

 TECHNICAL NOTES

# Ontario Respiratory Virus Tool

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## Introduction

The [Ontario Respiratory Virus Tool](#) allows users to select, overlap and analyze multiple respiratory pathogen data sets from Ontario, as well as view highlights and reported COVID-19 and influenza activity for the current week.

## Data Sources

- **COVID-19 case and outbreak:** These data are based on information extracted weekly from the Public Health Case and Contact Management Solution (CCM) by Public Health Ontario (PHO) for all public health units (PHUs). Data for cases reported April 1, 2023 onwards are extracted weekly. Data for cases reported up to March 31, 2023 are refreshed on an ad hoc basis. Hospitalization data from CCM is no longer updated, however, data up to January 20, 2024 remain accessible in the tool.
- **Laboratory-confirmed cases of influenza and institutional outbreaks of influenza and other respiratory pathogens:** The data for the current surveillance period were based on information extracted weekly from the integrated Public Health Information System (iPHIS) by PHO for all PHUs, with the exception of influenza case data from Toronto Public Health and Ottawa Public Health. Toronto Public Health and Ottawa Public Health share aggregate influenza case data with PHO each week. Previous surveillance periods' data (2014-15 to 2022-23) were extracted on October 25, 2023. Influenza data were submitted in aggregate starting mid-March 2020 for Toronto Public Health and as of December 20, 2023 (for data starting the week of December 10, 2023) for Ottawa Public Health.
- **PHO respiratory virus testing:** The data for the current surveillance period were based on information extracted weekly from the PHO Laboratory Information Management System. Previous surveillance periods' data were extracted on August 4, 2023.
- **COVID-19 testing data (i.e. tests for SARS-CoV-2) and SARS-CoV-2 percent positivity:** These data are based on information received weekly from the Provincial COVID-19 Diagnostic Network (PD-NOC), reported by member microbiology laboratories.
- **Number of influenza and other respiratory virus tests and number of positive test results for Ontario:** These data are sourced from the Public Health Agency of Canada's (PHAC) Centre for Immunization and Respiratory Infectious Diseases (CIRID) respiratory virus detection tables<sup>1</sup>, which are shared with PHO each week.
- **Hospital bed occupancy:** These bed census (I9) data are obtained from the Ministry of Health each week for COVID-19, influenza and RSV.
- **ICU bed occupancy:** These data are from the Critical Care Information System (CCIS), provided by CritiCALL Ontario.

- **COVID-19 vaccine:** These data are based on information extracted from the Ontario Ministry of Health’s COVaxON application on the Monday prior to data refresh. COVID-19 vaccine coverage data is no longer updated, although data up to December 2, 2023 can be accessed in the tool.
- **Ontario population estimates** were sourced from Statistics Canada for the years 2014-2022.<sup>2</sup>  
**Ontario population projections** were sourced from the Ontario Ministry of Finance for the years 2023 and 2024.<sup>3</sup>
  - COVID-19 vaccine coverage estimates use the 2023 population projections as the denominator.

## Data Caveats

- The data only represent cases that get tested and/or are reported to public health units and recorded in CCM or iPHIS. As a result, all counts will be subject to varying degrees of underreporting and may be an underestimate of the true number of individuals with the disease 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, access to testing and reporting behaviours. As such, data should be interpreted with caution.
- Observed trends over time should be interpreted with caution for the most recent period due to reporting and/or data entry lags. Previously reported data may change, unless otherwise noted, as public health units update data.
- CCM and iPHIS are dynamic disease reporting systems which allow ongoing updates to data previously entered. As a result, data extracted from CCM and iPHIS represent a snapshot at the time of extraction and may differ from previous or subsequent reports.
- Cases of COVID-19 and influenza as well as outbreaks of COVID-19, influenza and other respiratory outbreak in institutions or public hospitals are data displayed in the graphs are updated weekly for the 2023-24 surveillance period. Data for earlier surveillance periods are updated annually.
- Due to differences in reporting timeframes, counts presented here may not align with counts presented on PHU websites. For discrepancies in counts, data presented on the PHU website should be used.
- Surveillance periods start from September 1 of one year and ends August 31 of the following year. In online tools and graphs depicting respiratory virus data by surveillance week, the surveillance week containing September 1 (week 35) is used as the first week of the surveillance period.
  - While COVID-19 is not recognized as a seasonal respiratory virus unlike influenza and other respiratory viruses, data for COVID-19 are reported according to surveillance periods within parts of this tool.
- Surveillance weeks correspond to the [Public Health Agency of Canada \(PHAC\) influenza surveillance weeks](#).<sup>4</sup>
- Cases with unknown or missing ages were excluded from age-specific analyses.
- For cumulative rates of cases, hospital admissions (up to January 20, 2024) and deaths, the start year for the surveillance period was matched to the year for the population count used as the denominator for the calculation of rates. For example, for the 2023-24 surveillance period, the cumulative case rate is calculated using the 2023 population projections as the denominator.

- For calculating rates displayed in graphs for influenza cases and hospital bed occupancy; RSV hospital bed occupancy; and COVID-19 cases, CCM hospital admissions (up to January 20, 2024), bed occupancy and deaths; the population denominator was determined by the year in which the case or occupancy data were reported. For example, for cases or occupancy data reported the week of September 10, 2023, the 2023 population projections were used as the denominator. Population denominator will switch to the subsequent year starting the surveillance week considered week 1 for that year by [FluWatch](#).<sup>4</sup>

## COVID-19 and Influenza Activity

- COVID-19 and influenza are diseases of public health significance in Ontario and are therefore reportable to the province as per [Ontario Regulation \(O. Reg.\) 135/18 \(Designation of Diseases\)](#) and amendments under the [Health Protection and Promotion Act \(HPPA\)](#).<sup>5,6</sup> Other respiratory viruses are only reportable as respiratory infection outbreaks in institutions and public hospitals and therefore case-level information is not available for these other respiratory viruses to make similar weekly indicator change assessments.
- Respiratory virus percent positivity level and thresholds for determining weekly indicator changes are based on case, outbreak and laboratory data obtained from:
  - iPHIS and PHAC CIRID's respiratory virus detection tables for influenza
  - CCM and the PD-NOC for SARS-CoV-2.
- Percent positivity thresholds were assessed for SARS-CoV-2 using the PD-NOC data, and for influenza using data from the PHAC CIRID's Respiratory Virus Detection Surveillance System.
- The number of positive tests for SARS-CoV-2 as calculated from the PD-NOC may not align with the laboratory-confirmed COVID-19 cases reported in CCM. This may be due to factors such as:
  - Not all confirmatory SARS-CoV-2 tests in the province are part of the PD-NOC while all confirmed cases of COVID-19 in Ontario must be recorded in CCM.
  - Differences in the dates used to place the data in time (testing date for PD-NOC versus reported date for CCM).
  - The number of tests performed may not necessarily correspond with the number of persons tested, as more than one specimen may have been submitted per person. More than one test may also be performed per specimen.
- The number of positive tests for influenza as reported by the PHAC CIRID may not align with the number of laboratory-confirmed influenza cases reported in iPHIS as only a subset of all Ontario laboratories conducting influenza testing in the province report to CIRID while all laboratory-confirmed cases of influenza in Ontario must be reported to public health units and recorded in iPHIS. Observed differences may also be due to factors such as:
  - Differences in dates used to place the data in time (testing date for CIRID versus reported date for iPHIS).
  - The number of tests performed may not necessarily correspond with the number of persons tested, as more than one specimen may have been submitted per person. More than one test may also be performed per specimen.
- Percent positivity is calculated from the number of positive tests and the total number of tests performed in a given time period. Testing eligibility for COVID-19 and influenza differ along with the number of tests performed.

- For the most up to date information on testing eligibility please refer to the [provincial testing guidance](#) for COVID-19 and the [PHO Laboratory's guidance](#) for influenza.<sup>7,8</sup> For the most up to date information on seasonal respiratory viruses tested at PHO please refer to the PHO's laboratory respiratory testing algorithm.<sup>8</sup>
- Provincial COVID-19 percent positivity levels are defined as follows:
  - Low: <10.0% positivity
  - Moderate: 10.0% - 16.9% positivity
  - High: 17.0% - 24.9% positivity
  - Very high: ≥25.0% positivity
- Provincial influenza (i.e., influenza A and B combined) percent positivity levels are defined as follows:
  - Low: <10.0% positivity
  - Moderate: 10.0% - 24.9% positivity
  - High: 25.0% - 39.9% positivity
  - Very high: ≥40.0% positivity
- The threshold for the start of seasonal influenza activity is a provincial percent positivity level ≥5%. The threshold for inter-seasonal activity is when the provincial percent positivity level is <5%. This aligns with Public Health Agency of Canada seasonal thresholds.<sup>9</sup>
- Influenza public health unit activity levels are calculated weekly for each PHU by PHO using case and outbreak data from iPHIS. Currently, COVID-19 activity levels are not calculated at the health unit level.
- For surveillance purposes, COVID-19 and influenza are assigned to a percent positivity level of low, moderate, high, very high to provide a snapshot of the extent to which these respiratory viruses are circulating. These may differ from levels that the Public Health Agency of Canada uses and determined were appropriate when looking at the national level.
- For simplicity, percent positivity as a single measure was selected instead of a composite indicator using multiple measures, as this metric generally trends closely with case counts and outbreaks.
- Respiratory percent positivity thresholds are developed by PHO and are used to monitor influenza and other respiratory activity. These thresholds are reviewed annually. The review completed ahead of the 2023/2024 surveillance period indicated that no change was required for the thresholds developed for the 2022-23 surveillance period. The 2022-23 thresholds were determined by applying them against historical trends in influenza from pre-pandemic surveillance periods (2015-2016 to 2019-2020) and 2022-23; the 2020-2021 and 2021-2022 surveillance periods were excluded as the percent positivity was <5% for the majority of these surveillance periods.
- COVID-19 percent positivity thresholds were developed using the following approach:
  - First, COVID-19 percent positivity values reported in 2022 were evaluated against the PHO-developed percent positivity thresholds for influenza and other respiratory viruses. Ahead of the 2022-23 surveillance period, it was determined that COVID-19-specific percent positivity thresholds should be developed due to the following considerations:
    - COVID-19 percent positivity values observed in 2022 are lower compared to typical influenza percent positivity trends prior to the pandemic. This difference is likely the result of different populations being tested for influenza and COVID-19.

- Generally, those eligible for influenza testing are individuals with a high pre-test probability (e.g., symptomatic, have known exposure to disease, associated with an ongoing outbreak), and therefore more individuals tested will have a positive result.
- COVID-19 testing eligibility is broader and includes individuals with a low-pretest probability (e.g., asymptomatic, testing for medical procedure purposes), and therefore fewer individuals tested will have a positive result.
- Then, the percent positivity thresholds were adjusted and narrowed based on observed COVID-19 percent positivity levels in past waves, with a focus on waves in 2022 because of their applicability to the upcoming surveillance period (e.g., Omicron variant of concern widely circulating, vaccination coverage, testing eligibility, public health measures in place). During the Omicron surge (wave 5), the Ontario health system experienced an overwhelming number of cases and higher than usual hospital occupancy; the weekly percent positivity at this time reached an all-time high of over 29.4%, which provided the additional context for setting the very high range as  $\geq 25\%$ . After reviewing the minimum, maximum and median percent positivity values, percent positivity thresholds were selected.
- Finally, proposed COVID-19 percent positivity thresholds were reviewed by the Ministry of Health and local public health unit partners prior to being finalized.
- Thresholds were reviewed ahead of the 2023-24 surveillance period and no updates were made.
- Percent positivity thresholds for COVID-19 will be routinely reviewed, assessed, and updated as needed.
- Percent positivity thresholds were developed for surveillance and situational awareness purposes. Decisions regarding public health action and/or infection prevention and control should not solely rely on percent positivity level thresholds as context specific indicators (e.g., the group at risk, current trajectory of trends, immunization coverage, transmissibility, severity, risk tolerance, as well as local factors such as health care capacity and access to care, current measures in place, etc.) should be considered to inform public health decisions.
- Provincial percent positivity may not reflect the higher levels of activity that may be occurring disproportionately in select sub-populations at a given time.
- Weekly indicator change assessment was determined by considering a combination of indicators as detailed in Appendix A for COVID-19 and Appendix B for influenza.

## COVID-19

### CASE COUNTS AND TESTING

- Only cases meeting the confirmed case classification as listed in the [MOH Case Definition – Coronavirus Disease \(COVID-19\) document](#)<sup>7</sup> are included.
- Cases of confirmed reinfection, as defined in the provincial case definitions, are counted as unique cases.
- Reported Date is the date the COVID-19 case was reported to public health.
- 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.

- Male/Female information are sourced from the Sex field in CCM and are intended to represent sex assigned at birth. On October 14, 2021, changes were made in CCM to enable reporting on the Sex field where this data field is supplemented by archived Male/Female information previously entered in the Gender field.
- Orientation of case counts by geography is based on the permanent health unit (also referred to as diagnosing health unit or DHU). DHU refers to the case's public health unit of residence at the time of illness onset and not necessarily the location of exposure. Cases for which the DHU was reported as MOH-PHO (to signify a case is not a resident of Ontario) have been excluded from the analysis.
- The number of tests performed does not reflect the number of specimens or persons tested. More than one test may be performed per specimen or per person. As such, the percentage of tests that were positive does not necessarily translate to the number of specimens or persons testing positive.

## SEVERITY INDICATORS

### Hospital Bed Occupancy

- Hospital bed occupancy data presents the average daily occupancy count per week of people in hospital (including intensive care unit (ICU)) with active COVID-19 (i.e., tested positive). People may be counted in bed occupancy data for multiple days.
  - The 'COVID-19 Hospital Bed Occupancy (total)' indicator accounts for hospital bed occupancy among people in hospital with active COVID-19 (regardless of whether the reason for admission was COVID-19 or a non-COVID-19 related illness with a subsequent positive test for COVID-19).
  - The 'COVID-19 Hospital Bed Occupancy (due to infection)' indicator accounts for hospital bed occupancy among people in hospital for active COVID-19 (i.e., admitted, COVID-19 positive and primarily being treated for COVID-19).
- Hospital bed occupancy data are not available by sex.
- Hospital bed occupancy data by public health unit is determined based on the location of the hospital, not the patient's home address or health unit of residence.
- Hospital bed occupancy data are available by age group, however the age groups presented for these indicators differ from those elsewhere in the tool such as hospital admissions or cases from CCM by age group.
- ICU bed occupancy data presents the number of people in ICU because of COVID-19.
  - ICU bed occupancy data are not available by age, sex nor public health unit.
  - ICU bed occupancy data for surveillance weeks 37 to 42 (i.e., between September 10, 2023 and October 21, 2023) are not included due to technical issues with the Critical Care Information System, that affected data reported between September 9 and October 20, 2023. ICU bed occupancy data for the week of September 3, 2023 is incomplete due to this issue and was averaged over the 6 days for which data were available.
    - Hospitals in the West Region previously experienced data availability issues and are excluded from this report for October 24, 2023 to March 24, 2024.
- Hospital/ICU bed occupancy counts differ from CCM hospital admissions data presented as 'COVID-19 hospital admissions', which count the number of people admitted to hospital (or had their

hospital stay extended) each week due to COVID-19 (inclusive of ICU admissions), and were subsequently entered into CCM by PHUs.

- Start dates for bed occupancy indicators vary. Refer to Appendix C: [Table A1](#) for details.

## Hospital Admissions (CCM)

- Hospital admissions data from CCM are no longer being updated. However, data up to January 20, 2024 are still available in the tool and the data considerations below apply.
  - Data on hospital admissions in CCM 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 after follow-up was completed may not be captured in CCM.
  - Hospital admissions reported in CCM include cases admitted to hospital (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 in hospital. It includes Intensive Care Unit (ICU) cases, but not emergency room visits. Hospital admissions reported in CCM were identified by a reported hospital admission date or reported 'Yes' for hospitalization/ICU.
  - Hospital admission date in CCM 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 in CCM, then ICU admission date is used (if applicable). When there is no ICU admission date to serve as a proxy, then the case reported date is used.

## Deaths (CCM)

- Data on deaths in CCM are likely under-reported as this event may occur after the completion of public health follow up of cases. Cases that died after follow-up was completed may not be captured in CCM.
- For surveillance purposes, a COVID-19 death is defined as a death resulting from a clinically compatible illness in a confirmed COVID-19 case, unless there is a clear alternative cause of death that cannot be related to COVID-19 (e.g., trauma). There should be no period of complete recovery between the illness and the 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' or 'Under PHU Review'.
- 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. When there is no outcome date to serve as a proxy, then the case reported date is used.
- COVID-19 deaths in cases 0 to 19 years of age are not stratified by public health unit due to concerns regarding small counts of this sub-population, particularly in smaller health units.
- Historical COVID-19 outcome data between January 15, 2020 to March 31, 2023 have been updated as part of ongoing provincial data quality initiatives. As a result, changes to historical COVID-19 cases and deaths were included in this tool as of December 1, 2023.

## OUTBREAKS

- Outbreak reported week is based on the outbreak reported date, and if unavailable, the date the public health unit created the outbreak.
- Ongoing outbreaks are those that are reported in CCM as 'Open' without a 'Declared Over Date' recorded and were reported within the past 5 months.
- Outbreaks are declared by the local medical officer of health or their designate in accordance with the Health Protection and Promotion Act and criteria outlined in Ministry guidance documents.<sup>6</sup>
- Confirmed outbreaks in high-risk settings are defined in Ministry of Health's [Appendix 1: Case Definitions and Disease Specific Information for COVID-19](#).<sup>7</sup> Guidance for specific settings includes: [COVID-19 Guidance: Long-Term Care Homes, Retirement Homes, and Other Congregate Living Settings for Public Health Units](#).<sup>10</sup>
  - Note: Prior to May 5, 2021, a confirmed COVID-19 outbreak in a long-term care home or retirement home setting was defined as a single, laboratory-confirmed case of COVID-19 in a resident or staff member.
  - Outbreak definitions have changed over the course of the pandemic and outbreaks were declared based on the definitions in place at the time.

## Influenza and Other Respiratory Viruses

### INFLUENZA CASE COUNTS AND OUTBREAKS OF INFLUENZA AND OTHER RESPIRATORY VIRUSES

- Dates used for laboratory-confirmed influenza cases are based on the date the case was reported to the public health unit (PHU) as recorded in iPHIS.
- Cases of influenza A&B are included in the influenza A counts. In the surveillance periods before the COVID-19 pandemic, cases of influenza A&B made up less than 0.4% of all influenza cases.
- Influenza A cases may be further categorized into a subtype (H3 and H1). Not all laboratory-confirmed influenza A cases have testing completed to determine the subtype.
- Age and sex information for influenza cases reported by Toronto Public Health after March 15, 2020 and by Ottawa Public Health after December 10, 2023 are not available as these cases were no longer entered in iPHIS. Only aggregate influenza case counts by type, subtype and week are available after this time.
- Severity indicators are not available for influenza cases as data on hospitalization and deaths are not routinely collected and recorded in iPHIS.
- Unlike the other surveillance periods presented, the 2014–15 and 2020–21 surveillance periods included a week 53, which occurs once every five to six years. Week 53 in 2014–15 corresponded to December 28, 2014 to January 3, 2015. In 2020–21 week 53 corresponded to December 27, 2020 to January 2, 2021.
- The number of new institutional influenza outbreaks reported for the current week is based on the date the outbreak was reported to the PHU; when reported date is unavailable, the date the outbreak was created in iPHIS is used. Outbreaks of influenza A and B are included in the counts for outbreaks of influenza A.
- Outbreak reported week is based on the outbreak reported date, and if unavailable, the date the public health unit created the outbreak.



- Any outbreak where influenza was identified is reported under the appropriate influenza category (“Influenza A” or “Influenza B”) regardless of whether other viruses were also identified in the outbreak. Outbreaks of influenza A and B are included in the counts for outbreaks of influenza A.
- In iPHIS, public health units indicate the outbreak setting using the iPHIS exposures. Confirmed outbreaks in institutions (as defined in the HPPA) and public hospitals are reported in four groupings for this data tool: Long-term Care Homes, Retirement Homes, Hospitals and Other.<sup>6</sup>

## PHU ACTIVITY LEVELS

- Influenza public health unit activity levels are calculated weekly for each PHU by PHO using iPHIS data on laboratory-confirmed influenza cases and laboratory-confirmed influenza outbreaks in institutions and public hospitals. Influenza public health unit activity levels are not updated retroactively.
  - Due to lags in data entry in iPHIS, the influenza public health unit activity level reported may, in some instances, not align with a PHU’s true activity level.
- Influenza public health unit activity levels calculated for a particular surveillance week may not necessarily correspond to the number of new outbreaks reported in the same week because of ongoing outbreaks from previous weeks.
- Activity level data for Huron Perth Public Health prior to the 2020-21 surveillance period is not available in the map view as this health unit was formerly two separate health units and is unable to be displayed. Similarly, Southwestern Health Unit was formerly two separate health units prior to the 2018-19 surveillance period and therefore data is not available for the periods prior.
- Influenza public health unit activity levels are defined as follows and based on data reported from iPHIS:
  - **No activity:** No laboratory-confirmed cases of influenza reported and no ongoing laboratory-confirmed influenza outbreaks in an institution or public hospital.
  - **Sporadic:** At least one laboratory-confirmed case of influenza within the surveillance area at any time within the surveillance week based on the date the health unit received the laboratory report, with no ongoing laboratory-confirmed influenza outbreaks in an institution or public hospital.
  - **Localized:** At least one ongoing laboratory-confirmed influenza outbreak in an institution or public hospital during the surveillance week even if the outbreak was declared over on the first day of the surveillance week.
  - **Widespread:** Multiple ongoing laboratory-confirmed influenza outbreaks in long-term care homes, retirement homes or public hospitals. For PHUs with 30 or more of these institutions or public hospitals, at least 10% must be experiencing an ongoing influenza outbreak to be assessed as having “widespread” activity. For PHUs with fewer than 30 of these institutions or public hospitals, at least 15% must be in an active influenza outbreak. Denominator information is based on the number of long-term care homes, retirement homes and hospitals in each PHU.

## SEVERITY INDICATORS: HOSPITAL BED OCCUPANCY

### Influenza and Respiratory Syncytial Virus (RSV)

- Influenza hospital bed occupancy data presents the average daily occupancy count per week of people in hospital (including intensive care unit (ICU)) with influenza (i.e., tested positive). People may be counted in bed occupancy data for multiple days.
  - The 'Influenza Hospital Bed Occupancy (total)' indicator accounts for hospital bed occupancy among people in hospital with active influenza (regardless of whether the reason for admission was influenza or a non-influenza related illness with a subsequent positive test for influenza).
  - The 'Influenza Hospital Bed Occupancy (due to infection)' indicator accounts for hospital bed occupancy among people in hospital for active influenza (i.e., admitted, influenza positive and primarily treated for influenza).
- RSV hospital bed occupancy data presents the average daily occupancy count per week of people in hospital (including intensive care unit (ICU)) with RSV (i.e., testing positive). People may be counted in bed occupancy data for multiple days.
- Bed occupancy data by public health unit is determined based on the location of the hospital, not the patient's home address or health unit of residence.
- Hospital bed occupancy data are not available by sex.
- Bed occupancy data are available by age group, however the age groups presented for these indicators differ from those elsewhere in the tool such as influenza cases by age group and RSV laboratory tests by age group.
- Start dates for bed occupancy indicators vary. Refer to Appendix C: [Table A1](#) for details.

### PHAC CIRID LABORATORY DATA – INFLUENZA AND OTHER RESPIRATORY VIRUSES

- Percent positivity for influenza and other circulating non-influenza respiratory viruses represents viral respiratory specimens tested by 18 Ontario laboratories that submit results to the Public Health Agency of Canada's Centre for Immunization and Respiratory Infectious Diseases (CIRID).
- Percent positivity data are obtained from the PHAC CIRID respiratory virus detection tables, which are shared with PHO each week. The numbers reported represent results submitted to the CIRID by 18 participating laboratories in Ontario, including 11 PHO laboratory locations and seven hospital-based laboratories. Therefore these data represent a subset of laboratory tests conducted for each respiratory virus in the province.
- As of the 2022-23 surveillance period, the Shared Hospital Laboratory and the Sault Area Hospital (week 46 onwards) began reporting testing data to CIRID, resulting in an increase in the weekly number of tests reported. Results were assigned to a particular surveillance week based on when test results were reported to PHAC.
- These data represent the number of tests performed, which may not necessarily correspond with the number of patients, as more than one specimen may have been submitted per patient.
- Unlike case and outbreak data, these data are not updated retroactively when results are submitted late for previous surveillance weeks.

- The indicator ‘Total number of positive tests’ is not presented for the Public Health Agency of Canada data source, however it is available for other laboratory data sources. Therefore, when Public Health Agency of Canada (PHAC) is selected as the data source, the value for the ‘Total number of positive tests’ will display as zero in the tooltip when hovering over the graph.
- The indicator ‘Total number of tests’ is only displayed for influenza A and influenza B for the Public Health Agency of Canada data source.

## **PHO LABORATORY DATA– INFLUENZA AND OTHER RESPIRATORY VIRUSES**

- Trends over time should be interpreted with caution as PHO’s respiratory testing algorithm changes each year. For current information on testing eligibility, please refer to the PHO respiratory viruses (including influenza) Test Information Sheet.<sup>8</sup>
- Date was assigned using sample collection date if provided and login date (date the sample was received at PHO) otherwise.
- Public health unit was assigned using patient’s postal code if provided and submitter’s postal code otherwise.
- Percent positivity for populations with a small number tested may be unstable and should be interpreted with caution.
- Results may not be representative of Ontario overall as other microbiology laboratories also perform testing for influenza and other respiratory viruses.
- Current PHO respiratory testing includes routine testing of select population groups<sup>8</sup>, including:
  - Symptomatic children (<18 years) seen in the emergency department (ED)
  - Symptomatic hospitalized patients (ward and intensive care unit)
  - Symptomatic residents in congregate living settings (non-outbreak)
  - Specimens from the first four symptomatic individuals (including healthcare workers/staff) in an outbreak that request respiratory virus testing
  - Individuals attending physician offices that are part of the Sentinel Practitioner Surveillance Network (SPSN).<sup>11</sup> SPSN patients are exempt from laboratory testing restrictions.

### **Key Changes In PHO’s Testing Algorithm**

- As of September 20, 2017, routine testing was no longer provided for individuals seen in ambulatory and ED (not admitted) settings.
- From November 2018 to October 2019, PHO did not routinely test for human coronavirus and entero/rhinovirus. Counts for these two viruses should be interpreted with caution for this period.
- As of November 2, 2020, a new laboratory-developed multiplex respiratory virus PCR panel, “FLUVID”, was implemented which includes influenza A, influenza B, SARS-CoV-2, and respiratory syncytial virus.
- As of December 31, 2021, SARS-CoV-2 testing in ambulatory settings was restricted to high-risk populations and individuals who work in high-risk settings. Prior to that, testing was provided to all individuals across all settings.

- As of November 1, 2022, the Ministry of Health and Long-Term Care approved an expanded influenza testing program for long-term care and retirement homes to other laboratories. As such, the volume of specimens tested by PHO for these institutions decreased.
- As of January 2, 2024, symptomatic individuals from Emergency Department or Ambulatory Clinic, who are at risk of severe disease and in whom care or treatment may be impacted by respiratory test results, will be eligible for FLUVID.

## COVID-19 Vaccine Uptake

For further information on the processing, analysis, and caveats of the vaccination data presented in this tool, please refer to the Technical Notes section of the COVID-19 Vaccine Uptake Report. Note: This report as well as vaccine coverage data in the tool are no longer being updated. Data up to December 2, 2023 can still be accessed from this tool.

## References

1. Public Health Agency of Canada. Respiratory virus detections in Canada [Internet]. Ottawa, ON: Government of Canada; 2023 [modified 2023 Dec 14; cited 2023 Dec 22]. Available from: <https://www.canada.ca/en/public-health/services/surveillance/respiratory-virus-detections-canada.html>
2. Statistics Canada. Population estimates 2001-2022: table 1 - annual population estimates by age and sex for July 1, 2001 to 2022, health regions, Ontario [unpublished data table]. Ottawa, ON: Government of Canada; 2023 [received 2023 Mar 02].
3. Population Reporting. Population projections public health unit, 2022-2046 [data file]. Toronto, ON: Ontario. Ministry of Finance [producer]; Toronto, ON: Ontario. Ministry of Health, IntelliHealth Ontario [distributor]; [data extracted 2023 May 10].
4. Government of Canada. FluWatch week's calendar: 2022-2023 [Internet]. Ottawa, ON: Government of Canada; 2023 [modified 2023 Sep 12; cited 2023 Sep 15]. Available from: <https://www.canada.ca/en/public-health/services/diseases/flu-influenza/influenza-surveillance/fluwatch-weeks-calendar.html>
5. *Designation of Diseases*, O Reg 135/18. Available from: <https://www.ontario.ca/laws/regulation/180135>
6. *Health Protection and Promotion Act*, RSO 1990, c H-7. Available from: <https://www.ontario.ca/laws/statute/90h07>
7. Ontario. Ministry of Health; Ministry of Long-Term Care. Ontario public health standards: requirements for programs, services, and accountability. Infectious disease protocol. Appendix 1: case definitions and disease-specific information. Disease: diseases caused by a novel coronavirus, including Coronavirus Disease 2019 (COVID-19), Severe Acute Respiratory Syndrome (SARS) and Middle East Respiratory Syndrome (MERS). Effective: September 2023 [Internet]. Toronto, ON: King's Printer for Ontario; 2023 [cited 2023 Dec 20]. Available from: <https://www.ontario.ca/files/2023-12/moh-ophs-novel-coronavirus-en-2023-12-01.pdf>
8. Ontario Agency for Health Protection and Promotion (Public Health Ontario). Test information index: respiratory viruses (including influenza) [Internet]. Toronto, ON: King's Printer for Ontario; 2023 [updated 2023 Sep 11; cited 2023 Sep 15]. Available from: <https://www.publichealthontario.ca/en/Laboratory-Services/Test-Information-Index/Virus-Respiratory>
9. Public Health Agency of Canada. Weekly influenza reports [Internet]. Ottawa, ON: Government of Canada; 2022 [modified 2023 Dec 15; cited 2023 Dec 22]. Available from: <https://www.canada.ca/en/public-health/services/diseases/flu-influenza/influenza-surveillance/weekly-influenza-reports.html>
10. Ontario. Ministry of Health. COVID-19 guidance: long-term care homes, retirement homes, and other congregate living settings for public health units [Internet]. Version 11. Toronto, ON: King's Printer for Ontario; 2022 [modified 2023 June 26; cited 2023 Jun 26]. Available from: [https://www.health.gov.on.ca/en/pro/programs/publichealth/coronavirus/docs/LTCH\\_RH\\_guidance\\_PHU.pdf](https://www.health.gov.on.ca/en/pro/programs/publichealth/coronavirus/docs/LTCH_RH_guidance_PHU.pdf)
11. Ontario Agency for Health Protection and Promotion (Public Health Ontario). Sentinel practitioner surveillance network — influenza vaccine effectiveness program [Internet]. Toronto, ON: Queen's Printer for Ontario; 2019 [modified 2019 Nov 22; cited 2022 Dec 01]. Available from: <https://www.publichealthontario.ca/en/Health-Topics/Immunization/SPSN>

12. Ontario Agency for Health Protection and Promotion (Public Health Ontario). COVID-19 data and surveillance: routine surveillance report: COVID-19 vaccine uptake in Ontario [Internet]. Toronto, ON: King's Printer for Ontario; 2023 [updated 2023 Oct 24; cited 2023 Dec 22]. Available from: <https://www.publichealthontario.ca/en/data-and-analysis/infectious-disease/covid-19-data-surveillance>

# Appendix A: COVID-19 Indicators

## Indicator: Cases

- Any move from 0 → **Higher**
- Any move to 0 → **Lower**
- Compared to case counts in the previous week:
  - an increase of 10% or more cases → **Higher**
  - a change less than 10% → **Similar**
  - a decrease of 10% or more → **Lower**

## Indicator: Percent Positivity

- Any move from 0 → **Higher**
- Any move to 0 → **Lower**
- If percent positivity in the previous week was under 10%:
  - an increase of 1 percentage point or more → **Higher**
  - a change less than 1 percentage point → **Similar**
  - a decrease of 1 percentage point or more → **Lower**
- If percent positivity in the previous week was 10% or over:
  - an increase of 10% or more → **Higher**
  - a change less than 10% → **Similar**
  - a decrease of 10% or more → **Lower**

## Indicator: Outbreaks

- Any move from 0 → **Higher**
- Any move to 0 → **Lower**
- If the number of new outbreaks in the previous week was under 50:
  - an increase of 5 or more outbreaks → **Higher**
  - a change less than 5 outbreaks → **Similar**
  - a decrease of 5 or more outbreaks → **Lower**
- If the number of new outbreaks in the previous week was over 50:
  - an increase of 10% or more → **Higher**
  - a change less than 10% → **Similar**
  - a decrease of 10% or more → **Lower**

## Overall Weekly Indicator Change

The interpretation of the weekly indicator change is compared against the current epidemiologic context. If there is discordance between the indicator assessments, the magnitude of the change in each indicator is considered and cases and percent positivity are given greater consideration.



## Appendix B: Influenza Indicators

### Indicator: Cases

- Any move from 0 → **Higher**
- Any move to 0 → **Lower**
- If case counts in the previous week were under 25:
  - an increase of 5 or more cases → **Higher**
  - a change less than 5 cases → **Similar**
  - a decrease of 5 or more cases → **Lower**
- If case counts in the previous week were over 25:
  - an increase of 20% or more cases → **Higher**
  - a change less than 20% of cases → **Similar**
  - a decrease of 20% or more cases → **Lower**
- If case counts in the previous week were over 500:
  - an increase of 10% or more cases → **Higher**
  - a change less than 10% → **Similar**
  - a decrease of 10% or more → **Lower**

### Indicator: Percent Positivity

- Any move from 0 → **Higher**
- Any move to 0 → **Lower**
- Minimum increase of 1 percentage point up to 10%, then a 2 percentage point increase up to 20% and a 3 percentage point increase up to 30% etc. → **Higher**
- Change is less than the number of percentage points required to call activity higher or lower. → **Similar**
- Minimum decrease of 1 percentage point up to 10%, then a 2 percentage point decrease up to 20% and a 3 percentage point decrease up to 30% etc. → **Lower**

### Indicator: Influenza Outbreaks

- Any move from 0 → **Higher**
- Any move to 0 → **Lower**
- If the number of new outbreaks in the previous week was under 50:
  - an increase of 5 or more outbreaks → **Higher**
  - a change less than 5 outbreaks → **Similar**
  - a decrease of 5 or more outbreaks → **Lower**

- If the number of new outbreaks in the previous week was over 50:
  - an increase of 10% or more → **Higher**
  - a change less than 10% → **Similar**
  - a decrease of 10% or more → **Lower**

### Indicator: Public Health Unit Activity Levels

- If average of activity levels is > than in previous week → **Higher**
- If average of activity levels is equal to that of the previous week → **Similar**
- If average of activity levels is < than in previous week → **Lower**

### Indicator: Overall Weekly Indicator Change

The interpretation of the weekly indicator change is compared against the current epidemiologic context. If there is discordance between the indicator assessments, the magnitude of the change in each indicator is considered and cases and percent positivity are given greater consideration.

## Appendix C: Hospital bed occupancy data and start dates

**Table A1. Start dates for bed occupancy indicators**

Indicator	Start date
COVID-19 hospital bed occupancy (total); overall	April 1, 2020
COVID-19 hospital bed occupancy (total); by age group	October 11, 2021
COVID-19 hospital bed occupancy (due to infection)	January 9, 2022
COVID-19 ICU bed occupancy	May 1, 2020
Influenza hospital bed occupancy (total); overall and by age group*	November 27, 2022
Influenza hospital bed occupancy (total); age groups: 0 to 4, 5 to 11, 12 to 17 years	November 1, 2023
Influenza hospital bed occupancy (due to infection)	November 27, 2022
RSV hospital bed occupancy	November 27, 2022

\* Influenza bed occupancy for people aged 0 to 17 years are presented from November 24, 2022 to October 31, 2023 as a single stratum and as of November 1, 2023 as three mutually exclusive age groups (0 to 4, 5 to 11, 12 to 17).

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