



Special Focus: Outbreaks of COVID-19 in Long-Term Care Homes

Table of Contents

Table of Contents	2
Introduction	2
Summary of Outbreaks of COVID-19 in Ottawa Long-Term Care	3
LTCH Outbreaks of COVID-19	4
Number of LTCH Outbreaks	4
Size of LTCH Outbreaks	6
Duration of LTCH Outbreaks	7
Repeated Outbreaks in LTCH	9
LTCH Cases of COVID-19	11
Total confirmed cases	11
Confirmed Cases Among Residents and Staff	12
Number of Deaths Over Time	13
Number of Hospitalizations and ICU Admissions Over Time	14
Data Sources & Definitions	15
Limitations	15
References	15

Introduction

Residents of long-term care homes (LTCH) are particularly vulnerable to COVID-19 outbreaks because of their congregate living arrangements and exposure to staff with asymptomatic or pre-symptomatic COVID-19 (1). In addition, they are at higher risk of morbidity and mortality from COVID-19, as older adults are more likely to have multiple chronic diseases and functional impairments (1).

In Ottawa, there are 28 LTCH with beds for approximately 4,778 residents in total. There is an average of 171 beds per home (range, 46-450). Ottawa Public Health (OPH) works with LTCH to prevent, identify and manage outbreaks. Prevention activities include education, regular outreach phone calls, notices and updates sent by email or pre-recorded phone call and scheduled and unscheduled visits. OPH aids homes in determining when an outbreak is declared by assessing the period of communicability and potential exposures in the home. Outbreak management support includes site visits, daily communication and support in identifying gaps in control measures or other issues that may impact COVID-19 transmission.



Summary of Outbreaks of COVID-19 in Ottawa Long-Term Care

A COVID-19 outbreak in a LTCH is defined as one or more laboratory confirmed cases of COVID-19 in a resident or staff member who was present during the period of communicability (2). From March through December 2020, OPH investigated 78 outbreaks spanning 26 of 28 LTCH in Ottawa (Table 1).

- There were a total of 1540 associated cases (634 staff and 906 residents).
- Twenty-three (23) LTCH experienced more than one outbreak of COVID-19, ranging from 2 outbreaks to 6 outbreaks in the same institution.
- Sixty-two (62) outbreaks had 3 or fewer cases among residents, including 47 with no resident cases.
- Seventeen (17) outbreaks had ten or more residents who tested positive for COVID-19.
- There were 282 COVID-19 deaths associated with the outbreaks, including 2 among staff.

Table 1. Summary of LTCH COVID-19 outbreak indicators for residents, March through December 2020, Ottawa

Indicator	Estimate
Number of LTCH COVID outbreaks	78
Number of COVID infections in LTCH residents to date	906
Number of COVID-related hospitalizations in LTCH residents	95
Number of COVID-related deaths in LTCH residents	280
Overall outbreak attack rate of COVID infections in LTCH residents ²	19% (range, 0%-70%)
Hospitalization rate among residents with COVID-19	10%
Fatality rate among residents with COVID-19	31%
Average number of COVID outbreaks per LTCH ³	2.8 (range, 1-6)
Average number of COVID resident cases per outbreak	11.6 (range, 0-170)

Notes:

1. Data on cases are from the COD as of 2:00 p.m. on December 31, 2020.
2. Bed capacity was used to estimate the number of residents in each LTCH; however, occupancy and turnover were not accounted for and so attack rates could be higher or lower than calculated.
3. Among LTCH that had at least one outbreak.



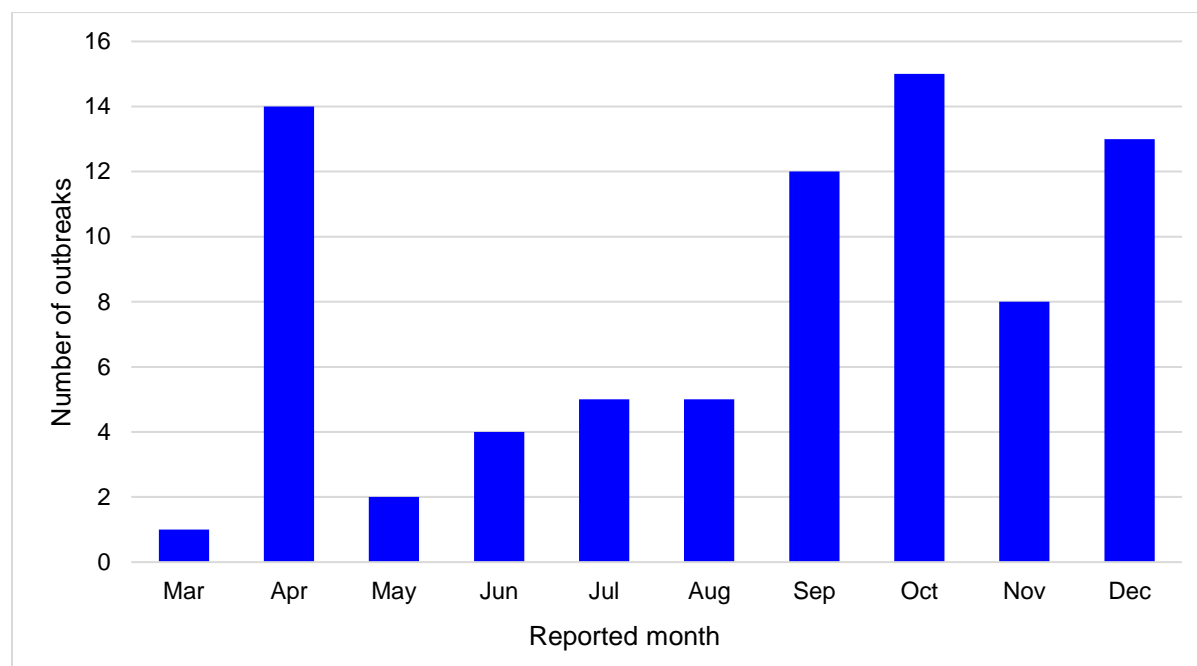
LTCH Outbreaks of COVID-19

Number of LTCH Outbreaks

Following the first known case of COVID-19 in a LTCH in late March, 14 of the 28 LTCH declared outbreaks in April (Figure 1). Two of these outbreaks were identified during surveillance testing of all LTCH that took place in late April. During the summer, as in the rest of Ottawa, the incidence of COVID-19 in LTCH was much lower. However, beginning in September 2020, COVID-19 incidence in LTCH increased.

Despite a higher number of LTCH outbreaks being declared in the fall (September to November 2020) compared to the spring (March to May 2020), overall morbidity and mortality was lower in the fall (Table 2). Overall, there were fewer cases, fewer hospitalizations and deaths and the average duration of the outbreaks was shorter. This indicates that a combination of factors including enhanced case detection, robust contact tracing efforts, and improved IPAC measures mitigated the impact of COVID-19 in this vulnerable population. By the end of December 2020, all LTCH in Ottawa except Salvation Army Grace Manor and Osgoode Care Centre had experienced a COVID-19 outbreak.

Figure 1. Number of COVID-19 outbreaks in LTCH in Ottawa by reported month, 2020



Notes:

1. Data on cases are from the COD as of 2:00 p.m. on December 31, 2020.
2. Eleven outbreaks in LTCH were still open at the time of data extraction.
3. One or more staff or resident cases of lab-confirmed COVID-19 is considered an outbreak in LTCH.



Table 2. Comparison of LTCH COVID-19 outbreak indicators between spring and fall 2020, Ottawa

	Spring	Fall
Number of outbreaks	17	35
Average duration (days)	43	28
Number of resident cases	572	224
Number of staff cases	337	187
Number of resident deaths	220	38
Number of staff deaths	2	0
Fatality rate among residents	38.5%	17.0%
Number of resident hospitalizations	67	13
Number of staff hospitalizations	4	1
Hospitalization rate among residents	11.7%	5.8%

Notes:

1. Data on cases are from the COD as of 2:00 p.m. on December 31, 2020.
2. Spring includes outbreaks declared in March, April, and May and all associated cases, hospitalizations and deaths. Fall includes outbreaks declared in September, October, and November.
3. Eleven outbreaks in LTCH were still open at the time of data extraction.
4. One or more staff or resident cases of lab-confirmed COVID-19 is considered an outbreak in LTCH.
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.
6. Due to the lag between disease acquisition and death, some deaths that may occur after data extraction would be missing from analysis.



Size of LTCH Outbreaks

The 5 largest COVID-19 outbreaks in LTCH during the pandemic were at Carlingview Manor (260 cases), Extendicare Starwood (187 cases), Madonna Care Community (157 cases), Extendicare West End Villa (134 cases), and Centre de Soins de Longue Durée Montfort (118 cases). Overall, there were more cases among residents than staff. However, there were some outbreaks with only staff cases, and several outbreaks had only one case. For example, there were 27 outbreaks with only one staff member. At the time of extraction, the outbreaks at Extendicare New Orchard Lodge and Forest Hill were ongoing.

The 5 highest resident attack rates were seen at Extendicare Starwood (70%, in fall), Centre de Soins de Longue Durée Montfort (68%, in spring), Madonna Care Community (61%, in spring), Carlingview Manor (56%, in spring), and Manoir Marochel (56%, in spring). Four of the 5 were outbreaks declared in April 2020. See Table 3.

Table 3. LTCH outbreaks with cumulative 10 or more confirmed cases of COVID-19, March to December 2020, Ottawa

Facility	Date Active	Total Cases	Resident Cases	# Beds	Resident Attack Rate ⁴	Staff Cases
Carlingview Manor	2020-04-07	260	170	303	56%	90
Extendicare Starwood	2020-09-25	187	134	192	70%	53
Madonna Care Community	2020-04-06	157	97	160	61%	60
Extendicare West End Villa	2020-08-30	134	88	242	36%	46
Centre de Soins de Longue Durée Montfort	2020-04-08	118	87	128	68%	31
Laurier Manor	2020-04-13	103	65	242	27%	38
St. Louis Residence	2020-04-21	55	35	198	18%	20
Perley Rideau Veterans' Health Centre	2020-04-15	53	21	450	5%	32
Manoir Marochel	2020-04-05	50	36	64	56%	14
Peter D Clark	2020-04-28	45	24	216	11%	21
Glebe Centre	2020-10-25	39	23	254	9%	16
Extendicare New Orchard Lodge ²	2020-11-25	36	23	111	21%	13
Elisabeth Bruyere Residence	2020-04-16	34	26	71	37%	8
Forest Hill ²	2020-12-25	32	14	160	9%	18
Extendicare Laurier Manor	2020-09-01	27	15	242	6%	12
Longfields Manor	2020-10-04	25	16	114	14%	9
St. Patrick's Home	2020-04-29	16	10	288	3%	6
St. Patrick's Home	2020-10-04	13	3	288	1%	10
Perley Rideau Veterans' Health Centre	2020-09-02	11	2	450	0%	9
Garry J Armstrong	2020-09-14	11	1	180	1%	10
Perley Rideau Veterans' Health Centre	2020-06-03	10	3	450	1%	7
Centre d'Accueil Champlain	2020-09-11	10	1	160	1%	9

Notes:

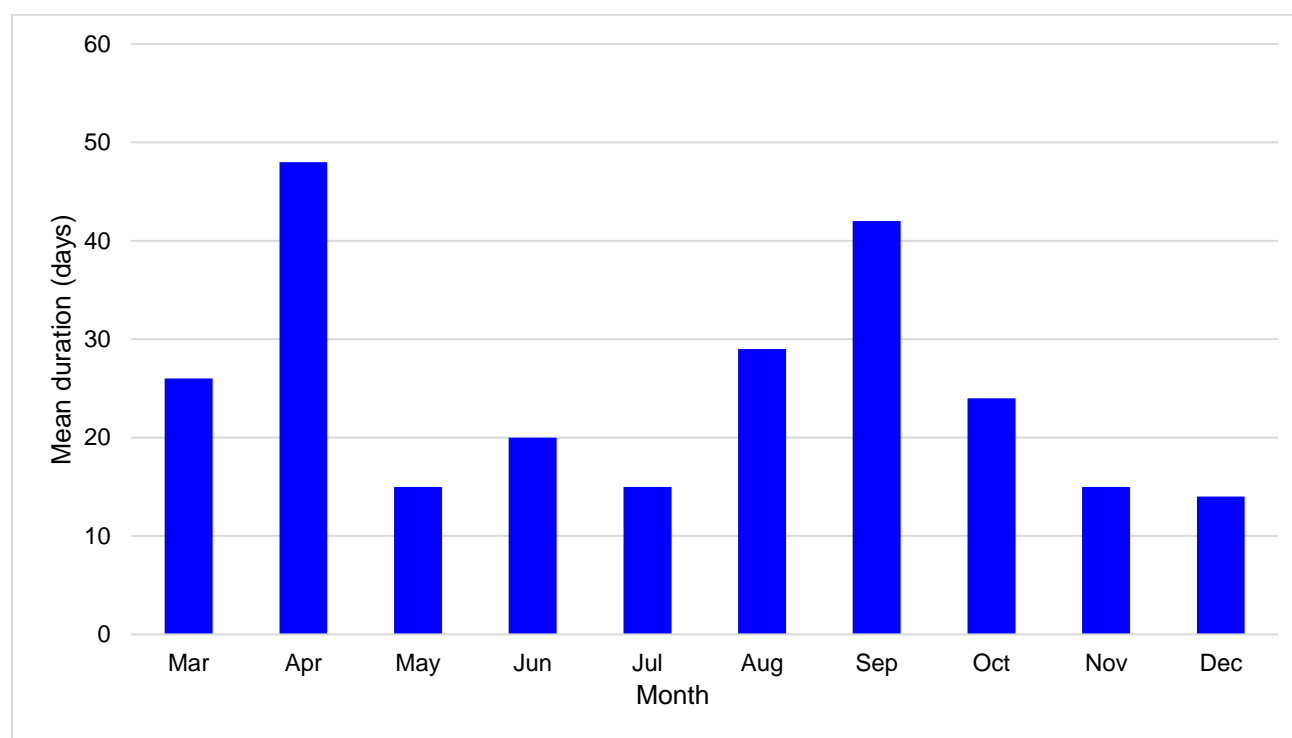
1. Data on cases are from the COD as of 2:00 p.m. on December 31, 2020.
2. The outbreaks at Extendicare New Orchard Lodge and Forest Hill were still open at the time of data extraction. Nine other outbreaks in LTCH were still open at the time of data extraction and had less than 10 cases at that time.
3. One or more staff or resident cases of lab-confirmed COVID-19 is considered an outbreak in LTCH.
4. Bed capacity was used to estimate the number of residents in each LTCH; however, occupancy and turnover were not accounted for and so attack rates could be higher or lower than calculated.



Duration of LTCH Outbreaks

Mean outbreak duration was 48 days among outbreaks reported in April, declined in May through July, increased again to an average duration over 42 days in August and September, and declined again in October through December (Figure 2). An outbreak can be declared over when there are no new cases in residents or staff after 14 days from the latest possible exposure (e.g. 14 days after illness onset of last resident case).

Figure 2. Mean duration of outbreaks of COVID-19 in Ottawa LTCH by reported month, 2020



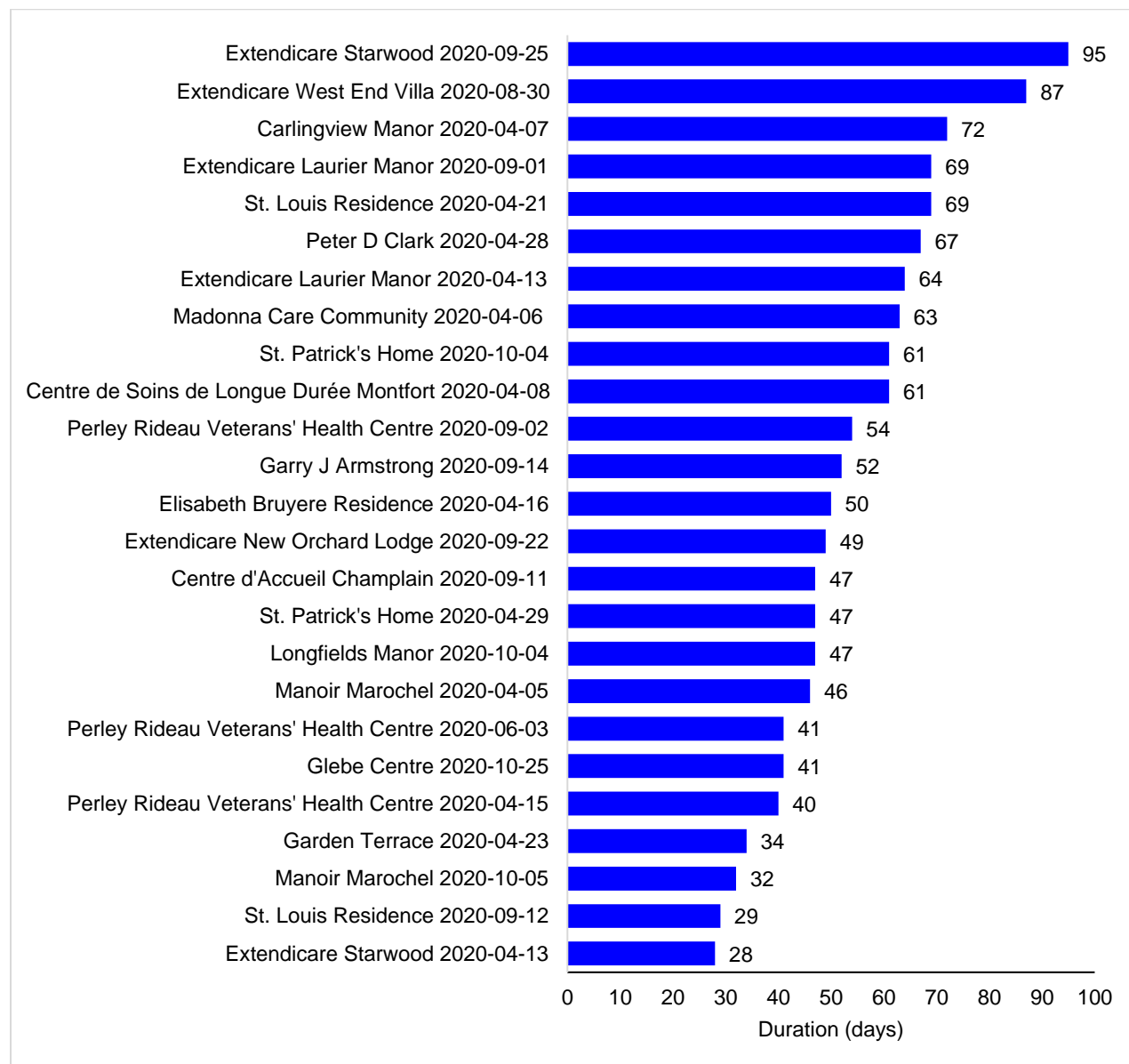
Notes:

1. Data on cases are from the COD as of 2:00 p.m. on December 31, 2020.
2. Eleven outbreaks in LTCH were still open at the time of data extraction.
3. One or more staff or resident cases of lab-confirmed COVID-19 is considered an outbreak in LTCH.



The 5 longest COVID-19 outbreaks in LTCH were at Extendicare Starwood (95 days), Extendicare West End Villa (87 days), Carlingview Manor (72 days), Extendicare Laurier Manor (69 days), and St. Louis Residence (69 days) (Figure 3).

Figure 3. COVID-19 outbreak duration longer than 28 days in Ottawa LTCH, 2020



Notes:

1. Data on cases are from the COD as of 2:00 p.m. on December 31, 2020.
2. Eleven outbreaks in LTCH were still open at the time of data extraction.
3. One or more staff or resident cases of lab-confirmed COVID-19 is considered an outbreak in LTCH.



Repeated Outbreaks in LTCH

Between March and December 2020, 23 out of the 28 LTCH in Ottawa experienced two to six outbreaks (Table 4). The total number of cases associated with repeated outbreaks varied from 3 to 262 cases, with a mean of 66 cases. Fifteen LTCH (65% of those with repeated outbreaks) had the total number of cases below the mean, while 8 (35%) had more than 66 cases (Figure 4). The number of iterations did not directly reflect the number of cases. For example, the 5 facilities with highest case counts had the outbreaks repeated twice (1 out of 5 facilities), three times (3 facilities) or four times (1 facility).

Table 4. Number of repeated COVID-19 outbreaks in Ottawa LTCH, March through December 2020

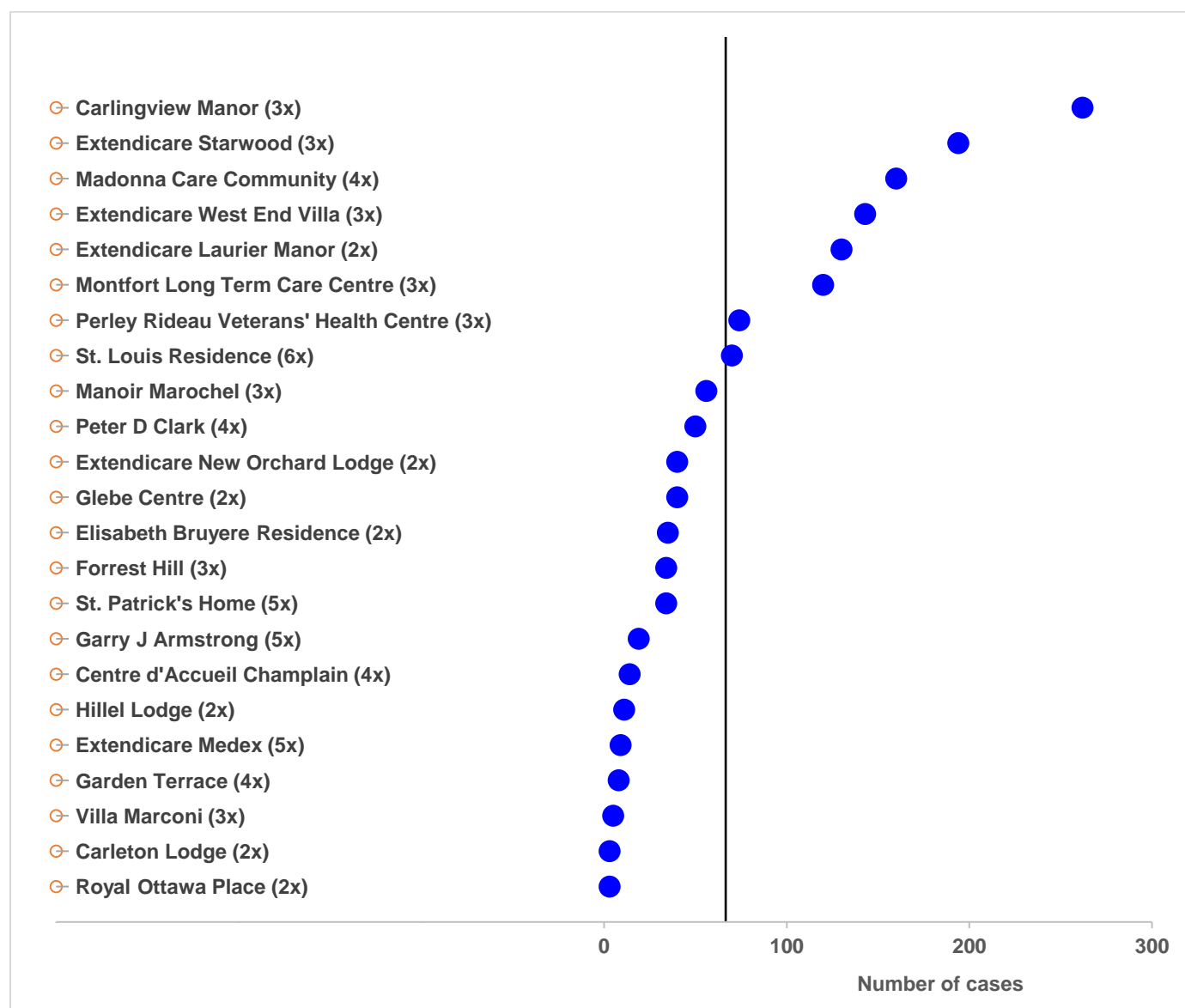
Number of outbreaks	Number of LTCHs
1	3
2	7
3	8
4	4
5	3
6	1

Notes:

1. Data on cases are from the COD as of 2:00 p.m. on December 31, 2020.
2. Includes staff and resident cases.
3. Fourteen outbreaks in LTCH were still open at the time of data extraction.
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.



Figure 4. Total number of confirmed cases of COVID-19 associated with LTCH that experienced repeated outbreaks, March through December 2020, Ottawa



Notes:

1. Data on cases are from the COD as of 2:00 p.m. on December 31, 2020.
2. Includes staff and resident cases.
3. Fourteen outbreaks in LTCH were still open at the time of data extraction.
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.
5. Vertical line represents the average number of cases per home (n=66). The circles to the right of the vertical line represent LTCHs that are above this average.

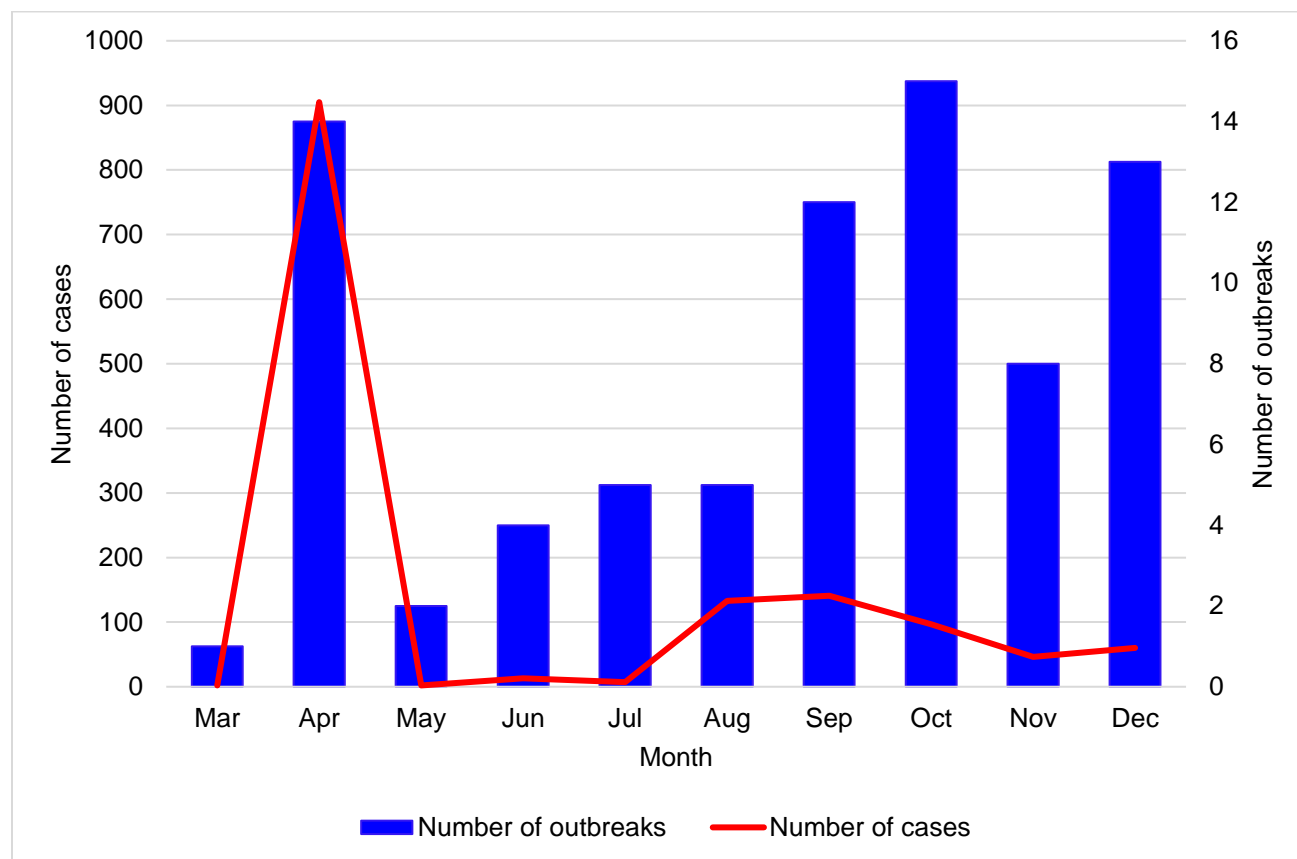


LTCH Cases of COVID-19

Total confirmed cases

A total of 1,540 cases were identified in LTCH residents and staff during March through December 2020 (Figure 5). The biggest burden of cases was experienced in outbreaks reported in April; the number of cases during the fall was lower, despite a high number of outbreaks.

Figure 5. Number of confirmed cases of COVID-19 associated with outbreaks in Ottawa LTCH by outbreak reported month



Notes:

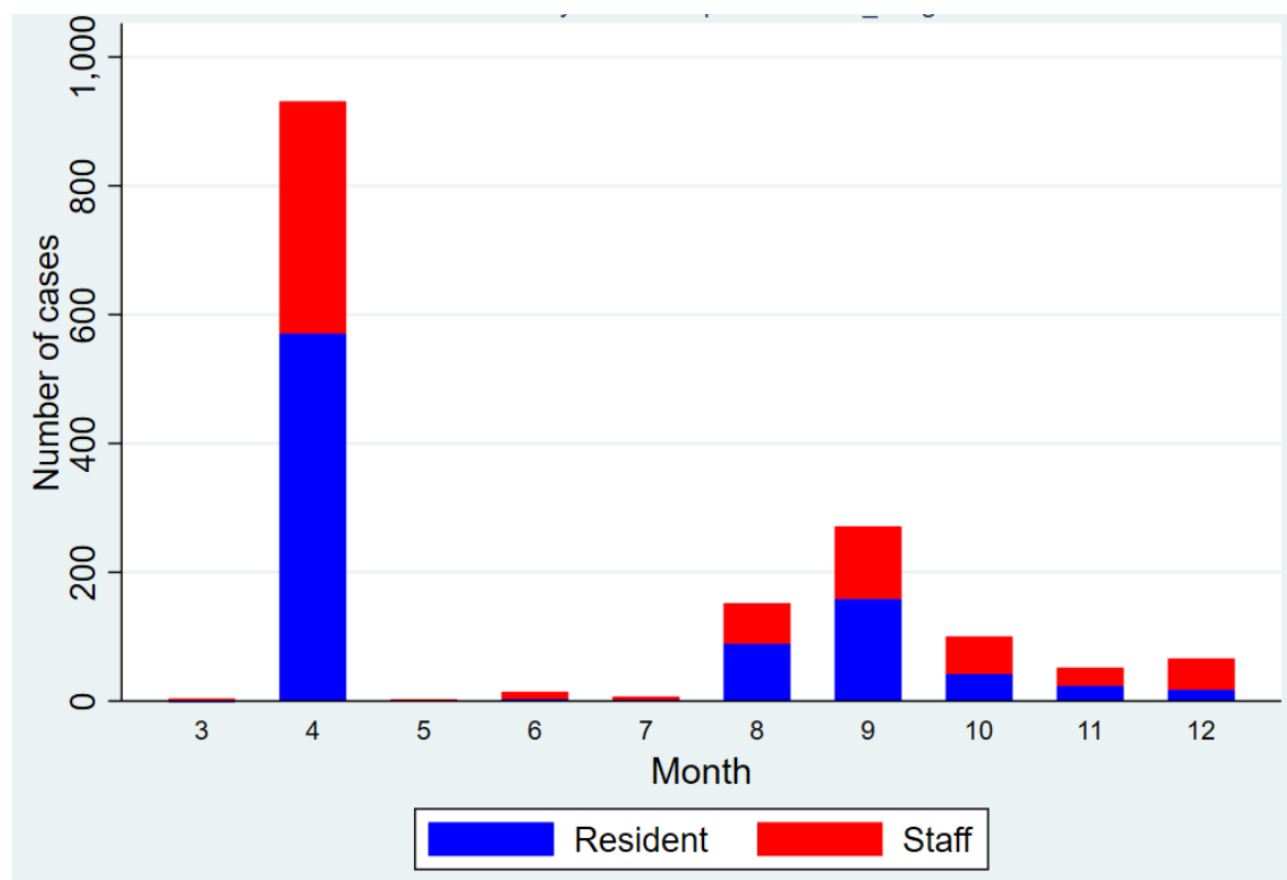
1. Data on cases are from the COD as of 2:00 p.m. on December 31, 2020.
2. Eleven outbreaks in LTCH were still open at the time of data extraction.
3. Confirmed cases are those with a confirmed COVID-19 laboratory result as per the Ministry of Health Public health management of cases and contacts of COVID-19 in Ontario. June 23, 2020 version 8.0.



Confirmed Cases Among Residents and Staff

Overall, most cases were among residents (n=906); however, 634 (41%) of cases occurred in staff (Figure 6). Among staff cases, 70 (11%) were recognized as the most likely source of the outbreak based on earliest onset of symptoms (or earliest test date if asymptomatic) among confirmed cases in the outbreak. Thus, 90% (70/78) of outbreaks had a staff member who was the most likely source of the outbreak. In outbreaks that had a resident identified with the earliest onset of symptoms, the original source case was unable to be identified (e.g. visitor or asymptomatic staff tested later). Among cases recognized as the most likely source of the outbreak, 13% (1/8) of resident index cases were asymptomatic and 30% (21/70) of staff index cases were asymptomatic.

Figure 6. Number of confirmed cases of COVID-19 associated with outbreaks in Ottawa LTCH by outbreak reported month, by resident or staff, 2020



Notes:

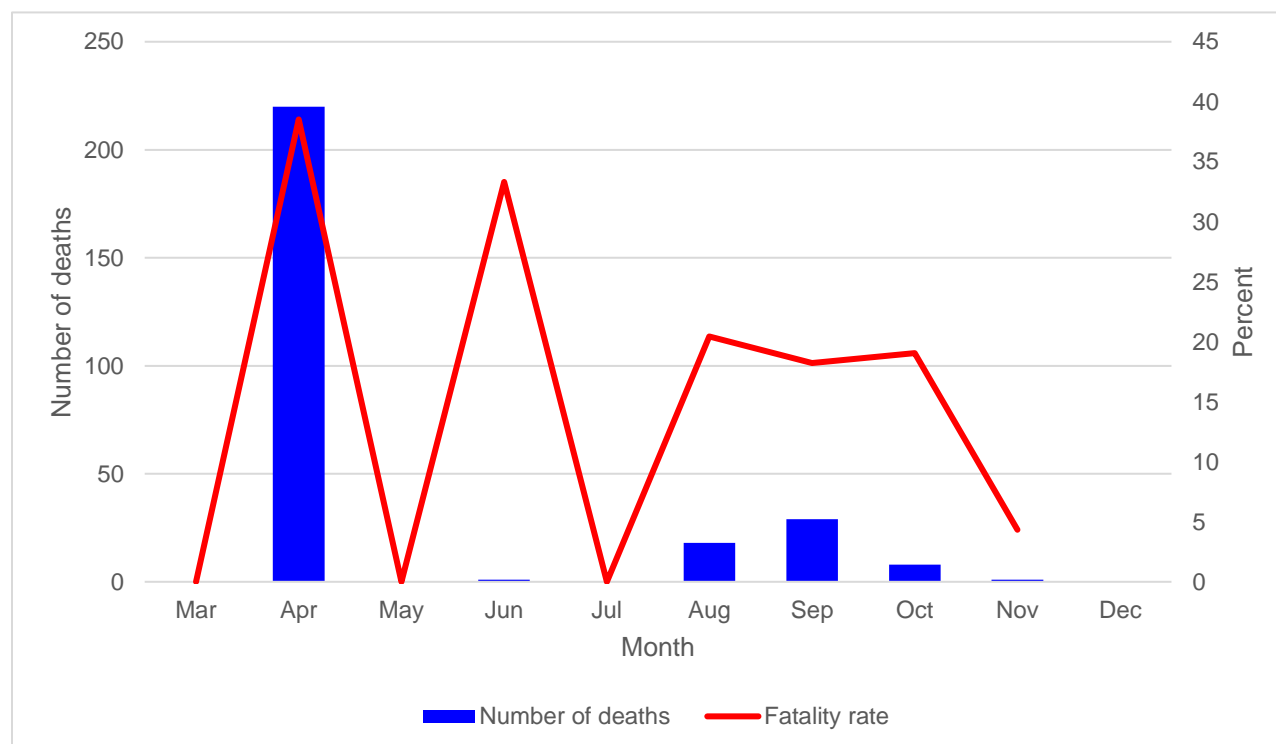
1. Data on cases are from the COD as of 2:00 p.m. on December 31, 2020.
2. Eleven outbreaks in LTCH were still open at the time of data extraction.
3. Confirmed cases are those with a confirmed COVID-19 laboratory result as per the Ministry of Health Public health management of cases and contacts of COVID-19 in Ontario. June 23, 2020 version 8.0.



Number of Deaths Over Time

There were 280 deaths among residents associated with outbreaks of COVID-19 in LTCH, representing a 31% resident case fatality rate. The number of deaths per month declined after April and the resident case fatality rate declined between spring and fall 2020 (Figure 7). There were two deaths among staff.

Figure 7. Number of deaths and resident case fatality rate associated with outbreaks of COVID-19 in Ottawa LTCH by month of death



Notes:

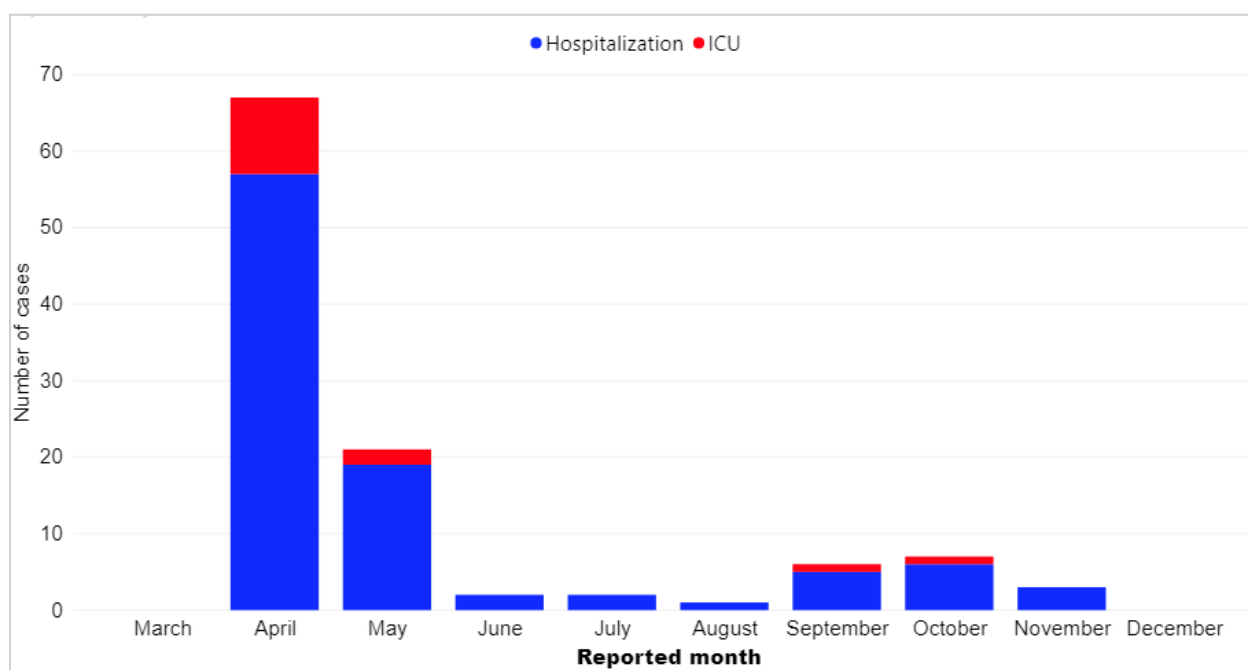
1. Data on cases are from the COD as of 2:00 p.m. on December 31, 2020.
2. Eleven outbreaks in LTCH were still open at the time of data extraction.
3. Confirmed cases are those with a confirmed COVID-19 laboratory result as per the Ministry of Health Public health management of cases and contacts of COVID-19 in Ontario. June 23, 2020 version 8.0.
4. Due to the lag between disease acquisition and death, some deaths that may occur after data extraction would be missing from analysis.



Number of Hospitalizations and ICU Admissions Over Time

Since the beginning of the pandemic, there have been 95 hospitalizations and 14 intensive care unit (ICU) admissions among residents and staff of LTCH who tested positive for COVID-19. The number of hospitalizations and ICU admissions associated with outbreaks of COVID-19 in LTCH decreased since their first peaks in April. There were fewer hospitalizations and ICU admissions associated with outbreaks in LTCH in fall 2020 (Figure 8).

Figure 8. Number of hospitalizations and ICU admissions associated with outbreaks of COVID-19 in Ottawa LTCH by outbreak reported month, 2020



Notes:

1. Data on cases are from the COD as of 2:00 p.m. on December 31, 2020.
2. Eleven outbreaks in LTCH were still open at the time of data extraction.
3. 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.
4. Due to the lag between disease acquisition and death, some hospitalizations and/or ICU admissions that may occur after data extraction would be missing from analysis.
5. Many residents of LTCH have advance medical directives choosing not to have aggressive medical treatment such as mechanical ventilation or resuscitation (CPR) which could impact hospitalizations and ICU admissions.



Data Sources & Definitions

Outbreak data was extracted from the OPH COVID-19 Ottawa Database (The COD) on December 31, 2020. Data on cases was extracted from The COD on January 4, 2020.

An outbreak in LTCH is defined by the presence of at least one laboratory confirmed case of COVID-19 in a resident or staff member who was present during their period of communicability. This means even if no transmission in the LTCH can be documented, an outbreak is declared. The outbreak is declared over when no new cases are identified for 14 days after the onset of symptoms of the last case (or 14 days after a positive test result if asymptomatic or 14 days after last day worked if a staff member).

Limitations

This report includes information about individuals reported to OPH on or before December 31, 2020. Outbreak cases with onset or diagnosis in December but not reported to OPH until January, 2021 are not included in this analysis. Eleven LTCH outbreaks were still open at the time of extraction and, thus, may have more linked cases once closed.

Age, sex and information about health status of all LTCH residents was not available to standardize comparisons between LTCH or to other settings. Bed capacity was used to estimate the number of residents in each LTCH; however, occupancy and turnover were not accounted for and so attack rates could be higher or lower than described. This also prevented determination of the role of acquired immunity among residents in reducing the size of repeated outbreaks.

The physical layout of facilities was not considered in the analysis. For example, older buildings with multi-resident rooms with limited extra space could make cohorting of positive residents to control spread difficult. Lastly, it should be noted that many residents of LTCH have advance medical directives choosing not to have aggressive medical treatment such as mechanical ventilation or resuscitation (CPR) which could impact hospitalization and death in this population.

References

1. Stall NM, Jones A, Brown KA, Rochon PA, Costa AP. [For-profit long-term care homes and the risk of COVID-19 outbreaks and resident deaths](#). CMAJ. 2020 Aug 17;192(33): E946-55.
2. Ontario Ministry of Health. [COVID-19 Outbreak Guidance for Long-Term Care Homes \(LTCH\)](#). Version 2 – April 15, 2020.

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