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ENHANCED EPIDEMIOLOGICAL SUMMARY

COVID-19 in Ontario: A Focus on Neighbourhood Material Deprivation, February 26, 2020 to December 31, 2022

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Please visit the interactive Ontario COVID-19 Data Tool to explore recent COVID-19 data by public health unit, age group, sex, and trends over time. Additional Enhanced Epidemiological Reports are available on the Public Health Ontario website.

Purpose

This report is one of a two-part series focused on neighbourhood-level trends related to health equity among laboratory-confirmed COVID-19 cases reported in Ontario, excluding those who reside in long-term care (LTC) settings. It focuses on the "material deprivation" dimension of the Ontario Marginalization Index (ON-Marg), which is connected to poverty and measures the inability of individuals and communities to access and attain basic material needs (e.g., educational attainment, quality of housing). Another report exploring trends in Neighbourhood Diversity is also available.[1]

The purpose of this report is to help decision makers and program planners identify populations for which prioritization of public health and health system resources and interventions are needed to mitigate the disproportionate impact of COVID-19.

Highlights

- Neighbourhoods with the highest level of material deprivation in Ontario experienced higher rates of COVID-19 during the period February 26, 2020 to December 31, 2022. The age-standardized rate of COVID-19 was 1.2 times higher in neighbourhoods with the highest level of material deprivation compared to those with the lowest level of material deprivation (Table 1).

- People living in neighbourhoods experiencing the highest level of material deprivation were more likely to experience severe outcomes (i.e., hospitalizations, intensive care unit (ICU) admissions, and deaths) than people living in neighbourhoods experiencing the lowest level of material deprivation. When standardized for age, hospitalization rate was 2.3 times higher (Table 2), ICU admission rate was 2.6 times higher (Table 3) and death rate was 2.5 times higher (Table 4).

- There was little variation in the proportion of COVID-19 cases between males and females across all age groups and quintiles of neighbourhood material deprivation (Figure 2).

Background

Over the course of the pandemic, trends in the incidence of COVID-19 were likely impacted by individual and societal level factors, differential uptake of the COVID-19 vaccine, the circulating SARS-CoV-2 variant, as well as changes in the public health measures put in place to protect against COVID-19.

In Ontario, a recent study by the Institute of Clinical and Evaluative Sciences (ICES) reported that individuals living in areas associated with lower socioeconomic status had higher rates of COVID-19 test positivity and hospitalization, in contrast to individuals living in higher socioeconomic neighbourhoods.[2] These findings are consistent with other studies that found low socioeconomic status to be a determinant of higher risk for COVID-19 infection and severe outcomes (i.e. hospitalizations).[3-4] For individuals living in lower income neighbourhoods, a number of risk factors increase COVID-19 exposure, acquisition of infection and severe outcomes. Many of these factors are closely connected to poverty and include living in crowded conditions, working in essential occupations, and experiencing barriers accessing personal protective equipment, testing and vaccines.[4] In addition, broader systemic and structural factors (e.g., racial discrimination and poverty) and variability in the type and duration of public health measures to mitigate COVID-19 transmission, have affected neighbourhoods disparately, with lower income neighbourhoods bearing most of the burden.[5-6]

Methods

ON-Marg and "Material Deprivation"

The material deprivation dimension of ON-Marg is closely connected to poverty. It refers to the inability of individuals and communities to access and attain basic material needs. It uses Canadian census data on income, quality of housing, educational attainment and family structure to assign neighbourhoods in Ontario to a measure of marginalization.

In this report, "neighbourhoods" refer to the census dissemination areas (DA), the smallest geographic unit for which Canadian census data are available, with an average population of 400 to 700 residents. ON-Marg assigns neighbourhoods to one of five levels or quintiles of material deprivation so that each grouping contains 20% of Ontario neighbourhoods. Using the Postal Code Conversion File Plus (PCCF+) version 7E, COVID-19 cases were assigned to neighbourhoods and then quintiles based on their postal code of residence. The quintiles for the material deprivation dimension are ordered from 1 to 5, with quintile 1 neighbourhoods having the lowest level of marginalization and quintile 5 neighbourhoods having the highest level of marginalization. The populations and other demographic characteristics of the neighbourhoods that comprise each quintile of the material deprivation index are included in Table A1.

The ON-Marg material deprivation dimension at the census DA level refers only to the neighbourhood and not to individuals. As such, trends highlighted in this report apply only to the neighbourhoods from which they arise and cannot be used to characterize individual members of a given area. These broader demographic trends may not reflect all residents of an area owing to the inherent heterogeneity of demographic characteristics which can vary substantially especially across large rural geographies.

Cases in this Report

A total of 1,550,063 laboratory confirmed cases of COVID-19 were reported in Ontario from February 26, 2020 to December 31, 2022. Of those, 1,401,843 (90.4%) cases were included in this report, following these exclusions:

- Persons that reside in long-term care settings as they are not included in the census data from which the material deprivation dimension of ON-Marg is determined (n=98,543). Although these cases represent a large number of the overall incidence and deaths, their exclusion ensures appropriate comparisons at the neighbourhood level.
- Cases without a reported postal code which is required to assign cases to a quintile of neighbourhood material deprivation (n=16,257).
- Cases that reside in regions of the province where census data are not available because they are suppressed by Statistics Canada to protect respondent's confidentiality or due to incomplete enumeration of Indigenous communities living on reserves (n=33,420). Indigenous individuals living off reserves are included in this analysis, however, Indigeneity data are not currently collected or captured in dimensions of ON-Marg.

The number of cases and incidence rates for each quintile of material deprivation are presented in this report. Where appropriate, rates have been age-standardized to remove the influence of age on trends and to allow for appropriate comparisons between neighbourhoods with varying levels of material deprivation. A map using colour coded Ontario census geographies that make up the five quintiles of neighbourhood material deprivation is shown in Figure A1.

Results

COVID-19 Cases and Neighbourhood Material Deprivation

- There was little variation in the proportion of COVID-19 cases by quintiles of neighbourhood material deprivation. (Table 1).
- Age-standardized rates of COVID-19 showed a gradient effect, with a steady increase in incidence rate as the level of neighbourhood material deprivation increased (Table 1). Neighbourhoods with the highest level of material deprivation (quintile 5) had an age-standardized cumulative rate of 10,943 cases per 100,000 population. This was 1.2 times the rate in the neighbourhoods with the lowest level of material deprivation (quintile 1), which had an age-standardized cumulative rate of 8,942 cases per 100,000 population.

Table 1. Summary of COVID-19 cases across neighbourhood material deprivation quintiles in Ontario, February 26, 2020 to December 31, 2022 (n= 1,401,843)

Quintiles of neighbourhood material deprivation	Cumulative case count	Percent of all COVID-19 cases (%)	Age-standardized cumulative rate per 100,000 population	Rate relative to the lowest level of material deprivation
Quintile 1 (least deprived)	297,106	21.2	8,942	Reference
Quintile 2	276,625	19.7	9,187	1.0
Quintile 3	266,837	19.0	9,854	1.1
Quintile 4	268,252	19.1	10,390	1.2
Quintile 5 (most deprived)	293,023	20.9	10,943	1.2

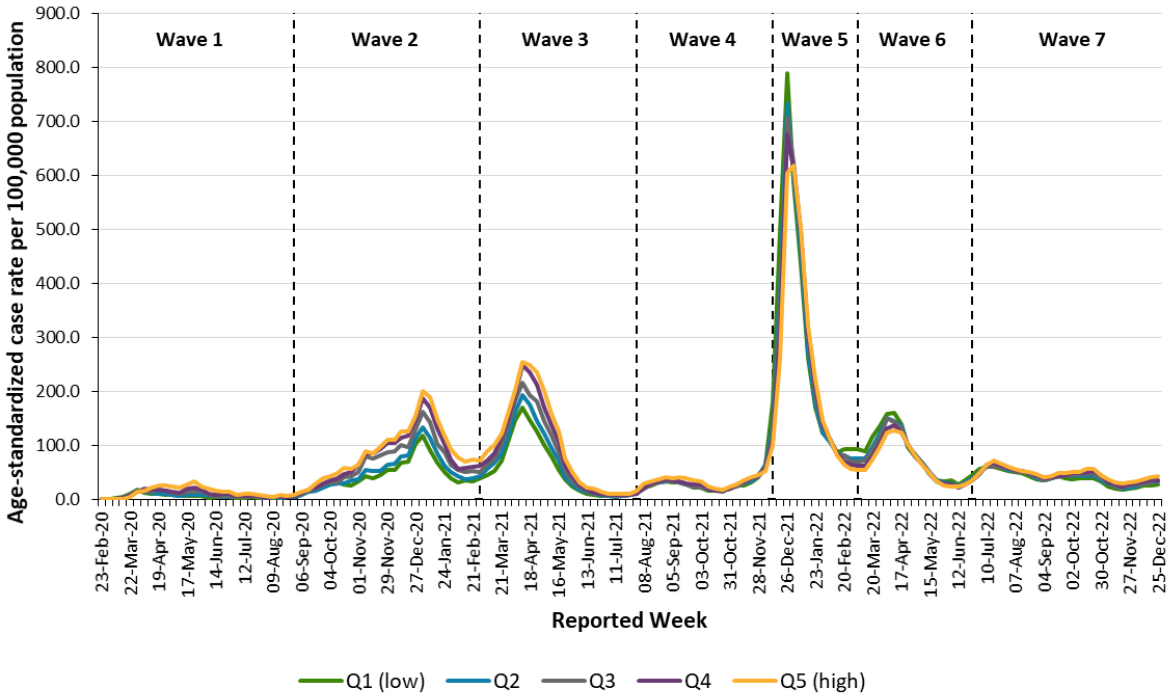
Note: Rates per 100,000 population are adjusted to the 2011 census population to account for any age differences between quintiles of neighbourhood material deprivation.
Data Source: CCM, ON-Marg 2016

Temporal Trends by Waves

The distribution of cases over time is presented based on waves and public health unit reported week, the date local public health units were first notified of the case Figure 1.

- The rate of COVID-19 cases was highest among neighbourhoods with the highest levels of material deprivation (quintiles 4 and 5) during waves 1, 2, 3, and 4.
- Starting towards the end of wave 4 and through to the middle of wave 6, a reversal in trends was observed, as neighbourhoods with the lowest levels of material deprivation (quintiles 1 and 2) had the highest age-standardized case rates.
- During wave 7, differences in case rates decreased across all neighbourhoods and trends converged.

Figure 1. Age-standardized rate of COVID-19 for each neighbourhood material deprivation quintile by wave and public health unit reported week: Ontario, February 26, 2020 to December 31, 2022

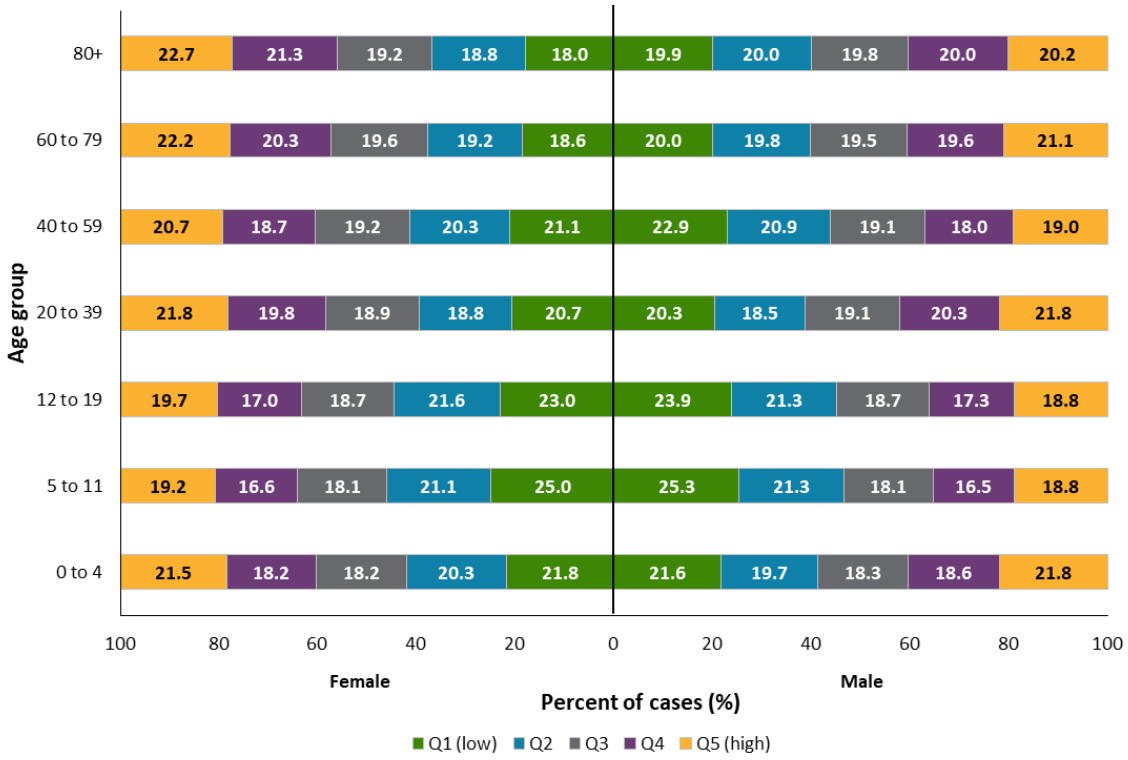


Note: Data included in wave 7 includes cases reported until December 31, 2022. Age-standardized rates are calculated using population counts from the 2019/20 RPDB population data and adjusted to the 2011 census population to account for any age differences between quintiles of marginalization.
Data Source: CCM, ON-Marg 2016

Age and Sex Distribution

- No clear trend emerged for associations between age and sex and neighbourhood-level material deprivation. Among all age groups, the proportion of COVID-19 cases was similar between males and females across the five quintiles (Figure 2).

Figure 2. Proportion of COVID-19 cases for each neighbourhood material deprivation quintile by sex and age group: Ontario, February 26, 2020 to December 31, 2022



Data Source: CCM, ON-Marg 2016

Severe Outcomes

HOSPITALIZATIONS

- A total of 55,679 COVID-19 hospitalizations were reported among the five quintiles of neighbourhood material deprivation. Of these hospitalizations, 15.4% (8,571/55,679) resided in neighbourhoods with the lowest levels of material deprivation, whereas 28.0% (15,608/55,679) resided in neighbourhoods with the highest levels of material deprivation (Table 2).

- Neighbourhoods with the highest levels of material deprivation had the highest age-standardized hospitalization rates for COVID-19, with this trend persisting over time (Figure 3).

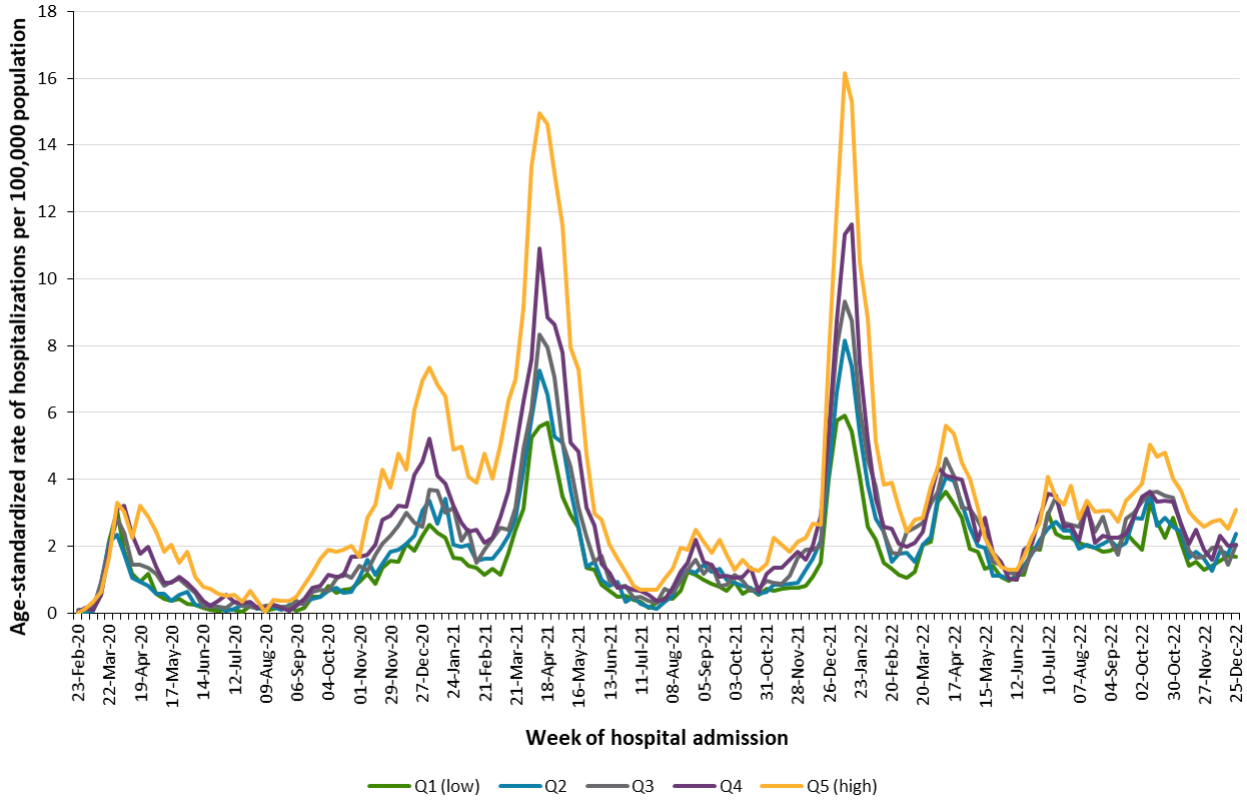
- Age-standardized hospitalization rates for COVID-19 increased with higher levels of neighbourhood material deprivation. The hospitalization rate for the neighbourhoods with the highest levels of material deprivation (525.0 admissions per 100,000 population in quintile 5) was approximately 2.3 times higher than neighbourhoods with the lowest levels of material deprivation (231.5 per 100,000 population) (Table 2).

Table 2. Summary of hospitalizations among confirmed cases of COVID-19 for each neighbourhood material deprivation quintile: Ontario, February 26, 2020 to December 31, 2022 (n= 55,679)

Quintiles of neighbourhood material deprivation	Median age (years)	Number of hospital admissions	Crude hospitalization rate per 100,000 population	Age-standardized hospitalization rate per 100,000 population	Rate relative to the lowest level of material deprivation
Quintile 1 (least deprived)	71	8,571	253.1	231.5	Reference
Quintile 2	70	9,474	307.2	272.1	1.2
Quintile 3	71	10,365	374.1	321.9	1.4
Quintile 4	70	11,661	442.5	372.8	1.6
Quintile 5 (most deprived)	67	15,608	576.5	525.0	2.3

Note: Age-standardized and crude rates are calculated using population counts from the 2019/20 RPDB population data. Age-standardized rates per 100,000 population are adjusted to the 2011 census population to account for any age differences between quintiles of marginalization.
Data Source: CCM, ON-Marg 2016

Figure 3. Age-standardized rate of hospitalization among confirmed cases of COVID-19 for each neighbourhood material deprivation quintile by week of hospital admission: Ontario, February 26, 2020 to December 31, 2022



Note: Age-standardized rates are calculated using population counts from the 2019/20 RPDB population data and adjusted to the 2011 census population to account for any age differences between quintiles of marginalization. Cases with a hospital admission date after December 31, 2022 have been removed from this figure, but are captured throughout the rest of the report.
Data Source: CCM, ON-Marg 2016

ICU ADMISSIONS

- Among the 8,881 COVID-19 cases that reported being admitted to an intensive care unit (ICU), 14.7% (1,308/8,881) resided in neighbourhoods with the lowest levels of material deprivation, whereas 30.2% (2,683/8,881) resided in neighbourhoods with the highest levels of material deprivation (Table 3).

- Neighbourhoods with the highest levels of material deprivation had the highest age-standardized ICU admission rates for COVID-19, with this trend persisting most of the times (Figure 4).

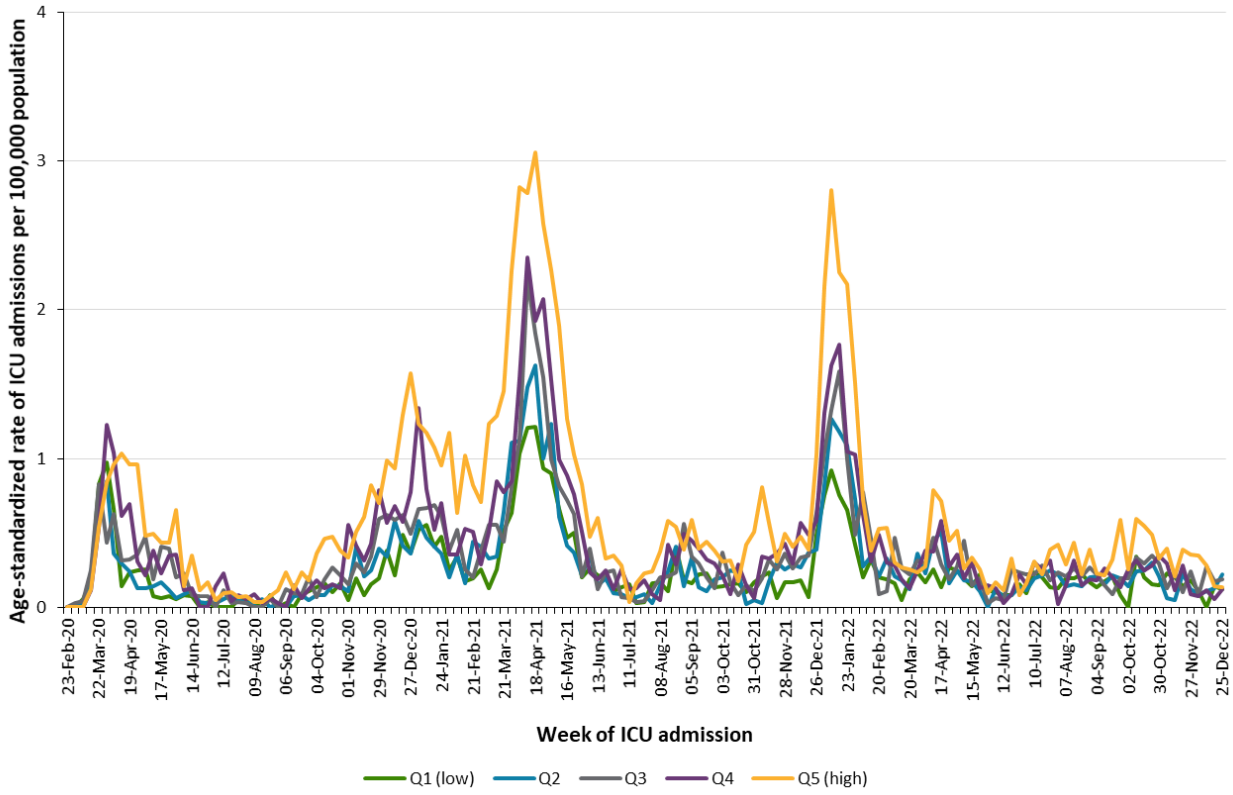
- After adjusting for age, the rates of ICU admissions showed a gradient effect with a steady increase in rates as quintiles of neighbourhood material deprivation increased (Table 3). The ICU admission rate for the neighbourhoods with the highest levels of material deprivation (92.9 admissions per 100,000 population in quintile 5) was approximately 2.6 times higher than the neighbourhoods with the lowest levels of material deprivation (35.6 per 100,000 population).

Table 3. Summary of ICU admissions among confirmed cases of COVID-19 for each neighbourhood material deprivation quintile: Ontario, February 26, 2020 to December 31, 2022 (n= 8,881)

Quintiles of neighbourhood material deprivation	Median age (years)	Number of ICU admissions	Crude ICU admission rate per 100,000 population	Age-standardized ICU admission rate per 100,000 population	Rate relative to the lowest level of material deprivation
Quintile 1 (least deprived)	65	1,308	38.6	35.6	Reference
Quintile 2	66	1,438	46.6	41.5	1.2
Quintile 3	65	1,618	58.4	51.4	1.4
Quintile 4	66	1,834	69.6	60.3	1.7
Quintile 5 (most deprived)	63	2,683	99.1	92.9	2.6

Note: Age-standardized and crude rates are calculated using population counts from the 2019/20 RPDB population data. Age-standardized rates per 100,000 population are adjusted to the 2011 census population to account for any age differences between quintiles of marginalization
Data Source: CCM, ON-Marg 2016

Figure 4. Age-standardized rate for ICU admissions among confirmed cases of COVID-19 for each neighbourhood material deprivation quintile by week of ICU admission: Ontario, February 26, 2020 to December 31, 2022



Note: Age-standardized rates are calculated using population counts from the 2019/20 RPDB population data and adjusted to the 2011 census population to account for any age differences between quintiles of marginalization. Cases with an ICU admission date after December 31, 2022 have been removed from this figure, but are captured throughout the rest of the report.
Data Source: CCM, ON-Marg 2016

DEATHS

- Among the 8,896 COVID-19 deaths that were reported within the examined time frame, 14.0% (1,247/8,896) resided in the neighbourhoods with the lowest levels of material deprivation, whereas 28.9% (2,573/8,896) resided in the neighbourhoods with the highest levels of material deprivation (Table 4).

- Generally, neighbourhoods within Ontario with the highest levels of material deprivation had the highest age-standardized death rates for COVID-19, with this trend persisting most of the times (Figure 5).

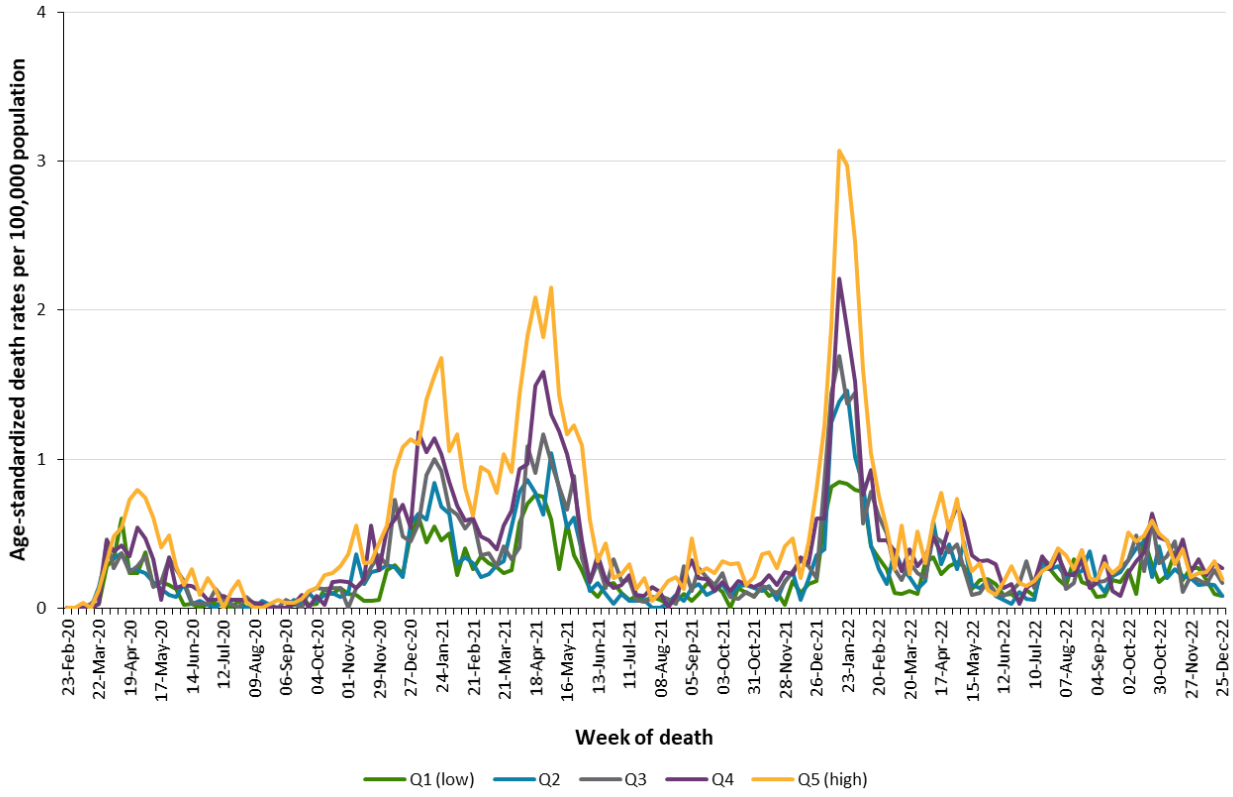
- After adjusting for age, the rate of death increased as neighbourhood material deprivation quintile increased (Table 4). The death rate for the neighbourhoods with the highest levels of material deprivation (80.9 admissions per 100,000 population in quintile 5) was approximately 2.5 times higher than the neighbourhoods with the lowest levels of material deprivation (31.8 per 100,000 population).

Table 4. Summary of deaths among confirmed cases of COVID-19 for each neighbourhood material deprivation quintile: Ontario, February 26, 2020 to December 31, 2022 (n= 8,896)

Quintiles of neighbourhood material deprivation	Median age (years)	Number of deaths	Crude death rate per 100,000 population	Age-standardized death rate per 100,000 population	Rate relative to the lowest level of material deprivation
Quintile 1 (least deprived)	79	1,247	36.8	31.8	Reference
Quintile 2	79	1,439	46.7	38.7	1.2
Quintile 3	79	1,647	59.4	47.3	1.5
Quintile 4	78	1,990	75.5	57.5	1.8
Quintile 5 (most deprived)	76	2,573	95.0	80.9	2.5

Note: Age-standardized and crude rates are calculated using population counts from the 2019/20 RPDB population data. Age-standardized rates per 100,000 population are adjusted to the 2011 census population to account for any age differences between quintiles of marginalization
Data Source: CCM, ON-Marg 2016

Figure 5. Age-standardized death rate among confirmed cases of COVID-19 for each neighbourhood material deprivation quintile by week of death: Ontario, February 26, 2020 to December 31, 2022



Note: Age-standardized rates are calculated using population counts from the 2019/20 RPDB population data and adjusted to the 2011 census population to account for any age differences between quintiles of marginalization. Cases with a death date after December 31, 2022 have been removed from this figure, but are captured throughout the rest of the report.
Data Source: CCM, ON-Marg 2016

Technical Notes

Details on data caveats and methods are documented in the Technical Notes of the Ontario COVID-19 Data Tool. For information on data caveats and methods related to the Ontario Marginalization Index (ON-Marg), please visit PHO's ON-Marg webpage.

Data Sources

- The data for this report were based on information successfully extracted from the Public Health Case and Contact Management Solution (CCM) for all PHUS by PHO as of:
    - **January 11, 2023 at 1 p.m**. for cases reported March 1, 2022 onwards
    - **January 9, 2023 at 9 a.m**. for cases reported August 1, 2021 to February 28, 2022
    - **January 9, 2023 at 9 a.m**. for cases reported up to July 31, 2021
- Statistics Canada Postal Code Conversion File Plus (PCCF+), version 7E.
- The health equity (material deprivation) analyses use data from the 2016 Ontario Marginalization Index (ON-Marg) [7], and population counts from the Ontario Health Insurance Plan (OHIP) Registered Person Database (RPDB) Cohort Fiscal Year 2019/20 (Extracted October 2020) (provided by Health Analytics and Insights Branch, Capacity Planning and Analytics Division, Ministry of Health).

Data Caveats: Case Data

- CCM is a dynamic disease reporting system, which allows ongoing updates to data previously entered. As a result, data extracted from CCM represent a snapshot at the time of extraction and may differ from previous or subsequent reports.
- The data only represent cases reported to public health units and recorded in CCM. As a result, all counts will be subject to varying degrees of underreporting due to a variety of factors, such as disease awareness and medical care seeking behaviours, which may depend on severity of illness, clinical practice, changes in laboratory testing, and reporting behaviours.
- Observed trends over time should be interpreted with caution for the most recent period due to reporting and/or data entry lags.
- Only cases meeting the confirmed case classification as listed in the MOH Case Definition – Coronavirus Disease (COVID-19) document are included in the report counts from CCM. This includes persons with:
    - laboratory confirmation by a validated NAAT assay
        - a validated point-of-care (POC) assay deemed acceptable to provide a final result
        - a validated laboratory-based serological assay for SARS-CoV-2
- Cases of confirmed reinfection, as defined in the provincial case definitions, are counted as unique investigations.
- Reported date is the date the case was reported to the public health unit.

- Data on hospital admissions, ICU admissions and deaths are likely under-reported as these events may occur after the completion of public health follow up of cases. Cases that were admitted to hospital or died after follow-up was completed may not be captured in CCM.

- Hospitalization/ICU data may be incomplete or missing for records where information was not gathered, reported to public health units or entered in CCM.

- Hospitalization includes all cases hospitalized (or that had their hospital stay extended) because of COVID-19. It includes cases that have been discharged from hospital as well as cases that are currently hospitalized. Includes Intensive Care Unit (ICU) cases but not emergency room visits. Hospitalizations were identified by a reported hospital admission date or reported 'Yes' for hospitalization/ICU admission.

    - Hospital admission date refers to the first admission date recorded on the case record. Hospital service transfers (e.g., alternate level of care (ALC)) are not reflected in the hospital admission date.

    - If hospital admission date is missing, then ICU admission date is used (if applicable). When there is no ICU admission date to serve as a proxy, then reported date is used.

- Cases admitted to an ICU include all cases for which an ICU admission date was reported at the time of data extraction. It includes cases that have been treated or that are currently being treated in an ICU. Cases admitted to an ICU are a subset of cases hospitalized. However, ICU admission counts may include cases admitted to ICU that are not included in hospitalization counts if the initial hospital admission date for a case occurred prior to December 12, 2021.

    - ICU admission date refers to the first admission date recorded on the case record (i.e., the first ICU admission date would be used if a case was readmitted).

    - If ICU admission date is missing, reported date is used as a proxy.

- 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 was unrelated to cause of death'.

    - COVID-19 deaths are placed in time using the 'Date of Death' field in CCM. If the date of death is missing, the outcome date field is used as a proxy.

- Cases with unknown or missing ages were excluded from age-specific analyses.

- COVID-19 cases from CCM for which the Classification and/or Disposition was reported as ENTERED IN ERROR, DOES NOT MEET DEFINITION, IGNORE, DUPLICATE or any variation on these values have been excluded. The provincial case count for COVID-19 may include some duplicate records, if these records were not identified and resolved.

- Waves refer to the reported week for COVID-19 cases using the following date ranges:
    - Wave 1: February 26, 2020 to August 31, 2020 (length of wave 188 days)
        - The week starting February 23, 2020 presented in Figure 1-4 contains data from February 26 on.
    - Wave 2: September 1, 2020 to February 28, 2021 (length of wave 181 days)
    - Wave 3: March 1, 2021 to July 31, 2021 (length of wave 153 days)
    - Wave 4: August 1, 2021 to December 14, 2021 (length of wave 136 days)
    - Wave 5: December 15, 2021 to February 28, 2022 (length of wave 76 days)
    - Wave 6: March 1, 2022 to June 18, 2022 (length of wave 110 days)
    - Wave 7: June 19, 2022 to December 31, 2022 (ongoing)

Data Caveats: ON-Marg

- ON-Marg is a data tool that combines a wide range of demographic indicators into multiple distinct dimensions of marginalization. It is an area-based index which assigns a measure of marginalization based on neighbourhood versus individual characteristics. As such, the broader demographic trends of an area may not reflect all residents of a neighbourhood owing to the inherent heterogeneity of demographic characteristics which can vary substantially especially across large rural geographies. For more information, please visit PHO's ON-Marg website.
- RPDB data includes individuals alive and eligible for OHIP. Postal codes were assigned to individuals according to the most recent residential address available. Residents of Ontario who do not have a health card number, individuals aged less than 65 years who have not had any health care system activity in the past seven years, and individuals aged 65 and older who have not had any health care system activity in the past two years are excluded from the population counts.
- Quintile specific rates per 100,000 were age-standardized to the 2011 census population to account for any age differences between quintiles of material deprivation.[8]

Appendix A

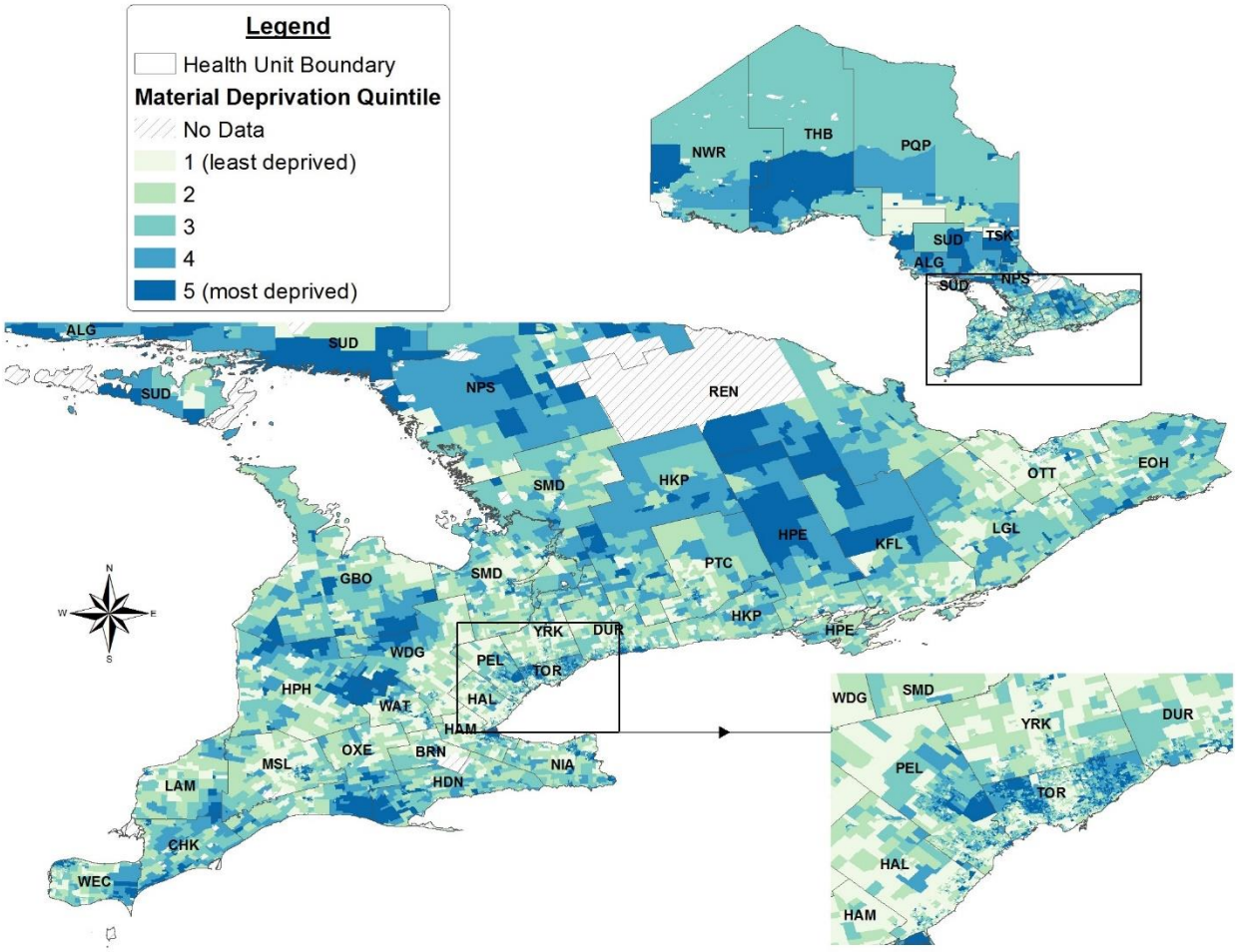
Table A1. Demographic characteristics of the neighbourhood material deprivation quintiles (ON-Marg 2016)

Population characteristic	Quintile 1 (least deprived)	Quintile 2	Quintile 3	Quintile 4	Quintile 5 (most deprived)
Population	3,026,112	2,833,474	2,547,530	2,432,696	2,541,350
Proportion of the population	22.5%	21.1%	18.9%	18.1%	18.9%
Non-White, non-Indigenous	23.1%	26.5%	29.4%	32.0%	38.1%
Black	2.3%	2.9%	4.1%	5.1%	10.2%
East and Southeast Asian	9.7%	10.8%	9.4%	10.0%	10.1%
Latino	1.1%	1.1%	1.3%	1.7%	2.4%
Middle Eastern	2.8%	2.7%	2.5%	2.4%	3.5%
South Asian	5.9%	7.5%	10.5%	11.0%	9.6%
Recent immigrant (<5 years)	2.7%	2.9%	3.1%	4.0%	5.6%
Cannot speak English or French	1.4%	1.9%	2.3%	3.0%	4.0%
Seniors (age 65+)	15.9%	16.5%	17.4%	18.2%	16.1%
Low income	10.3%	14.1%	17.2%	20.5%	26.8%
Without high school diploma	16.8%	20.7%	25.4%	32.1%	44.3%
Lone-parent families	23.6%	15.6%	19.7%	29.6%	47.9%
Dwellings that are apartment buildings	7.6%	9.3%	11.7%	16.1%	29.5%

Population characteristic	Quintile 1 (least deprived)	Quintile 2	Quintile 3	Quintile 4	Quintile 5 (most deprived)
Average number of persons per dwelling	2.8 persons	2.8 persons	2.8 persons	2.6 persons	2.5 persons

The sum of the population of all quintiles is less than the total Ontario population because not all areas could be assigned to an ON-Marg quintile.
The non-White, non-Indigenous population includes the included ethno-racial groups along with persons that identify as being of mixed ethnicity/race and "other".
Data Source: Statistics Canada[9]

Figure A1: Ontario census geographies and the Ontario Marginalization Index (ON-Marg): Neighbourhood material deprivation



See Table A2 for the full names for health units shown on this map.
Data source: Statistics Canada[10], ON-Marg 2016

Table A2. Ontario public health units (PHUs)

Code	Health Unit Name
ALG	The District of Algoma Health Unit
BRN	Brant County Health Unit
CHK	Chatham-Kent Health Unit
DUR	Durham Regional Health Unit
EOH	The Eastern Ontario Health Unit
GBO	Grey Bruce Health Unit
HAL	Halton Regional Health Unit
HAM	City of Hamilton Health Unit
HDN	Haldimand-Norfolk Health Unit
HKP	Haliburton, Kawartha, Pine Ridge District Health Unit
HPE	Hastings and Prince Edward Counties Health Unit
HPH	Huron Perth Health Unit
KFL	Kingston, Frontenac and Lennox And Addington Health Unit
LAM	Lambton Health Unit
LGL	Leeds, Grenville and Lanark District Health Unit
MSL	Middlesex-London Health Unit
NIA	Niagara Regional Area Health Unit
NPS	North Bay Parry Sound District Health Unit
NWR	Northwestern Health Unit
OTT	City of Ottawa Health Unit
OXE	Oxford Elgin St. Thomas Health Unit
PEL	Peel Regional Health Unit
PQP	Porcupine Health Unit

PTC	Peterborough County-City Health Unit
REN	Renfrew County and District Health Unit
SMD	Simcoe Muskoka District Health Unit
SUD	Sudbury and District Health Unit
THB	Thunder Bay District Health Unit
TOR	City of Toronto Health Unit
TSK	Timiskaming Health Unit
WAT	Waterloo Health Unit
WDG	Wellington-Dufferin-Guelph Health Unit
WEC	Windsor-Essex County Health Unit
YRK	York Regional Health Unit

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