reporting system that allows for ongoing updates; therefore, data in this report represent a snapshot at the time of extraction and may differ from previous or subsequent reports.

Testing data for Ottawa, by 10-year age group, was provided by ICES (the organization formerly called the Institute for Clinical Evaluative Sciences). The testing data did not differentiate by whether an individual was an in-person school attendee or a contact of a case.

School attendees are either in-person students or staff. Estimates of the number of in-person students was provided to OPH by the four publicly funded school boards, which totalled 124,211 students. The number of in-person staff attendees was not provided, but numbers of staff and students during the 2018-19 school year are available from the

Ontario Ministry of Education and indicate that approximately 93% of school attendees were students.[3]

It is important to consider a number of data limitations. Primary among them, it is possible that many cases go undetected because not all high-risk contacts are tested (and the testing data available does not include the number of high-risk contacts tested). Case-finding and rates of infection are dependent on testing, which in turn is dependent on individual and societal factors such as age (as this relates to the likelihood of being symptomatic) and systemic barriers to testing (including accessibility, stigma and other factors). In addition, provincial testing guidelines for school attendance changed in late September such that children with only one non-specific symptom (e.g., sore throat, runny nose, congestion, headache, nausea, fatigue) could return to school after 24 hours if their symptoms were improving and were not required to be tested prior to return. (Children who had one of four specific symptoms associated with COVID-19 (fever, cough, shortness of breath or loss of smell or taste), or who had two or more non-specific symptoms were required to self-isolate for 14 days (changed to 10 days in December) and recommended to be tested.) As a result of these factors, counts and calculated rates of diagnoses are likely an underestimate of the true burden of COVID-19.

Another limitation is that rate calculations, particularly in schools, are dependent on accurate population estimates; however, the population of in-person students can change over time. In addition, because the numbers of in-person students were not available for private schools or for staff, infection and transmission rates were calculable only for in-person students for the four publicly funded school boards.

Snapshot

- 888 in-person school attendees, in 246 Ottawa schools across the four school boards and private schools, were reported with confirmed COVID-19 infection during September – November 2020.

- 560 of the cases among in-person school attendees attended during their period of communicability.

- 55 school outbreaks were declared.
    - The median number of cases in each outbreak was 2 (range, 2-17).
    - In total, there were 197 outbreak-related cases: 43 in staff and 154 in students. This total includes approximately 63 source cases who likely acquired their infection outside of school.

Parental concerns

Following closure in March 2020, schools in Ottawa were reopened in August and September. Parents of elementary students could choose to enroll their children for in-

person or online school. Parents of secondary school students could choose to enroll in a mix of in-person and online school or online-only school.

To make enrollment decisions, parents balanced, among other factors, their concerns that children would feel isolated and not benefit from school supports if they did not attend school in person, and that they would be exposed to COVID-19 in school if they did attend in person.

School supports

Some of the factors that parents considered when deciding about enrollment included concerns about missing out on school supports if their children stayed home. According to a survey of parents in Ottawa with children under 18 years old in their home conducted by OPH in October 2020[4]:

- A high proportion (78%) of Ottawa parents were concerned that their child(ren) were missing out on talking, playing, being social or learning with others outside of their home.
- Three out of five (60%) Ottawa parents were concerned that their child(ren) were missing connecting with their school or daycare community.
- Just over half (53%) of Ottawa parents were concerned that their child(ren) were missing being supported by their teachers/educators and school/daycare.

Another concern of parents was their own mental health and ability to parent children in the home. A total of 42% of parents with children under 18 years old in the home reported fair or poor mental health and emotional well-being, compared with 9% in 2017.[5] In addition, 11% did not think they handled well the day to day demands of raising children.

Risk of getting COVID-19 in school

Other considerations when deciding whether to enroll their children for in-person or online school were their children's tolerance for mask-wearing and their risk of getting COVID-19 at school or on the school bus.

The October 2020 OPH survey found that, among Ottawa parents with children <18 years of age at home:

- Three out of ten (30%) were very or somewhat concerned about their child tolerating wearing a mask for long periods of time;
- 62% were very or somewhat concerned about their child getting COVID-19 at school or daycare; and
- 57% were very or somewhat concerned about their child getting COVID-19 on the school bus.

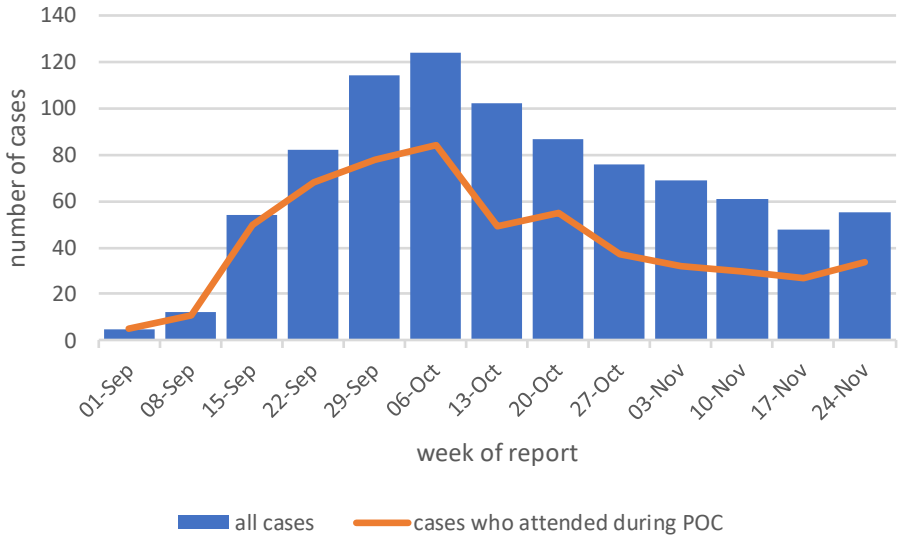
Trends in COVID-19 in schools over time

Cases

A total of 888 in-person school attendees were diagnosed with COVID-19 infection during September – November 2020. A total of 560 (63%) of the 888 cases attended during part of their period of communicability (POC).

The number of cases in schools, and cases in school during their POC, increased during September, peaked during the week of October 6, and then declined almost each week in October and November (Figure 1).

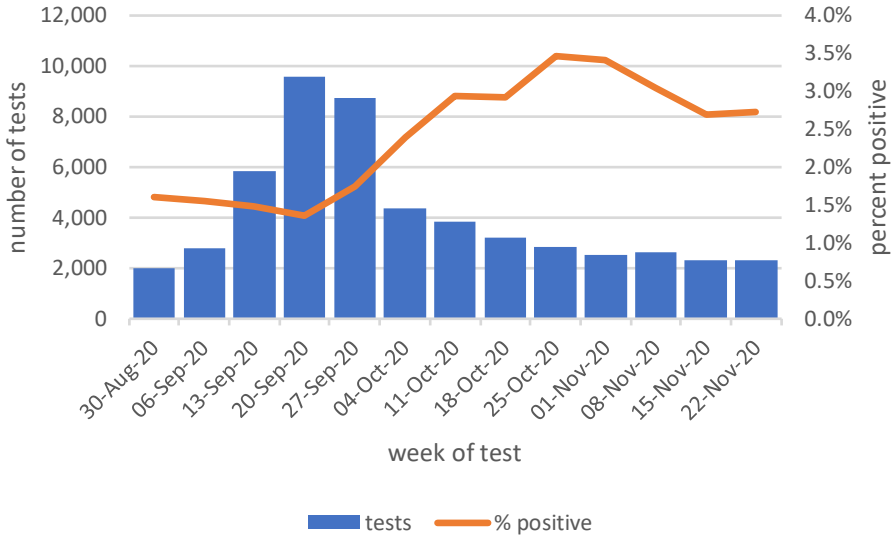
Figure 1. Number of in-person school attendees diagnosed with confirmed COVID-19 and number attending school during their POC, by week, September 1 – November 30, 2020, Ottawa



POC: period of communicability. All cases include in-person students and staff who tested positive for COVID-19.

Changes in testing guidelines and uptake might explain some of the decline in cases. Testing among Ottawa residents aged less than 20 years peaked in late September, just as testing was limited to close contacts and certain symptomatic individuals, and then declined in October (Figure 2). A similar trend in reports of cases to OPH shortly followed (Figure 1). In addition, the percent of tests among less than 20 years-olds that were positive increased when testing volume declined, suggesting that more cases would have been detected had there been more testing.

Figure 2. Number and percent positivity of COVID-19 tests carried out among Ottawa residents aged less than 20 years, by week of test, August 30 – November 28, 2020, Ottawa



Data source: ICES

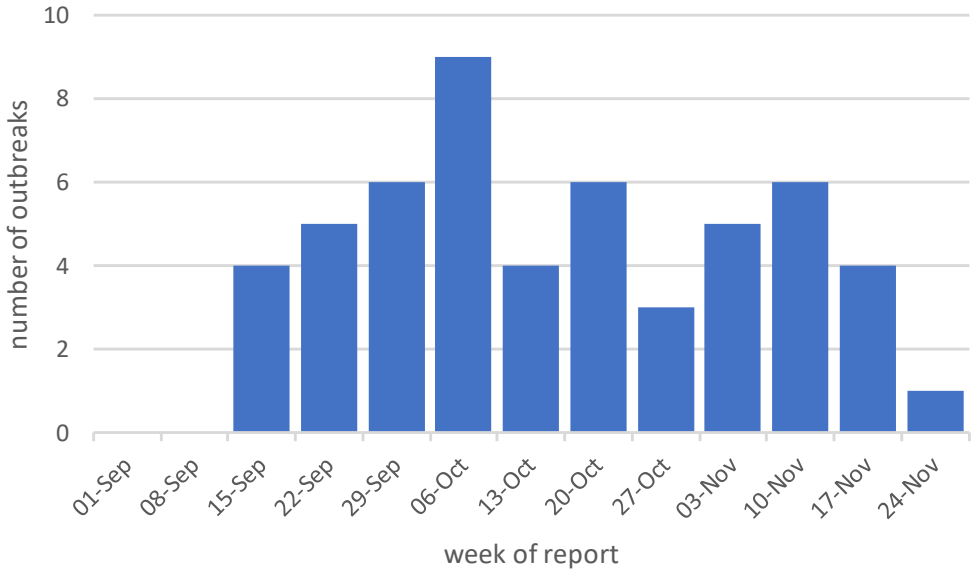
There were 695 cases in in-person student attendees from the four publicly funded school boards, corresponding to a cumulative case rate of 560/100,000 population. This rate was similar in elementary and secondary school students and in the general population over the same time frame.

Outbreaks

An outbreak in a school is defined as two or more lab-confirmed COVID-19 cases in in-person students and/or staff (or other visitors) in a school with an epidemiological link, within a 14-day period, where at least one case could have reasonably acquired their infection in the school. Operationally, a case with an epidemiologic link in school within a 14-day period was considered evidence of an outbreak unless the case had an exposure (e.g., a household contact previously diagnosed with COVID-19) determined to be a much more probable exposure. Outbreaks are declared after consideration of the individual circumstances of school attendees who tested positive for COVID-19. Outbreaks are often identified when a case is found among high-risk contacts who have already been sent home on self-isolation following the identification of a previous case. The case that is identified first is referred to as the “index” case; subsequent epidemiologically-linked infections are “secondary” cases. During outbreak investigation, one or more “source” cases (i.e., cases that served as the initial source of infection for the outbreak) might be identified.

A total of 55 outbreaks were declared, with starting dates between September 18 and November 30, 2020. Outbreak size ranged from two to 17 cases; however, more than half of outbreaks were comprised of just two cases (i.e., one index and one secondary case). The peak number of school outbreaks occurred during the week of October 6. The number of outbreaks has declined since then (Figure 3).

Figure 3. Number of COVID-19 outbreaks among in-person school attendees, by week, September 1 – November 30, 2020, Ottawa



Characteristics of the spread of COVID-19 within schools

Contacts

When outbreak- or non outbreak-related cases are identified in school, OPH works with the school to identify all school attendees who were in close contact with the case while the case was communicable. A high-risk contact in the school is someone who was in close contact, usually within 2 metres for longer than 15 minutes, without adequate personal protective equipment. These contacts are contacted as soon as possible by OPH to alert them of their exposure and the need to self-isolate. High-risk contacts are dismissed for a period of 14 days after the last day of contact with a case and are recommended to get tested for COVID-19 five days after their last exposure to the case even in the absence of symptoms, or sooner if they develop symptoms. A negative test result does not, however, change the period of isolation for a high-risk contact.

A total of 11,376 school attendees were identified as high-risk contacts of the 560 cases (an average of 20 high-risk contacts per case) who attended during their period of communicability. Of these, 134 (1%) were diagnosed with confirmed COVID-19 infection that was linked to their exposure in school. This could be an underestimate of the number of contacts who were infected with COVID-19 because not all contacts were tested.

Source and spread of COVID-19 in schools

Among the 888 cases in in-person school attendees, 197 (22%) were associated with 55 outbreaks. Most (78%) of outbreak-associated cases were in students, which is less than would be expected based on the proportion of attendees who are students.

A total of 63 possible source cases were identified for the 55 outbreaks during the course of outbreak investigation. Among source cases, 48 (76%) were students, less than would be expected based on the estimated proportion of attendees who are students. Among the 49 (78% of) source cases for whom risk factors were obtained, 29 (59%) had household or other close contact with a known case. Approximately one quarter of source cases with or without household or close contact with a case were asymptomatic, and 12 (22% of) the 55 outbreaks had only asymptomatic source cases.

The proportion of in-person attendees who were infected with COVID-19 in school was low. Assuming that all source outbreak cases acquired their infection outside school, 134 cases, representing 68% of all outbreak cases and 15% of all outbreak and non-outbreak cases, acquired their infection in school. Among the 124,211 in-person student attendees in the four publicly funded school boards, 0.11% were diagnosed with COVID-19 infection that was acquired in school. The diagnosed infection rate was not very different between secondary school students (0.12%) and elementary school students (0.09%).

Conclusions

There is evidence of limited transmission of COVID-19 within schools, which peaked in early October and then declined. A total of 55 outbreaks were declared during September 1 – November 30, 2020, most attributable to a student source case, consistent with a larger share of school attendees being students.

However, transmission within the school setting was apparently low. The overall infection rate, measurable among students in the four publicly funded school boards, was approximately one case in every 1,000 students. Furthermore, most outbreaks were contained to a single secondary case with exposure within the school setting; 85% of cases in school acquired their infection elsewhere. However, due to low testing rates, it is possible that some infections went undetected and that there was more spread of COVID-19 within schools than it would appear.

Infections in school attendees who do not go for testing are not diagnosed and therefore not managed or investigated. Systemic barriers such as accessibility and stigma make it less likely that some individuals will get tested. Also, some families may choose not to have asymptomatic children tested because it does not reduce the length of their exclusion from school and they do not perceive the benefit (e.g., to identify transmission in school and to prevent further spread). Lastly, testing guidelines tightened in late September, reducing the number of people going for testing and making it more accessible to those with the greatest likelihood of infection; but it also reduced case-finding among individuals with asymptomatic or less symptomatic infection and unrecognized exposures. Considering the high rate of asymptomatic infection, particularly among young people,[6] it is possible that only a portion of cases in schools were diagnosed.

Efforts to prevent the spread of COVID-19 in any setting, such as wearing masks and physically distancing, are a substantial burden on all of us, and schools are no exception. This daily and regular effort can be physically and mentally taxing on parents, students and staff. In addition, to ensure schools are kept as safe as possible, high-risk contacts need to be excluded from school for approximately 14 days, and this exclusion disrupts their learning and family routines. However, these efforts need to be weighed against the burden and concern for the children and youth's physical and emotional development and well-being, as well as families' mental health which may be affected when schools are closed.

References

[1] Government of Ontario, Ontario Updates COVID-19 Testing Guidelines, September 24, 2020, https://news.ontario.ca/en/statement/58507/ontario-updates-covid-19-testing-guidelines

[2] Ministry of Health, COVID-19 guidance: school outbreak management, https://www.ontario.ca/page/covid-19-guidance-school-outbreak-management

[3] Ontario Ministry of Education, Education Facts, 2018-19, http://www.edu.gov.on.ca/eng/educationFACTS.html.

[4] Ottawa Public Health. Status of Mental Health in Ottawa During the COVID-19 Pandemic, Fall of 2020. Results of a population survey October 8 to 20, 2020. Jan 2021. Ottawa (ON): Ottawa Public Health 2021

[5] 2017 Canadian Community Health Survey (CCHS), Ontario Share File. Statistics Canada.

[6] Ontario Agency for Health Protection and Promotion (Public Health Ontario). COVID-19 Infection in Children: January 15, 2020 to July 13, 2020. Toronto, ON: Queen's Printer for Ontario; 2020, https://www.publichealthontario.ca/-/media/documents/ncov/epi/2020/05/covid-19-epi-infection-children.pdf?la=en

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Data tables

Figure 1. Number of in-person school attendees diagnosed with confirmed COVID-19 and number attending school during their POC, by week, September 1 – November 30, 2020, Ottawa

Week beginning	all cases	cases who attended during POC
01-Sep	5	5
08-Sep	12	11
15-Sep	54	50
22-Sep	82	68
29-Sep	114	78
06-Oct	124	84
13-Oct	102	49
20-Oct	87	55
27-Oct	76	37
03-Nov	69	32
10-Nov	61	30
17-Nov	48	27
24-Nov	55	34

POC: period of communicability. All cases include in-person students and staff who tested positive for COVID-19.

Figure 2. Number and percent positivity of COVID-19 tests carried out among Ottawa residents aged less than 20 years, by week of test, August 30 – November 28, 2020, Ottawa

Week beginning	Number of tests	% positivity
01-Sep	1994	1.6%
08-Sep	2782	1.5%
15-Sep	5857	1.5%
22-Sep	9572	1.4%
29-Sep	8716	1.7%
06-Oct	4381	2.4%
13-Oct	3811	2.9%
20-Oct	3195	2.9%
27-Oct	2836	3.5%
03-Nov	2498	3.4%
10-Nov	2626	3.0%
17-Nov	2311	2.7%
24-Nov	2305	2.7%

Data source: ICES

Figure 3. Number of COVID-19 outbreaks among in-person school attendees, by week, September 1 – November 30, 2020, Ottawa

Week beginning	Number of outbreaks
01-Sep	0
08-Sep	0
15-Sep	4
22-Sep	5
29-Sep	6
06-Oct	9
13-Oct	4
20-Oct	6
27-Oct	3
03-Nov	5
10-Nov	6
17-Nov	4
24-Nov	1