

RÉSUMÉ ÉPIDÉMIOLOGIQUE AMÉLIORÉ

Décès liés à la COVID-19 chez les résidents des foyers de soins de longue durée en Ontario

Objectif

Le présent rapport décrit le taux de létalité apparent parmi les résidents des foyers de soins de longue durée (FSLD) ayant reçu un diagnostic de maladie à coronavirus 2019 (COVID-19), en particulier parmi les cas enregistrés durant les vagues Delta (13 juin 2021 au 12 décembre 2021) et Omicron BA.1/BA.2 (13 décembre 2021 au 26 juin 2022) de la pandémie.

Pour en savoir davantage au sujet des répercussions de la COVID-19 chez les résidents des FSLD, veuillez consulter l'[outil de surveillance des données sur la COVID-19 en Ontario](#). Pour en savoir plus sur la vaccination contre la COVID-19 en Ontario et les conséquences du programme de vaccination sur les cas de COVID-19, veuillez consulter le rapport intitulé [La vaccination contre la COVID-19 en Ontario](#).

Faits saillants

- La létalité (définie comme la mort survenant 30 jours après l'infection) parmi les résidents des FSLD a évolué avec le temps et l'émergence de nouveaux variants. Le taux de létalité apparent a diminué depuis le début de la pandémie et même s'il a notablement augmenté avec l'émergence du variant Delta, il est à son plus bas niveau pendant la vague Omicron BA.1/BA.2 ([Figure 1](#)). Le déclin du taux de létalité apparent est dû en partie à la vaccination et aux doses de rappel ainsi qu'aux modifications de la gravité des variants ([Figure 2](#)).
- La vaccination, en particulier les doses de rappel, a différé entre les vagues Delta et Omicron BA.1/BA.2. La plupart des résidents infectés pendant la vague Delta avaient reçu au moins deux doses des vaccins plus de 120 jours avant de contracter le virus, un moins grand nombre de résidents ayant reçu récemment une deuxième ou une troisième dose ([Tableau 2A](#)). Le nombre de personnes ayant reçu une dose de rappel était beaucoup plus élevé pendant la vague Omicron BA.1/BA.2, la majorité des résidents vaccinés ayant reçu une troisième ou une quatrième dose de 14 à 120 jours avant de contracter la maladie ([Tableau 2B](#)).
- On constate une baisse considérable du taux de létalité apparent lorsque l'on compare la vague Delta et la vague Omicron BA.1/BA.2. Parmi les résidents non vaccinés, le risque de décès dans les 30 jours suivant le début de la maladie pendant la vague Omicron représentait 0,17 du risque de décès observé pendant la vague Delta (ce qui représente une baisse de 83 %) ([Tableau 3B](#)).
- Une comparaison entre les résidents vaccinés et les résidents non vaccinés révèle une baisse considérable du taux de létalité apparent entre les deux. Durant la vague Omicron BA.1/BA.2 actuelle, le risque de décès chez les personnes ayant reçu au moins deux doses entre le 14^e jour et le 120^e jour précédant l'infection représentait 0,66 du risque des personnes non vaccinées (soit une diminution de 33 % du risque de décès) ([Table 3C](#)).

La combinaison des répercussions du type de variant et du statut vaccinal montre que les résidents des FSLD ayant la meilleure protection vaccinale ont un risque de décès 89 % inférieur pendant la vague Omicron BA.1/BA.2 par comparaison à un résident non vacciné infecté pendant la vague Delta (risque relatif (RR) du taux de létalité = 0,11) ([Tableau 3D](#)).

Définitions : statut vaccinal

Dans le présent rapport, le statut de protection vaccinal se fonde sur la combinaison du nombre de doses de vaccin contre la COVID-19 reçues et les jours écoulés entre la dernière dose reçue et l'infection :

- **Mieux protégé** : ayant reçu deux doses ou plus, de 14 à 120 jours avant l'infection
- **Partiellement protégé** : ayant reçu une dose, ou deux doses ou plus de 14 à 120 jours avant l'infection
- **Non vacciné** : n'ayant reçu aucune dose de vaccin

Résultats

Tableau 1. Sommaire des cas et des décès chez les résidents des foyers de soins de longue durée pendant la vague Delta (13 juin au 12 décembre 2021) et la vague Omicron BA.1/BA.2 (13 décembre 2021 au 26 juin 2022) en Ontario

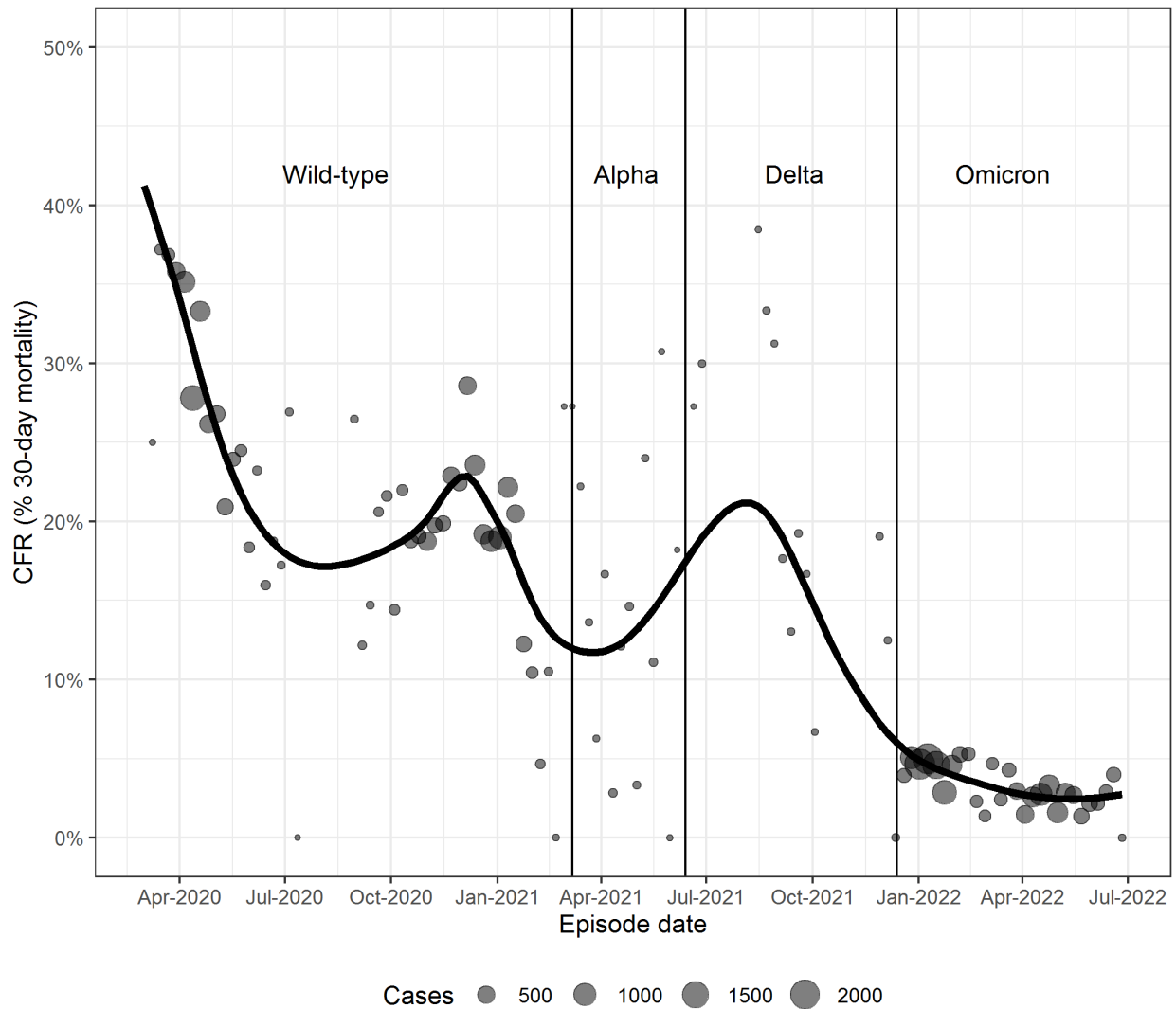
Cas et décès	Vague Delta (13 juin 2021- 12 décembre 2021)	Vague Omicron (13 décembre 2021 - 26 juin 2022)
Nombre de cas	316	17 947
Nombre de décès	58	657
Taux de létalité apparent (décès/cas)	18,4 %	3,7 %
Âge médian (ÉI) pour les cas ne causant pas la mort (ans)	86 (78 - 92)	85 (78 - 91)
Âge médian (ÉI) pour les décès (ans)	88,5 (83 - 94)	88 (82 - 93)
% d'hommes* (pour les cas ne causant pas la mort)	30,6 %	35,5 %
% d'hommes* (pour les décès)	48,38 %	48,0 %

Notes : ÉI signifie écart interquartile, pour lequel le premier quartile (Q₁) et le troisième quartile (Q₃) sont indiqués entre parenthèses.

*Le sexe n'a pas été indiqué pour tous les cas. Le dénominateur utilisé pour calculer les pourcentages de cas inclut l'ensemble des cas.

Source des données : Solution GCC

Figure 1. Case-fatality ratio among long-term care home residents by case episode week, March 1, 2020 to June 26, 2022



Notes: Line is a smoothed CFR estimate produced using generalized additive model based on the weekly number of cases and deaths. The size of the dots corresponds to the weekly number of cases. Points have been suppressed for weeks with less than 10 cases. Variant periods are defined as the time period for which the estimated prevalence of the given lineage is at least 50% of cases.

Data Source: CCM/COVax

Table 2A. Number of confirmed COVID-19 cases (and % of column total) by vaccine protection status categories during the Delta period (June 13, 2021 – December 12, 2021)

Number of doses and days since last dose before infection	Unvaccinated	Partially protected	Most protected
Unvaccinated	33 (100%)	n/a	n/a
1 st dose was 14 to 120 days before infection	n/a	4 (2%)	n/a
1 st dose was more than 120 days before infection	n/a	3 (1%)	n/a
2 nd dose was 14 to 120 days before infection	n/a	n/a	32 (43%)
2 nd dose was more than 120 days before infection	n/a	202 (97%)	n/a
3 rd dose was 14 to 120 days before infection	n/a	n/a	42 (57%)
3 rd dose was more than 120 days before infection	n/a	n/a	n/a
4 th dose was 14 to 120 days before infection	n/a	n/a	n/a
4 th dose was more than 120 days before infection	n/a	n/a	n/a
Total	33	209	74

Note: LTCH residents are considered partially protected if they have received only one dose, or two or more doses more than 120 days prior to infection. LTCH residents are considered most protected if they have received two or more doses with the last dose between 14 and 120 days of infection. Individuals are not considered to have received a valid dose until 14 days after dose administration to account for the time required to establish an immune response.

Data Source: CCM/COVax

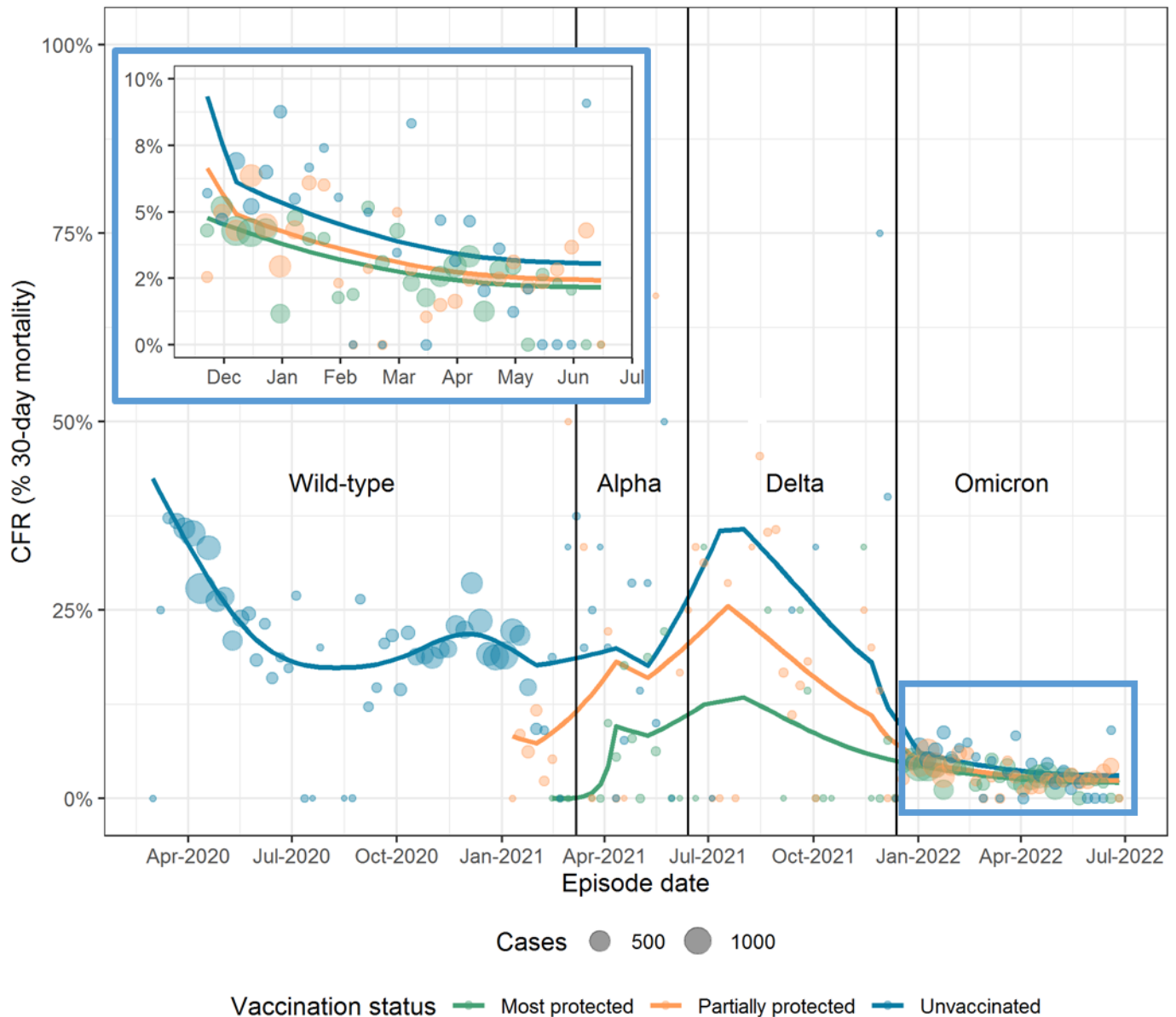
Table 2B. Number of confirmed COVID-19 cases (and % of column total) by vaccine protection status categories during the Omicron BA.1/BA.2 period (December 13, 2021 – June 26, 2022)

Number of doses and days since last dose before infection	Unvaccinated	Partially protected	Most protected
Unvaccinated	2,018 (100%)	n/a	n/a
1 st dose was 14 to 120 days before infection	n/a	60 (1%)	n/a
1 st dose was more than 120 days before infection	n/a	65 (1%)	n/a
2 nd dose was 14 to 120 days before infection	n/a	n/a	215 (2%)
2 nd dose was more than 120 days before infection	n/a	1,559 (26%)	n/a
3 rd dose was 14 to 120 days before infection	n/a	n/a	5,631 (57%)
3 rd dose was more than 120 days before infection	n/a	3,567 (59%)	n/a
4 th dose was 14 to 120 days before infection	n/a	n/a	4,079 (41%)
4 th dose was more than 120 days before infection	n/a	753 (13%)	n/a
Total	2,018	6,004	9,925

Note: LTCH residents are considered partially protected if they have received only one dose, or two or more doses more than 120 days prior to infection. LTCH residents are considered most protected if they have received two or more doses with the last dose between 14 and 120 days of infection. Individuals are not considered to have received a valid dose until 14 days after dose administration to account for the time required to establish an immune response.

Data Source: CCM/COVax

Figure 2. Case-fatality ratio (CFR) among long-term care home residents by vaccination status, March 1, 2020 to June 26th, 2022



Notes: Lines are smoothed CFR estimates produced using a generalized additive model based on the weekly number of cases and deaths, adjusted with an interaction term for variant period and vaccine status. The size of the dots corresponds to the weekly number of cases. Points have been suppressed for weeks with less than two cases to improve legibility. Vaccine protection status is defined based on number of doses and days since last dose before infection. LTCH residents are considered partially protected if they have received only one dose, or two or more doses more than 120 days prior to infection. LTCH residents are considered most protected if they have received two or more doses with the last dose between 14 and 120 days of infection.

Data Source: CCM/COVax

Table 3A. Summary of case-fatality ratios (CFR) among long-term care home residents by vaccine protection status* during the Delta (June 13, 2021 – December 12, 2021) and Omicron BA.1/BA.2 (December 13, 2021 – June 26, 2022) periods

Case-fatality Ratio	Unvaccinated CFR (# deaths/# cases)	Partially protected CFR (# deaths/# cases)	Most protected CFR (# deaths/# cases)
Delta period (June 13, 2021 – December 12, 2021)	30.3% (10/33)	20.1% (42/209)	8.1% (6/74)
Omicron period (December 13, 2021 – June 26, 2022)	4.8% (96/2018)	3.8% (230/6004)	3.3% (331/9925)

Notes: *Vaccine protection status is defined based on number of doses and days since last dose before infection. LTCH residents are considered partially protected if they have received only one dose, or two or more doses more than 120 days prior to infection. LTCH residents are considered most protected if they have received two or more doses with the last dose between 14 and 120 days of infection.

Data Source: CCM/COVax

Table 3B. Estimates of CFR risk reduction and 95% confidence intervals (95% CI) due to variant severity by vaccine protection status* during the Omicron BA.1/BA.2 (December 13, 2021 – June 26, 2022) period

Risk reduction due to variant severity	Reference group	Crude RR	Adjusted [†] RR (95% CI)
Unvaccinated	Delta unvaccinated	0.16	0.17 (0.10 - 0.30)
Partially protected	Delta partially protected	0.19	0.20 (0.14 - 0.25)
Most protected	Delta most protected	0.41	0.42 (0.18 - 0.78)

Notes: *Vaccine protection status is defined based on number of doses and days since last dose before infection. LTCH residents are considered partially protected if they have received only one dose, or two or more doses more than 120 days prior to infection. LTCH residents are considered most protected if they have received two or more doses with the last dose between 14 and 120 days of infection.

[†] Adjusted risk reduction estimates are based on generalized additive models adjusted for age, sex, and an interaction term for variant period and vaccine status. Confidence intervals are estimated using parametric bootstrapping.

Data Source: CCM/COVax

Table 3C. Estimates of CFR risk reduction and 95% confidence intervals (95% CI) due to vaccine protection status* during the Omicron BA.1/BA.2 (December 13, 2021 – June 26, 2022) period

Risk reduction due vaccination status	Reference group	Crude RR	Adjusted [†] RR (95% CI)
Unvaccinated	Omicron unvaccinated	Reference	Reference
Partially protected	Omicron unvaccinated	0.81	0.77 (0.62 - 0.99)
Most protected	Omicron unvaccinated	0.70	0.66 (0.54 - 0.89)

Notes: *Vaccine protection status is defined based on number of doses and days since last dose before infection. LTCH residents are considered partially protected if they have received only one dose, or two or more doses more than 120 days prior to infection. LTCH residents are considered most protected if they have received two or more doses with the last dose between 14 and 120 days of infection.

[†] Adjusted risk reduction estimates are based on generalized additive models adjusted for age, sex, and an interaction term for variant period and vaccine status. Confidence intervals are estimated using parametric bootstrapping.

Data Source: CCM/COVax

Table 3D. Estimates of total CFR risk reduction and 95% confidence intervals (95% CI) due to variant severity and vaccine protection status* during the Omicron BA.1/BA.2 (December 13, 2021 – June 26, 2022) period

Total risk reduction due to variant severity and vaccination status	Reference group	Crude RR	Adjusted [†] RR (95% CI)
Unvaccinated	Delta unvaccinated	0.16	0.17 (0.10 - 0.30)
Partially protected	Delta unvaccinated	0.13	0.13 (0.08 - 0.25)
Most protected	Delta unvaccinated	0.11	0.11 (0.07 - 0.19)

Notes: *Vaccine protection status is defined based on number of doses and days since last dose before infection. LTCH residents are considered partially protected if they have received only one dose, or two or more doses more than 120 days prior to infection. LTCH residents are considered most protected if they have received two or more doses with the last dose between 14 and 120 days of infection.

[†] Adjusted risk reduction estimates are based on generalized additive models adjusted for age, sex, and an interaction term for variant period and vaccine status. Confidence intervals are estimated using parametric bootstrapping.

Data Source: CCM/COVax

Technical Notes

Data Sources

- SARS-CoV-2 infection and mortality data were based on information successfully extracted from CCM for all public health units (PHU) by PHO as of: August 2, 2022 at 1 p.m. for cases reported from January 1, 2022 onwards; August 2, 2022 at 9 a.m. for cases reported from January 1, 2021 to December 31, 2021; and June 24, 2022 at 9 a.m. for cases reported up to December 31, 2020.
 - To account for 7 days of data entry lag and 30 days for case follow-up, the data included are for cases reported in Ontario with case episode dates before June 26, 2022 and deaths linked to those cases up until the date of extraction (August 2, 2022).
- COVID-19 vaccination data were based on information successfully extracted from the Ontario Ministry of Health's COVaxON application as of August 2, 2022 at approximately 7:00 a.m.

Methods

POPULATION

- In order to identify cases post-vaccination, clients in CCM and COVaxON were linked using health care number as well as other personal identifiers, including name, date of birth, gender, and postal code.
- Methods for processing COVaxON vaccine uptake data are described in the Technical Notes of the [COVID-19 Vaccine Uptake Report](#)¹ and methods for processing the CCM case data are described in the Technical Notes of the [Ontario COVID-19 data tool](#).²
- 'Long-term care home residents' includes cases that reported 'Yes' to the risk factor 'Resident of a long-term care home'; or 'Yes' to the risk factor 'Resident of nursing home or other chronic care facility' and reported to be part of an outbreak assigned as a long-term care home (via the Outbreak number or case comments field); or were reported to be part of an outbreak assigned as a long-term care home (via the outbreak number or case comments field) with an age over 70 years and did not report 'No' to the risk factors 'Resident of long-term care home' or 'Resident of nursing home or other chronic care facility'. 'Long-term care home residents' excludes cases that reported 'Yes' to any of the health care worker occupational risk factors.

MEASURES

- For surveillance purposes, a COVID-19 death is defined as a death resulting from a clinically compatible illness unless there is a clear alternative cause of death that cannot be related to COVID-19 (e.g., trauma, medically assisted death). There should be no period of complete recovery from COVID-19 between illness and reported death.
 - Deaths are determined by using the Outcome and Type of Death fields in CCM. COVID-19 deaths are counted where the Outcome value is 'Fatal' and the Type of Death value is not 'DOPHS (Disease of Public Health Significance) was unrelated to cause of death'. COVID-19 deaths are placed in time using the 'Date of Death' field in CCM.

- Variant periods for Delta and Omicron are defined as the time period for which the estimated prevalence of a given lineage is at least 50% of cases. The variant periods do not necessarily correspond with dates used for COVID-19 waves. The date range for the Omicron period used in this report (December 13, 2021 – June 26, 2022) approximately corresponds to when BA.1 and BA.2 lineages were most prevalent, and so these findings may not apply to other Omicron subvariants. Further details on COVID-19 variants may be found in the [SARS-CoV-2 Genomic Surveillance in Ontario report](#).³
- Case Episode Date is based on the best estimate of the date of disease onset. This date is calculated based on either the date of symptom onset, specimen collection/test date for the COVID-19 test, or the date the COVID-19 case was reported to public health (not the specimen collection/test date).
- Only cases meeting the confirmed case classification as listed in the MOH [COVID-19 Case Definition](#) are included.⁴
- Demographic information (sex, age, public health unit of residence) in this report are sourced from demographic fields in CCM. Further details on CCM case data are described in the Technical Notes of the [Ontario COVID-19 data tool](#).²

VACCINE STATUS

- Vaccine protection status is based on the number of doses received and the days since dose received. Residents are defined as “partially protected” if they have only received one dose, and/or received their last dose more than 120 days prior. Residents are considered “most protected” if they have received two or more doses, with the last dose received between 14 and 120 days before infection. Residents who were infected within 14 days of dose administration are considered “partially protected” as long as they had received at least one dose that was administered at least 120 days prior, or “unvaccinated” if they have not been vaccinated or were infected within 14 days of receiving their first dose.
- Individuals are not counted as having received a valid vaccine dose until 14 or more days after dose administration, to account for the time required to establish an immune response.
- Dose administration date was used to determine the dose number (e.g., the first chronological dose was considered dose 1) as well as the dose interval (e.g., number of days from first to second dose).

ANALYSIS

- The case fatality ratio is the proportion of identified cases that succumb to the infection within 30 days. For more information regarding CFR, refer to [COVID-19 Case Fatality, Case Identification, and Attack Rates in Ontario](#).⁵
- Vaccine uptake varied between Delta and Omicron BA.1/BA.2 periods, as third and fourth booster doses were more available during the Omicron BA.1/BA.2 period (see [Table 2](#)). A sensitivity analysis conducted to assess for residual impacts of receiving a booster dose during the Omicron BA.1/BA.2 period found no additional effects of having received third and fourth doses compared to second doses received within 120 days prior to infection. For this reason, this report does not distinguish between vaccine protections provided by second, third and fourth doses, but does account for time since dose before infection.

- Fatal Delta and Omicron cases whose death date preceded their reported case episode date (N=4), or fatal cases who were missing a death date (N=2) were included. A total of 33 cases had a death date that was more than 30 days after case episode date and were excluded. An additional 146 deaths were classified as having a cause of death unrelated to COVID-19, and were excluded.
- Generalized additive models used to calculate estimates of adjusted risk reductions were adjusted for age, sex, and an interaction term for variant period and number of doses received. Variant period includes 10 week transitions between the wild-type, Alpha, and Delta periods, and a five week transition between Delta and Omicron periods. Model-adjusted CFR and confidence intervals are estimated using marginal standardization.⁶
- Cases are reported using age at the time of illness.

Data Caveats

- COVaxON and CCM are dynamic reporting systems, which allow ongoing updates to data previously entered. As a result, data extracted from COVaxON and CCM represent a snapshot at the time of extraction and may differ from previous or subsequent reports.
- The data represent vaccinations and case information reported and recorded in COVaxON or CCM, respectively. As a result, all counts may be subject to varying degrees of underreporting due to a variety of factors.
- The proportion of cases with a history of past infection is higher during the Omicron BA.1/BA.2 period. During the Delta period, 1.6% of cases among LTCH residents were considered re-infections, compared to 7.1% of cases among LTCH residents during the Omicron BA.1/BA.2 period. Natural immunity provided by past infection may contribute to the risk reductions observed between Delta and Omicron BA.1/BA.2 periods.
- Linking COVaxON and CCM data is dependent on availability of personal identifiers reported in both databases. For example, if a client was reported in both COVaxON and CCM, but personal identifiers (e.g., health card number, date of birth) were not available, then sufficient information would not have been available to identify the client and the client would not have been included in the linkage.
- Only cases that are unvaccinated or have received Health Canada authorized vaccines are included. Vaccinated cases included in this study were reported to have received the Pfizer-BioNTech Comirnaty, Moderna Spikevax, AstraZeneca Vaxzevria/COVISHIELD, and Janssen COVID-19 vaccines. Cases that received one or more doses of a non-Health Canada authorized vaccine are excluded.
- The time interval between doses was not assessed to determine if subsequent doses were administered as per the product-specific recommended minimum interval.

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