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TECHNICAL NOTES

Assault-Related Emergency Department Visits Health Equity Snapshot

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Introduction

Health equity is created when all people (individuals, groups, and communities) have a fair opportunity to reach their fullest health potential.[1] Health inequities are driven by the political, cultural, economic, and social structures that create inequitable distribution of power, privilege, and resources, including capitalism, systemic racism, and colonialism. These social and structural determinants influence the conditions that people are born into, grow up in, live, and work. They have impacts on access to high-quality health and social services, experiences within the healthcare system, and health outcomes.[2]

This Health Equity Snapshot reports on health inequities by summarizing how rates of emergency department (ED) visits for assault-related injuries vary across levels of marginalization for the province, public health units (PHUs), and Local Health Integration Networks (LHINs) (for historical purposes). Data are reported by two year intervals for the years 2015-2016 to 2023-2024 based on year of discharge from the ED. This Snapshot contains seven summary measures of socioeconomic inequality which are used to quantify the relationship between ED visits for assault-related injuries and marginalization.

Ontario Marginalization Index

Rates of assault-related ED visits are measured across quintiles of neighbourhood marginalization using the Ontario Marginalization Index (ON-Marg).[3] ON-Marg was created by combining Canadian census data across a number of indicators into four distinct dimensions of marginalization.[4] The differences in health status between quintiles of ON-Marg reported in this Snapshot reflect different pathways in which social and structural determinants of health impact health and wellbeing:

- The **material resources** dimension is closely connected to poverty and refers to the inability for individuals and communities to access and attain basic material needs relating to housing, food, clothing, and education. The differences reported in this Snapshot may be reflecting the pervasive impact that socioeconomic position has on a person's access to necessities for good health, exposure to unhealthy stress and instability, and support for healthy behaviours.
- The **racialized and newcomer populations** dimension measures the proportion of newcomers and/or nonwhite, non-Indigenous populations, and relates to the impacts of racialization and xenophobia. The differences reported in this Snapshot may be the result of interpersonal and structural racism, and not necessarily the result of individual-level causal factors.[5] While newcomers to Canada often have better overall health outcomes than Canadian-born counterparts, a phenomenon commonly known as the "healthy immigrant effect," many newcomers may experience declining health linked to the adoption of a Western lifestyle (e.g., sedentary lifestyle and diet) and the cumulative exposure to stress associated with racism and discrimination, and systemic barriers to employment, housing, and health care.[6]

- The **households and dwellings** dimension relates to family and neighbourhood stability and cohesiveness, and is based on measures of the types and density of residential accommodations and family structure characteristics. The differences reported in this Snapshot may reflect the impact socially supportive environments have on mental health and overall wellbeing.
- The **age and labour force** dimension relates to the impacts of disability and dependence. It refers to area-level concentrations of people who do not have income from employment, including older adults (age 65+), children, adults whose work is not compensated and/or those unable to work due to disability. The differences reported in this Snapshot may reflect the impact of age and disability on communities, including the obstacles to health due to discrimination (e.g., ageism), social exclusion, and difficulty accessing quality health care.

Indicator Definition

Description

Age-standardized rate per 100,000 population of emergency department (ED) visits for assault-related injuries. Rates are reported across five levels of marginalization for each of the four dimensions of ON-Marg, and summarized using socioeconomic measures of inequality. This indicator definition was adapted from APHEO Injury-Related Emergency Department Visits Indicator.[7]

Numerator

- Number of emergency department visits captured in the National Ambulatory Care Reporting System (NACRS) with ICD-10 All DX Codes of X85 – Y09, and Y87.1.

Denominator

- Census population.

Exclusions

- AM_Case_Type not equal "EMERGENCY"
- Records with invalid or missing postal codes
- Records with invalid age
- Non-Ontario residents
- Cases geocoded to dissemination areas that are not assigned ON-Marg quintile values

Summary Measures of Socioeconomic Inequality

Seven summary measures of socioeconomic inequality are provided which quantify the association between marginalization and health status. For more information, please see Summary Measures of Socioeconomic Inequalities in Health.[8]

Rate Difference

The absolute difference in rates of the health outcome between the most marginalized and least marginalized (Quintile 5 - Quintile 1). The rate difference is zero when there is no inequity, while higher values indicate that the burden of poor health is higher among the most marginalized, and negative values indicate that the burden is highest among the least marginalized.

Rate Ratio

The relative difference obtained by dividing the rate of the most marginalized by the rate of the least marginalized group (Quintile 5/Quintile 1). The rate ratio is one when there is no inequity. The rate ratio can only assume positive values. Values of greater than one indicate that the burden of poor health is higher among the most marginalized, and values less than one indicate that the burden is highest among the least marginalized.

The Slope Index of Inequality (SII)

An absolute summary measure of inequality which represents the slope of the linear regression line across all quintiles of marginalization. Values of zero indicate no inequities across quintiles, while positive values indicate a social gradient where health status decreases as the population becomes more marginalized. Negative values indicate a social gradient where health status improves with increasing marginalization. The SII is zero when there is no inequity, while higher values indicate that the burden of poor health is higher among the most marginalized, and negative values indicate that the burden is highest among the least marginalized.

The Relative Index of Inequality (RII) (ratio)

A relative summary measure of inequality which represents the slope of a log-linear Poisson regression model across all quintiles of marginalization, as outlined in Moreno-Betancur et al. (2015).[9] Can be interpreted as the predicted value of the health outcome in the hypothetical least marginalized individual divided by the predicted value of the hypothetical most marginalized individual. The RII is one when there is no inequity. The RII can only assume positive values. Values of greater than one indicate that the burden of poor health is higher among the most marginalized, and values less than one indicate that the burden is highest among the least marginalized.

The Relative Index of Inequality (RII) (mean)

A relative summary measure of inequality, calculated by dividing the slope index of inequality by the mean rate of the health outcome in the population. Values of zero indicate no inequities across quintiles, while positive values indicate a social gradient where health status decreases as the population becomes more marginalized, while negative values indicate a social gradient where health status improves with increasing marginalization. The RII mean is zero when there is no inequity, while higher values indicate that the burden of poor health is higher among the most marginalized, and negative values indicate that the burden is highest among the least marginalized.

Population Attributable Fraction (PAF)

The projected reduction, in relative terms, in the rate of a health indicator if each quintile of marginalization experienced the rate of the least marginalized quintile (quintile 1), expressed as a percentage of the total health outcome. The larger the value of PAF, the larger the level of inequity. PAF is zero if no further improvement can be achieved (i.e., if all quintiles have reached the same level of health status as the least marginalized quintile). Negative values represent the percent increase in additional cases that would result if each quintile experienced the rate of the least marginalized group.

Population Impact Number (PIN)

The projected reduction, in absolute terms, in the number of cases of a health indicator if each quintile of marginalization experienced the rate of the least marginalized quintile group (quintile 1), expressed as a count. The larger the value of PIN, the larger the level of inequity. PIN is zero if no further improvement can be achieved (i.e., if all quintiles have reached the same level of health status as the least marginalized quintile). Negative values represent the number of additional cases that would result if each quintile experienced the rate of the least marginalized group.

Metrics

- Age-standardized rates per 100,000 (by quintile of ON-Marg, from quintile 1 (low marginalization) to quintile 5 (high marginalization)).
- Summary measure of socioeconomic inequality. No results are provided for geographies that contain quintiles with zero cases.
- Statistically significant summary measure of socioeconomic inequality.
- Statistical significance of summary measure of socioeconomic inequality compared to Ontario (values are considered statistically significantly different if 95% confidence intervals do not overlap).
- Case counts by quintile and population denominators are available in the download data file.

Methods

The analytic approach taken to calculate the results presented in this Snapshot is as follows:

1. Assign cases to a level of marginalization
2. Calculate age-standardized quintile-specific rates of health status
3. Calculate summary measures of socioeconomic inequality

Assign Cases to a Level of Marginalization

Individuals who appear in administrative health data are assigned to a quintile of ON-Marg based on the dissemination area (DA) of residence. A DA is a standard census geographic unit with a population of 400 to 700 persons. Quintiles 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. Two different methods of creating quintiles are used in this analysis:

- **Local cutoffs:** With this method, quintiles are weighted specifically for each individual PHU or LHIN. Each quintile will contain 20% of all dissemination areas within a given PHU or LHIN. This option should be selected by users who are interested in defining the level of marginalization based on the local population characteristics, rather than population characteristics of Ontario.
- **Ontario cutoffs:** With this method, quintiles are weighted provincially, so that each quintile contains 20% of all Ontario dissemination areas. This means that the distribution of quintiles across sub-provincial geographies such as PHUs and LHINs will not necessarily be equal. This option should be selected by users who are interested in making comparisons between groups defined by a level of marginalization based on the entire province, or for making comparisons between geographies using provincially comparable measures of marginalization.

The Statistics Canada Postal Code Conversion File Plus (PCCF+) is used to geocode cases to DAs based on their postal code. Once cases have been assigned to DAs, ON-Marg is used to assign cases to a level of marginalization for each of the four dimensions, for both local and Ontario cutoffs. To account for changing levels of marginalization over time, health status data are assigned to the closest version of ON-Marg by date (e.g., 2018 cases are assigned to quintiles using the 2016 version of ON-Marg, while 2019 cases are assigned to quintiles using the 2021 ON-Marg).

Calculate Age-Standardized Rates

Numerators were created by aggregating health status data by ON-Marg quintiles. Denominators for each ON-Marg quintile were created by aggregating DA-level age-group specific counts for the 2016 and 2021 censuses. Numerators were assigned denominator data of the closet census year. For example, 2016 census counts are used as the denominator for 2014-2018 health status data.

Rates were directly age-standardized to the 2011 Canadian population using 15-year age groups to account for potential differences in the age structure of each quintile, and to account for changes in age structure over time. Fifteen year age-groups (0 to 14, 15 to 29, 30 to 44, 45 to 59, 60 to 74, 75 and older) were used for more stable population estimates. Two years of data were combined for analysis to provide more stable rates. Age-standardized rates and associated variances have been calculated using methodology described on the APHEO website.[10]

Calculate Summary Measures of Inequality

Summary measures of socioeconomic inequality were calculated to summarize differences in health status across the five quintiles of marginalization. Seven summary measures were calculated for each of the four ON-Marg dimensions using the local and Ontario quintile cutoffs, and for each two year grouping of analysis.

Data Sources

Numerator - Emergency Department Visits

- National Ambulatory Care Reporting System, 2015-2024 [data file]. Ottawa, ON: Canadian Institute for Health Information [producer]; Toronto, ON: Ontario. Ministry of Health, IntelliHealth Ontario [distributor]; [data extracted 2026 May 22].

Denominator - Census Population

- Original Source: Statistics Canada
- Statistics Canada as extracted by Ontario Agency for Health Protection and Promotion (Public Health Ontario). 2016 census of population – dissemination area: census profile - age and sex for Canada, provinces, territories, census divisions, census subdivisions and dissemination areas, 2016 census [Internet]. Ottawa, ON: Statistics Canada; 2017 Nov 29 [extracted 2018 Apr 24]. Available from: https://www12.statcan.gc.ca/census-recensement/2016/dp-pd/prof/details/download-telecharger/comp/GetFile.cfm?Lang=E&TYPE=CSV&GEONO=044_ONTARIO
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Considerations

- Submission of 2023 and 2024 data by some Ontario hospitals was incomplete at the time of data extraction.
- Interpret 2020 through 2023 results with caution due to changes in the availability of health care and health seeking behaviour during the COVID-19 pandemic.

How to Cite This Snapshot

Generic Citation Format:

Ontario Agency for Health Protection and Promotion (Public Health Ontario). Assault-related emergency department visits health equity snapshot measure in sentence case [Internet]. Toronto, ON: King's Printer for Ontario; cYYYY [modified YYYY Mon DD; cited YYYY Mon DD]. Available from: https://www.publichealthontario.ca/en/Data-and-Analysis/Health-Equity/Assault-Related-ED-Visit

Example:

Ontario Agency for Health Protection and Promotion (Public Health Ontario). Assault-related emergency department visits health equity snapshot: relative risk [Internet]. Toronto, ON: King's Printer for Ontario; c2026 [modified 2026 Jul 14; cited 2026 Jul 14]. Available from: https://www.publichealthontario.ca/en/Data-and-Analysis/Health-Equity/Assault-Related-ED-Visit

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Citation

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