Public Health Ontario | Santé publique Ontario

ENHANCED EPIDEMIOLOGICAL SUMMARY

Measles in Ontario

Updated: November 21, 2024

Introduction

Measles is a highly contagious respiratory virus. Symptoms of measles include fever, a red blotchy rash, red watery eyes and cough. Immunization is the best protection against measles. For children and most adults born in or after 1970, this means receiving two doses of measles containing-vaccine (e.g., MMR vaccine).

In Ontario, measles has been rare, owing to the successful elimination of measles in Canada and high immunization coverage. As a result, measles cases are predominantly associated with travel (often referred to as "measles importations"). Due to an increase in measles activity globally, Ontario has begun to see more cases of measles.

This report describes the epidemiology of measles in Ontario from January 1, 2013 to November 20, 2024. This report is updated every four weeks.

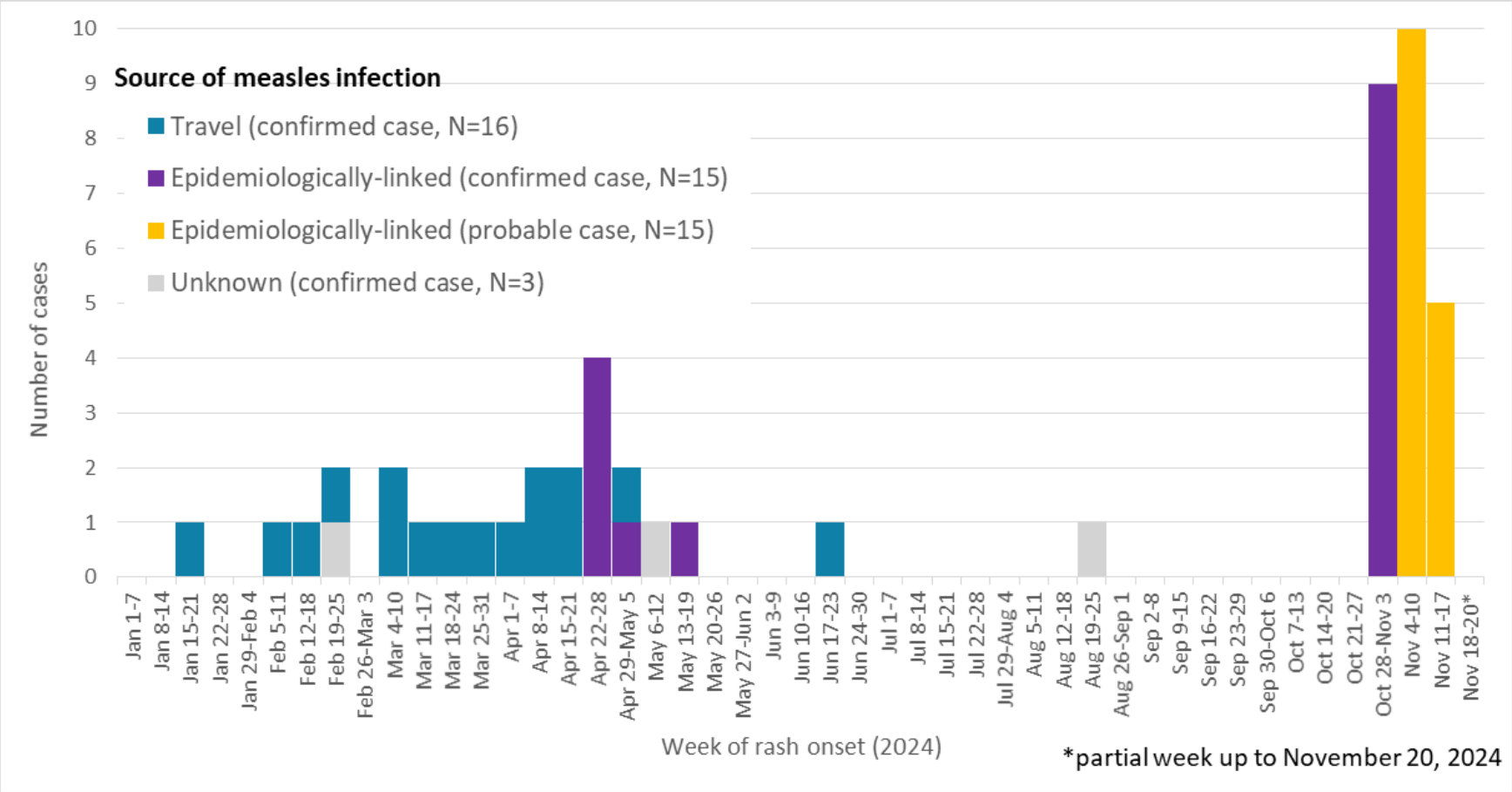
This report includes the most current information available from Ontario's integrated Public Health Information System (iPHIS) as of November 20, 2024 at 8:00 am.

Highlights

- As of November 20, 2024, 34 confirmed and 15 probable cases of measles have been reported in Ontario in 2024. This reflects an increase of 9 confirmed and 15 probable cases since the previous epidemiological summary on October 24 when the last reported confirmed case of measles occurred during the week of August 19-25 (Figure 1).
  - All cases were in individuals born in or after 1970; 31 were in children and adolescents, and 18 in adults. Twenty-nine of the children were unimmunized and immunization status was unknown for two children. Four of the adults were previously immunized with at least two doses of measles-containing vaccine, one was previously immunized with one dose of measles-containing vaccine, nine adults were unimmunized, and immunization status was unknown for four adults (Table 1).
  - Cases occurred in 12 different public health units (Table 1).
  - Sixteen cases were associated with travel (i.e., acquisition of measles outside of Canada), two of whom resulted in six epidemiologically-linked cases in April and May. Three cases occurred in individuals with unknown sources of exposure (i.e., no history of travel and not epidemiologically-linked to another case). Between October and November, an out-of-province exposure to a travel-related case of measles in New Brunswick resulted in 24 epidemiologically-linked cases (9 confirmed, 15 probable) in Ontario (Figure 1).

- Six cases have required hospitalization, including 5 children and 1 adult. All hospitalized children were unimmunized; of these, there was one death in a child less than five years old.
- Based on the most recent monthly summary of laboratory data available, 1,464 individuals were tested for acute measles infection using molecular PCR between January 1 and November 9, 2024; of these, 1.6% were positive (refer to Technical Notes for further details on laboratory data).

Figure 1: Number of Measles Cases by Week of Rash Onset and Source of Infection: Ontario, January 1, 2024 – November 20, 2024



Notes:

- The incubation period for measles (i.e., period from exposure to prodromal symptoms) averages 10 to 12 days; the time from exposure to rash onset ranges from 7 to 21 days (average 14 days).[1,2] Cases are considered to be infectious from one day before the start of the prodromal period, which is usually four days before rash onset, to four days after rash onset.[1]
- Based on the incubation and the infectious period, epidemiologically-linked cases may appear up to 25 days after the rash onset date of the most recently reported case of measles. Prodrome onset date was used for two epidemiologically-linked cases since rash onset date was unavailable.
- Provincial surveillance definitions for confirmed and probable cases of measles are available in Appendix 1[3] and may be adapted in the event of an outbreak to reflect the specific circumstances of the outbreak under investigation.
- Source of measles infection is determined to be travel-related if the person travelled outside Canada 7 to 21 days prior to rash onset.

Table 1: Characteristics of Measles Cases: Ontario, January 1, 2024 – November 20, 2024

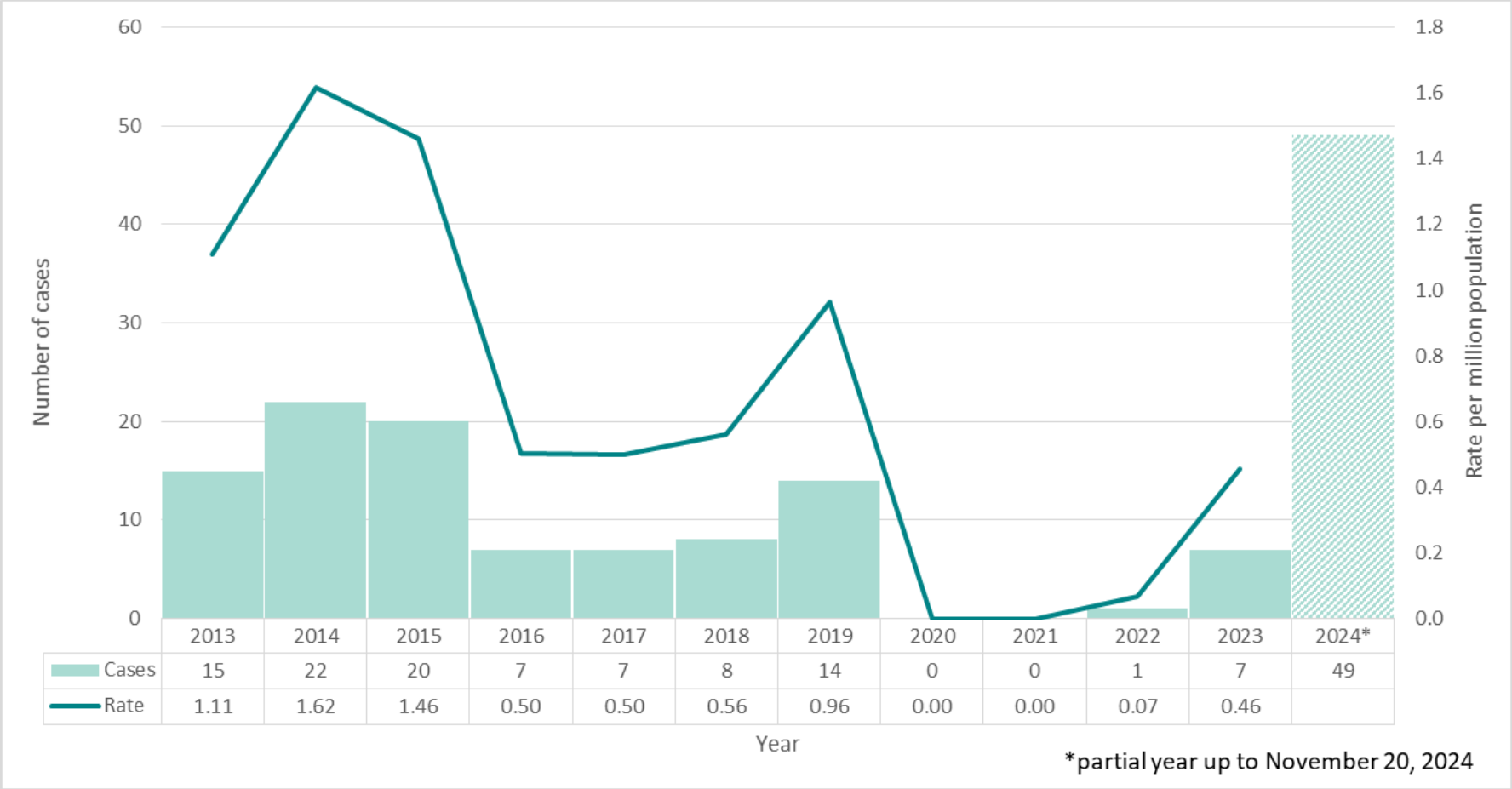
Case Characteristics	2024 (as of November 20, 2024)
Total cases	49
Gender	
Female	23 (46.9%)
Male	26 (53.1%)
Age (years)	
<1	2 (4.1%)
1-4	10 (20.4%)
5-9	9 (18.4%)
10-19	10 (20.4%)
20-39	16 (32.7%)
40+	2 (4.1%)
Cases born in or after 1970	49 (100.0%)
Public Health Unit	
Brant County Health Unit	1 (2.0%)
City of Hamilton Public Health Services	6 (12.2%)
Durham Region Health Department	1 (2.0%)
Grey Bruce Health Unit	7 (14.3%)
Haldimand-Norfolk Health Unit	1 (2.0%)
Halton Region Health Department	3 (6.1%)
Middlesex-London Health Unit	1 (2.0%)
Peel Public Health	2 (4.1%)
Southwestern Public Health	16 (32.7%)
Toronto Public Health	9 (18.4%)
Windsor-Essex County Health Unit	1 (2.0%)
York Region Public Health	1 (2.0%)
Hospitalizations	6 (12.2%)
Deaths	1 (2.0%)

Case Characteristics	2024 (as of November 20, 2024)
Source of Measles Infection	
Travel (confirmed case)	16 (32.7%)
Epidemiologically-linked (confirmed case)	15 (30.6%)
Epidemiologically-linked (probable case)	15 (30.6%)
Unknown (confirmed case)	3 (6.1%)
Immunization Status	
Unimmunized	35 (71.4%)
1 dose	1 (2.0%)
2 or more doses	4 (8.2%)
Unknown/no proof of immunization	9 (18.4%)

Trends Over Time

- Between 2013 and 2023, there were 101 confirmed cases of measles reported in Ontario (Figure 2).
- Prior to the COVID-19 pandemic (2013–2019), the annual number of measles cases in Ontario ranged between seven and 22; in comparison, one case was reported during the pandemic (2020–2022) while seven cases were reported in 2023 (Figure 2).
    - Similar trends were seen in Canada overall, where the number of measles cases decreased dramatically during the COVID-19 pandemic.
- 94 cases occurred in individuals born after 1970 (93.1%) (Table 2).
- Most cases were unimmunized (i.e., no doses received; 62.4%) or had unknown immunization status (24.8%) (Table 2).

Figure 2: Number of Measles Cases and Incidence Rate per Million Population: Ontario, January 1, 2013 – November 20, 2024

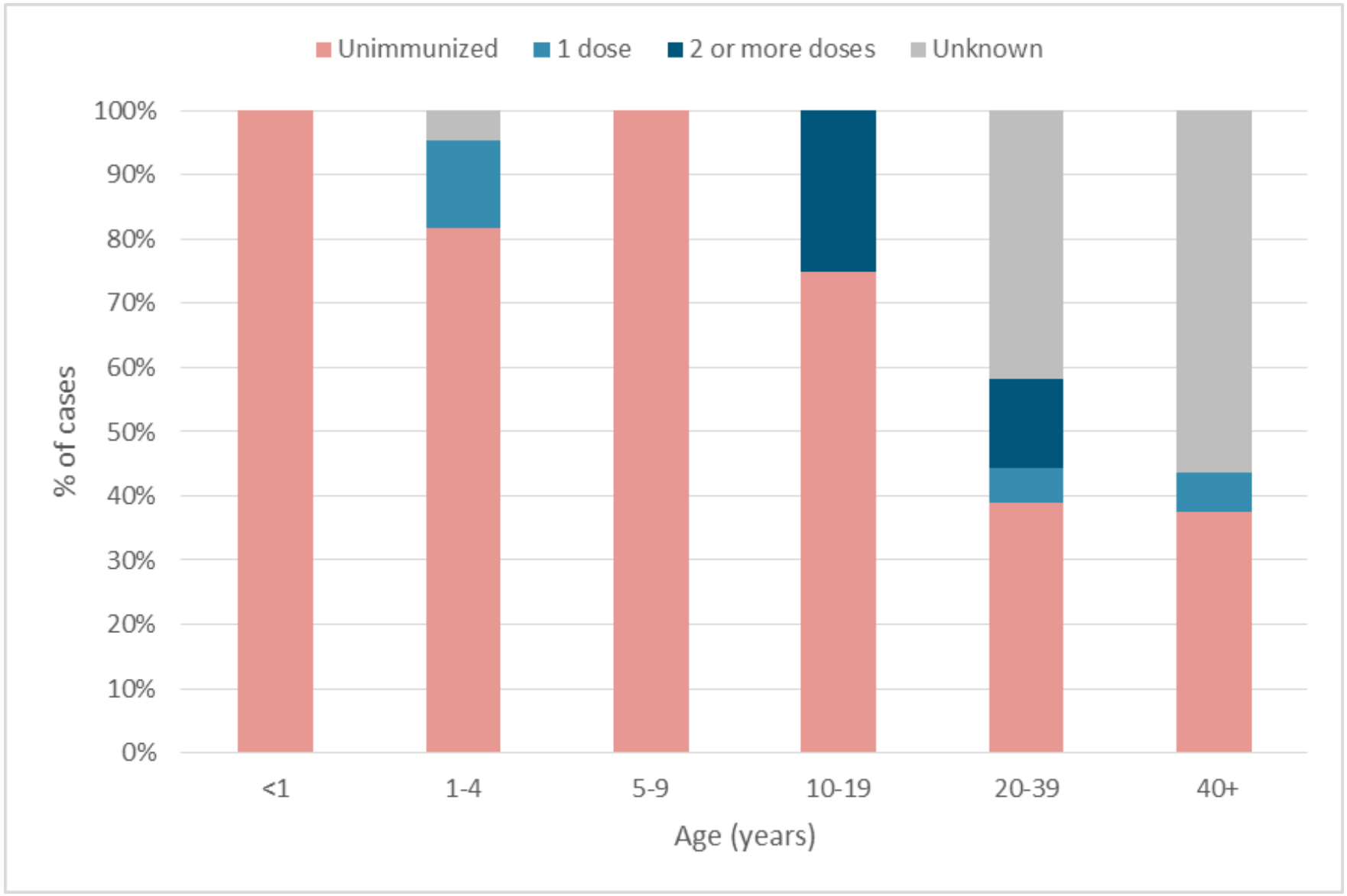


	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024*
Cases	15	22	20	7	7	8	14	0	0	1	7	49
Rate	1.11	1.62	1.46	0.50	0.50	0.56	0.96	0.00	0.00	0.07	0.46	

Table 2: Characteristics of Measles Cases: Ontario, January 1, 2013 – December 31, 2023

Case Characteristics	2013-2023
Total Cases	101
Gender	
Female	49 (48.5%)
Male	52 (51.5%)
Age (years)	
<1	13 (12.9%)
1-4	22 (21.8%)
5-9	6 (5.9%)
10-19	8 (7.9%)
20-39	36 (35.6%)
40+	16 (15.8%)
Cases born in or after 1970	94 (93.1%)
Hospitalizations	28 (27.7%)
Deaths	0 (0.0%)
Immunization Status	
Unimmunized	63 (62.4%)
1 dose	6 (5.9%)
2 or more doses	7 (6.9%)
Unknown/no proof of immunization	25 (24.8%)

Figure 3: Immunization Status of Measles Cases by Age Group: Ontario, January 1, 2013 – December 31, 2023



Technical Notes

Data Sources

CASE DATA

- The case data for this report were based on information entered in the Ontario Ministry of Health (MOH) integrated Public Health Information System (iPHIS) database as of November 20, 2024 at 8:00 am.
- iPHIS is a dynamic disease reporting system that allows ongoing updates to previously entered data. As a result, data extracted from iPHIS represent a snapshot at the time of extraction and may differ from previous or subsequent reports.

LABORATORY DATA

- The most recent monthly summary of laboratory data was extracted from the Public Health Ontario Laboratory Information Management System on November 11, 2024 and reflect finalized molecular PCR results indicating acute measles infection for samples received up to November 9, 2024. Specimen collection date was used where available, otherwise login date was used. Counts represent unique individuals and may change in future reports as results are finalized.
- Due to differences in the dates of extraction for case and laboratory data, the number of cases and individuals testing positive by PCR may differ.

ONTARIO POPULATION DATA

Ontario population data were sourced from Statistics Canada and the Ministry of Finance:

- Statistics Canada. Population estimates 2013-2022: table 17-10-0134-01: estimates of population (2016 census and administrative data), by age group and sex for July 1st, Canada, provinces, territories, health regions (2018 boundaries) and peer groups [Internet]. Ottawa, ON: Government of Canada; 2023 Mar 2 [extracted 2023 Mar 13]. Available from: https://doi.org/10.25318/1710013401-eng
- Population projections 2023-2024: Population reporting. Population Projections Public Health Unit, 2022-2046 [data file]. Toronto ON: Ministry of Finance [producer]; Toronto, ON: Ontario. Ministry of Health, IntelliHealth Ontario [distributor]; [data extracted 2023 May 10].

Data Caveats

- Data reported for 2020-2022 should be interpreted with caution. Both testing and iPHIS data entry practices were likely impacted by the COVID-19 pandemic response.
- Only measles cases meeting the confirmed and probable case classification as listed in the Ontario MOH surveillance[3] or outbreak case definitions are included in the reported case counts.
    - Changes to provincial surveillance case definitions and disease classifications have occurred over the years and thus may impact the analysis of trends over time. Cases are classified in iPHIS based on the Ontario MOH surveillance case definitions in use at the time the case was identified.
    - PHO's technical report "Factors Affecting Reporting Diseases in Ontario: Case Definition Changes and Associated Trends 1991-2016" and its associated appendix provide more detailed information on this topic.[4]

- With the exception of Figure 1 where cases of measles are reported based on the rash onset date, cases of measles are reported based on the Episode Date in all other analysis. Episode date is an estimate of the onset date of disease for a case that is determined using the following hierarchy in iPHIS: Onset Date > Specimen Collection Date > Lab Test Date > Reported Date.
    - For example: If an Onset Date exists, it will be used as the Episode Date. If Onset Date is not available, then the next available date in the hierarchy (i.e., Specimen Collection Date) will be used, and so on.
- Case counts by geography are based on the diagnosing health unit (DHU). DHU refers to the case's public health unit of residence at the time of illness onset or report to public health and not necessarily the location of exposure. Cases that were not residents of Ontario at the time of illness onset were excluded from the analysis.
- Cases for which the Disposition Status was reported as ENTERED IN ERROR, DOES NOT MEET DEFINITION, DUPLICATE-DO NOT USE, or any variation on these values, were excluded from this analysis.
- To determine immunization status of cases, only documented doses of a measles-containing vaccine administered on or after the 1st birthday and at least 14 days prior to disease onset were included.
- A case of measles is considered imported if the person travelled outside Canada 7 to 21 days prior to rash onset.
- To be considered as a fatal case outcome, a case must not have REPORTABLE DISEASE WAS UNRELATED TO CAUSE OF DEATH selected as the Death Type Description, at the time of data extraction.

References

1. Gastanaduy P, Haber P, Rota PA, Patel M. Measles. In: Centers for Disease Control and Prevention, author; Hall E, Wodi PA, Hamborsky J, Morelli V, Schillie S, editors. Epidemiology and prevention of vaccine-preventable diseases. 14th ed. Washington, DC: Public Health Foundation; 2021 [cited 2024 Mar 05]. Available from: https://www.cdc.gov/vaccines/pubs/pinkbook/meas.html
2. American Academy of Pediatrics, Committee on Infectious Diseases; Kimberlin DW, Barnett ED, Lynfield R, Sawyer MH, editors. Red Book: 2021-2024 report of the committee of infectious diseases [Internet]. 32nd ed. Itasca, IL: American Academy of Pediatrics; 2021. Available from: https://online.statref.com/Home/Resolve?id=23017&grpalias=HSICOTR
3. Ontario. Ministry of Health. Ontario public health standards: requirements for programs, services and accountability. Infectious diseases protocol. Appendix 1: case definitions and disease-specific information. Disease: measles. Effective: March 2024. Toronto, ON: Queen's Printer for Ontario; 2022. Available from: https://www.ontario.ca/files/2024-03/moh-measles-appendix-en-2024-03-19.pdf
4. Ontario Agency for Health Protection and Promotion (Public Health Ontario). Factors affecting reportable diseases in Ontario: case definition changes and associated trends in Ontario: 1991-2016 [Internet]. Toronto, ON: Queen's Printer for Ontario; 2018 [cited 2024 Mar 05]. Appendix, Measles. Available from: https://www.publichealthontario.ca/-/media/documents/F/2018/factors-reportable-diseases-ontario-1991-2016.pdf?la=en&hash=A10D37CEE72926746247664DEA6E8E503AFAE0B2

Citation

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