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SURVEILLANCE REPORT

Integrated Respiratory Virus Risk Indicators for Ontario: January 12, 2025 to January 25, 2025

Published: January 17, 2025

Introduction

This weekly report provides short-term projections of SARS-CoV-2, influenza, and respiratory syncytial virus (RSV) activity and risk of related severe viral respiratory disease (i.e., requiring hospitalization) for all three viruses in the pediatric (<18 years) and general adult (18-64 years) populations in Ontario. The "nowcast" estimation methodology[1] used to create these indicators relies on data reported up to **January 11, 2025**.

The projections provided in this report are intended to provide situational awareness of potential near-term changes in respiratory virus activity in the province. These projections should be used in combination with context-specific indicators (e.g., the group at risk, current trajectory of trends, immunization coverage), consideration of local factors (e.g., health care capacity and access to care), and other measures for assessing respiratory virus activity (e.g., wastewater concentration for SARS-CoV-2, hospital admissions).

The highlights from this report are presented in the Ontario Respiratory Virus Tool,[2] which provides additional information on respiratory virus surveillance activity in Ontario.

Highlights

- Over the next two weeks (January 12, 2025 to January 25, 2025), the following changes are projected for SARS-CoV-2, influenza, and RSV activity among Ontarians less than 65 years of age:
  - SARS-CoV-2 activity is projected to **remain stable** (Figures 1a, 1b).
  - Influenza activity is projected to **increase** (Figures 2a, 2b).
  - RSV activity is projected to **decrease** (Figures 3a, 3b).
- The risk of related severe respiratory virus illness for the most recent assessment period (the week before the time period noted in the report title) is **very high** in the pediatric (<18 years) and **very high** in the general adult (18-64 years) populations. Over the next two weeks:
  - The risk of severe illness among the pediatric population is projected to **increase** (Figures 4a, 4b).
  - The risk of severe illness among the general adult population is projected to **increase** (Figures 5a, 5b)**.**

Highlights Change Assessment

The table below provides an overview of how the week over week change for each indicator is assessed and reported on in the highlights section of this report. Changes are assessed by comparing the percent change between the observed values of the fitted line for the most recent date with observed data, to the predicted values for the latest prediction date (i.e., the most recent date with observed data plus 14 days). Assessed changes are mapped to thresholds that are based on those used for the Ontario Respiratory Virus Tool (as documented in the accompanying Technical Notes, Appendix A).[2]

Indicators	Change Assessment Threshold
SARS-CoV-2, Influenza, and RSV Percent Positivity (Figures 1a-3b)	**Increase:** • If the percent positivity in the previous week was exactly 0%, then an increase of any percent • If the percent positivity in the previous week was under 10%, then an increase of 0.5 percentage points or more • If the percent positivity in the previous week was 10% or over, then an increase of 5% or more **Remain Stable:** • If the percent positivity in the previous week was under 10%, then a change less than 0.5 percentage points • If the percent positivity in the previous week was 10% or over, then a change less than 5% **Decrease:** • Regardless of the percent positivity in the previous week, any decrease to exactly 0% • If the percent positivity in the previous week was under 10%, then a decrease of 0.5 percentage points or more • If the percent positivity in the previous week was 10% or over, then a decrease of 5% or more
Risk of Severe Illness – Pediatric and Adult Populations (Figures 4a-5b)	**Increase:** • An increase of 5% or more **Remain Stable:** • A change less than 5% **Decrease:** • A decrease of 5% or more

Summary of Data Sources by Indicator

The following data sources were used to update the indicators presented in this report on a weekly basis. Refer to Technical Notes for additional information about each of the data sources used, and to the Summary of Methods section for a description of how the indicators were developed.

Indicator	Public Health Ontario (PHO)	Ontario Laboratories Information System (OLIS)	Ministry of Health Bed Census
SARS-CoV-2 Percent Positivity (Figures 1a, 1b)		x	
Influenza Percent Positivity (Figures 2a, 2b)	x		
RSV Percent Positivity (Figures 3a, 3b)	x		
Risk of Severe Illness - Pediatric Population (Figures 4a, 4b)	x	x	x
Risk of Severe Illness - Adult Population (Figures 5a, 5b)	x	x	x

Interpretation Notes

- SARS-CoV-2, influenza, and RSV activity should be assessed independently due to differences in provincial testing strategy, populations eligible for testing, and data collection and entry requirements. Refer to the Data and Methodological Caveats section for further details regarding testing eligibility.
- Background on recent methodological updates (as of October 18, 2024):
  - The Ontario Laboratories Information Data System (OLIS) has replaced the Provincial COVID-19 Diagnostic Network (PD-NOC) as the source for COVID-19 (SARS-CoV-2) testing used in this report. OLIS covers virtually all testing laboratories in the province and allows for breakdowns by age group that were previously not available from PD-NOC.
  - For influenza activity graphs, separate generalized additive models (GAMs) for each of influenza A and B were applied to observed percent positivity data for the past two-year period to project the daily pathogen-specific percent positivity going forward 14 days, along with 95% prediction intervals. The projected estimates from each of these models were combined (added up) to produce an overall influenza projection, as presented in this report. Previously, a combined influenza GAM was applied to observed total influenza percent positivity data (i.e., irrespective of influenza type). Moreover, the unique contribution of each of influenza A and B activity is now considered in the generalized linear models (GLMs) used to estimate severe disease risk in the pediatric and adult population (i.e., each virus is now included separately, while previously only total influenza activity was considered).

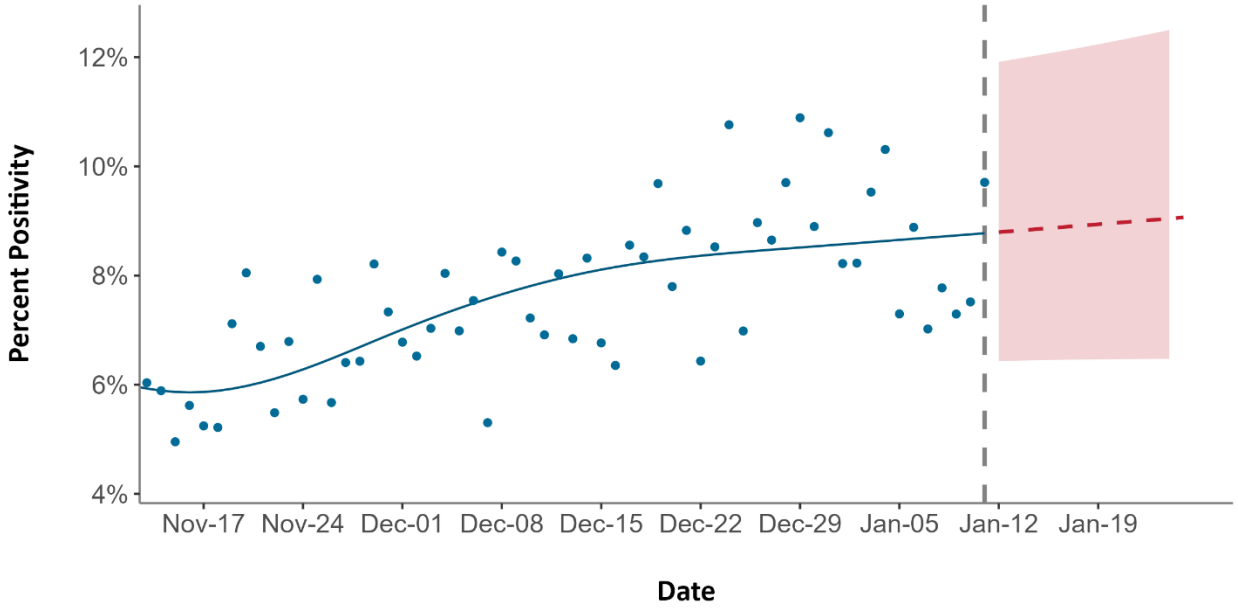
- Respiratory virus testing in Ontario:
  - Not all respiratory virus tests performed in Ontario are conducted by PHO. For example, PHO does not capture tests performed by Ontario's major pediatric hospitals, which may impact the generalizability of influenza and RSV estimates in the pediatric population.
  - Testing performed by PHO is skewed towards outbreak detection as well as towards older individuals, particularly those aged 65+ years. As a result, the number of tests performed in certain age groups is sometimes low, which may impact the stability of age group-specific percent positivity estimates derived from PHO data where used (i.e., for influenza and RSV percent positivity).
  - Testing volumes may change over time. Higher numbers of tests might be conducted at the same time in one surveillance period compared to another. The reason for differences can vary with one example being that testing criteria may change. For the most up to date information on testing eligibility in Ontario please refer to the provincial testing guidance for SARS-CoV-2 and Public Health Ontario laboratory's guidance for influenza and RSV.[3,4]
  - All data and projections exclude adults 65 years and older and those with a missing age group. Given differences in testing eligibility and hospital admission patterns for older adults in congregate care facilities (e.g., long-term care homes), compared to the general adult population, indicators specific to older adult populations should be considered when assessing viral activity and disease in these populations.
- Trends should be interpreted with caution as the most recent period of data may be subject to reporting and/or data entry lags, which may impact the accuracy of projections. Changes in testing eligibility over time may also impact the accuracy of projections.
  - Assessments of increases or decreases in trends are based on whether projections indicate any change in activity or disease risk in the upcoming two-week period. These criteria may differ from the weekly indicator changes outlined on the "Summary" Tab in the Ontario Respiratory Virus Tool, [2] which are determined by considering a combination of indicators (see Technical Notes, Ontario Respiratory Virus Tool).
- This report does not provide estimates of the expected number of cases or hospitalizations due to COVID-19, influenza, or RSV.

Projections of Viral Respiratory Activity

Pathogen-specific activity was determined from patterns in percent positivity using laboratory data reported by PHO and OLIS; Projections were produced using a "nowcast" statistical model.

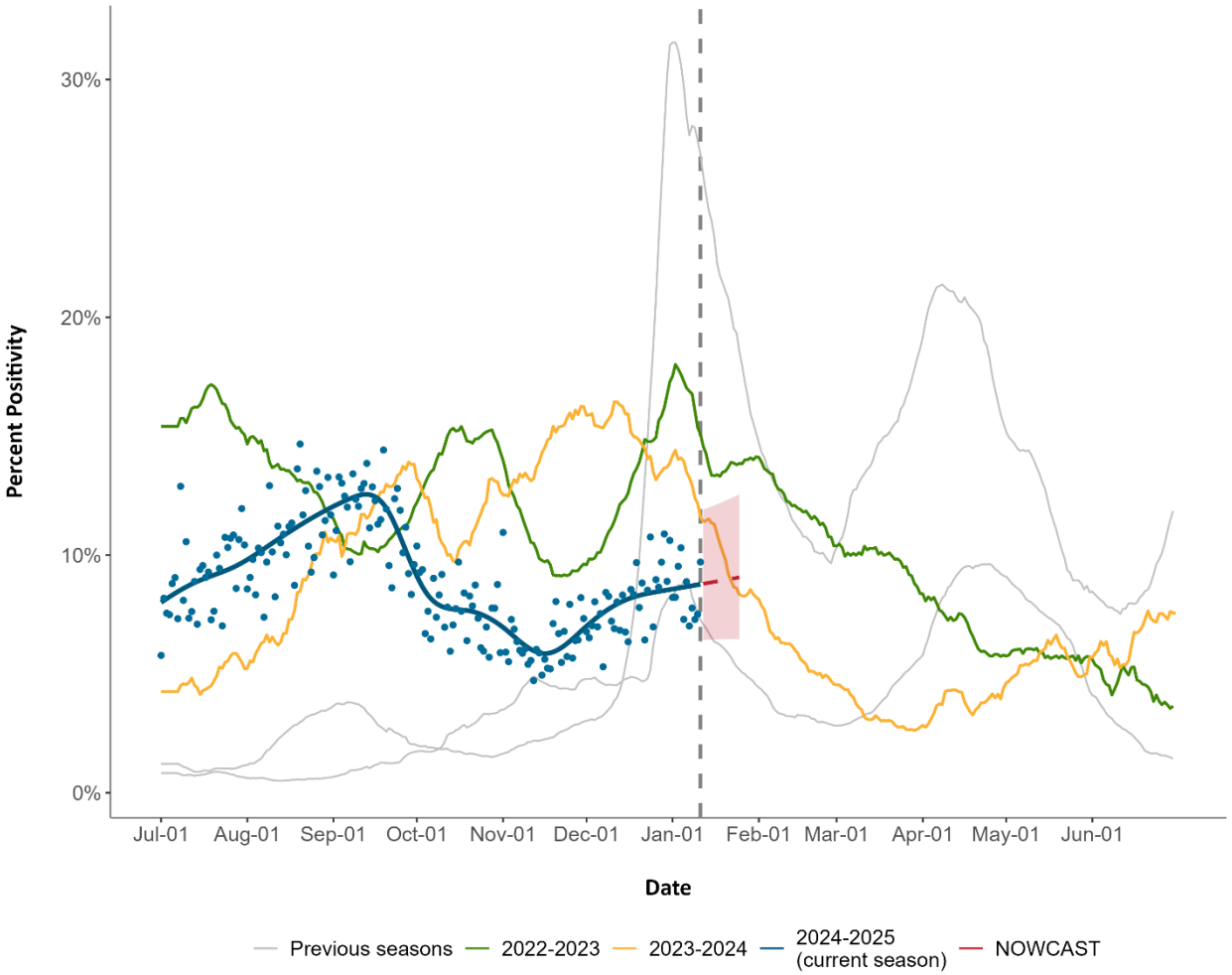
Further details on the data sources and statistical approaches used in this report are provided in the Technical Notes and Appendix A.

Figure 1a: Recent and Projected SARS-CoV-2 Activity (Percent Positivity) among Ontarians less than 65 Years of Age



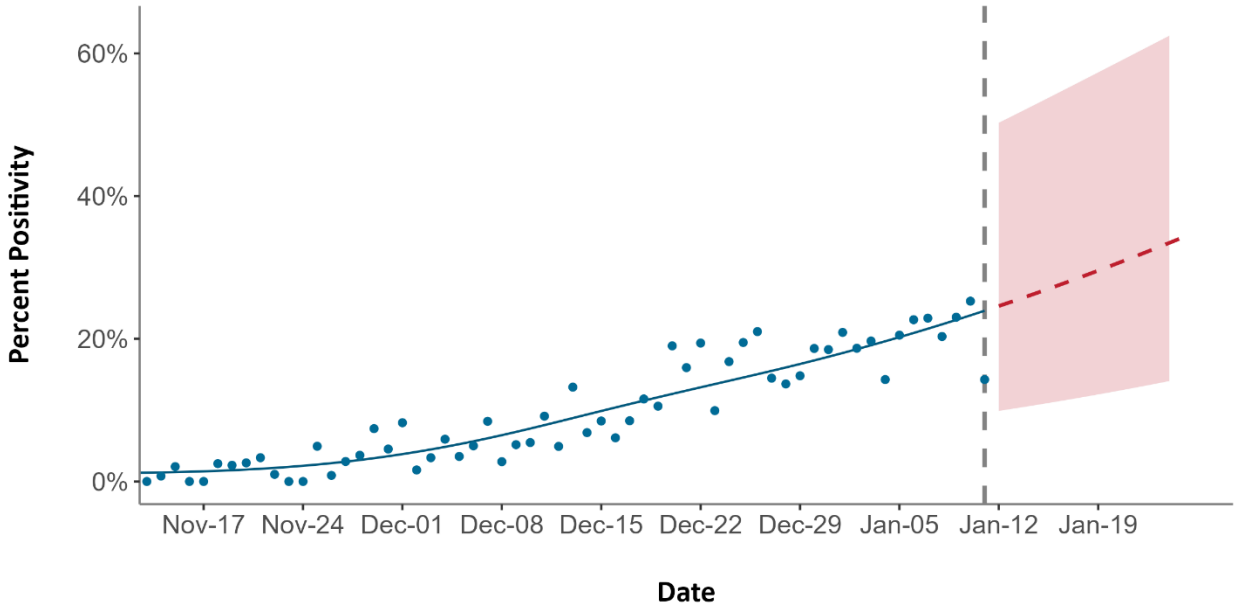
Note: This figure shows a subset of the data presented in Figure 1b below for the 2024-25 (current) season. It is comprised of the most recent eight weeks of data and the two-week projection. The blue line shows the smoothed daily observed percent positivity (blue dots) for the 2024-25 season. The grey vertical dashed line indicates the most recent day with observed data. The dashed red line represents the estimated viral activity (percent positivity) from nowcast projection modelling. The light red shaded area represents the 95% prediction interval around the model estimates.
Data Source: Ontario Laboratories Information System (OLIS)

Figure 1b: Historic and Projected SARS-CoV-2 Activity (Percent Positivity) among Ontarians less than 65 Years of Age



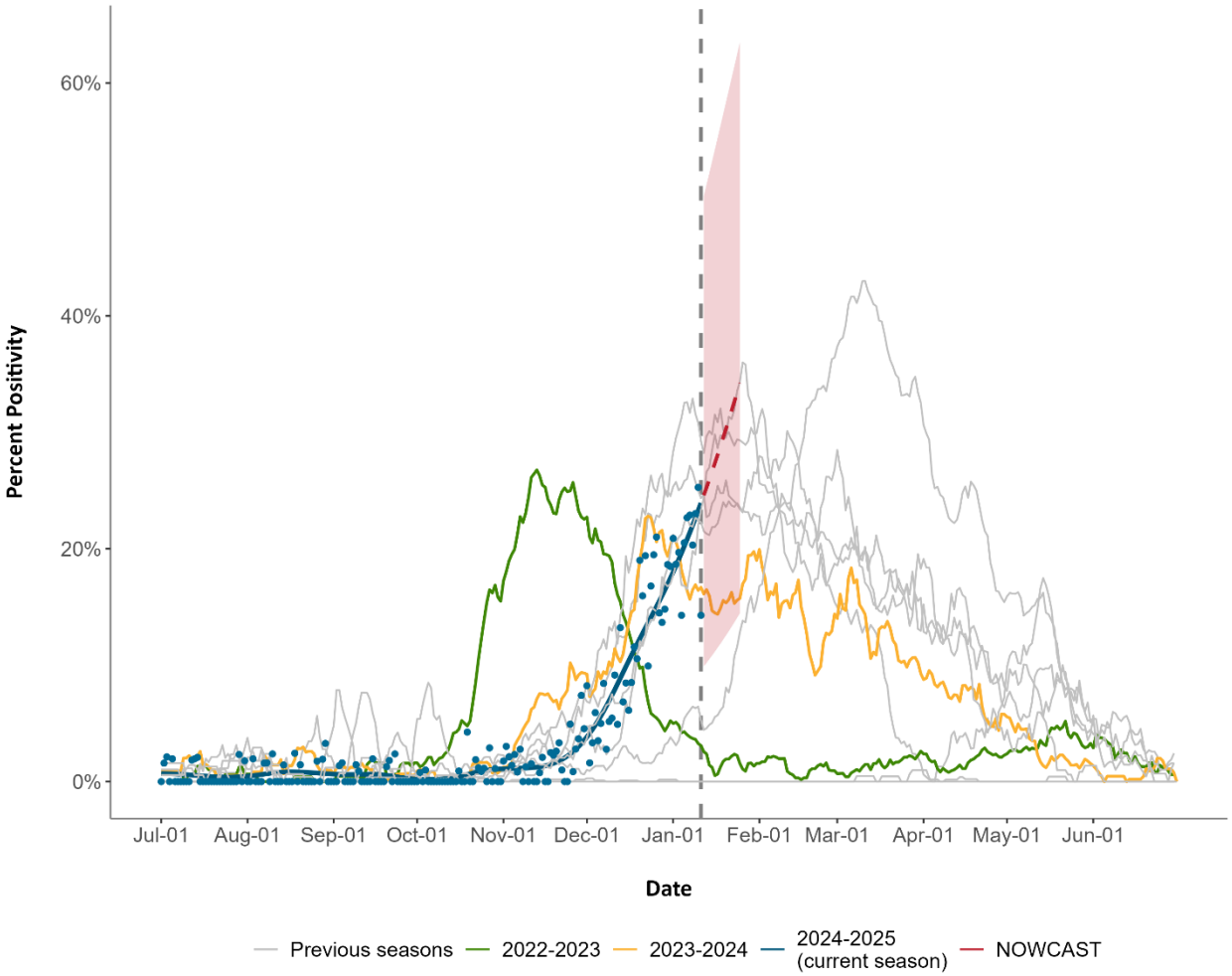
Note: Blue line shows the smoothed daily observed percent positivity (blue dots) for the 2024-25 season. The grey vertical dashed line indicates the most recent day with observed data. The dashed red line represents the estimated viral activity (percent positivity) from nowcast projection modelling, which makes projections using the past two years of daily OLIS data in a generalized additive model (GAM). The light red shaded area represents the 95% prediction interval around the model estimates. The yellow line shows the smoothed daily observed percent positivity for the 2023-24 season and the green line shows the 2022-23 season. The grey line shows the smoothed daily percent positivity for earlier seasons (i.e., 2020-21 through 2021-22). Notably, surveillance periods are shown starting on July 1st of each year to align with annual influenza and RSV activity.
Data Source: Ontario Laboratories Information System (OLIS)

Figure 2a: Recent and Projected Influenza Activity (Percent Positivity) among Ontarians less than 65 Years of Age



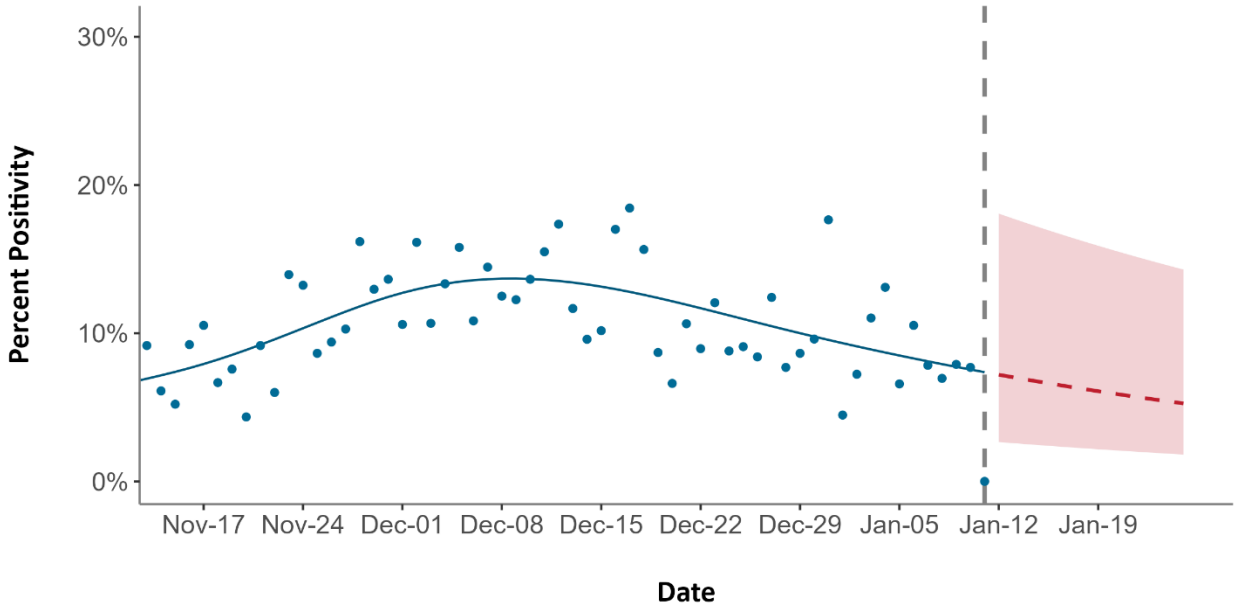
Note: This figure shows a subset of the data presented in Figure 2b below for the 2024-25 (current) season. It is comprised of the most recent eight weeks of data and the two-week projection. The blue line shows the smoothed daily observed percent positivity (blue dots) for the 2024-25 season. The grey vertical dashed line indicates the most recent day with observed data. The dashed red line represents the estimated viral activity (percent positivity) from nowcast projection modelling. The light red shaded area represents the 95% prediction interval around the model estimates.
Data Source: PHO Laboratory Information Management System

Figure 2b: Historic and Projected Influenza Activity (Percent Positivity) among Ontarians less than 65 Years of Age



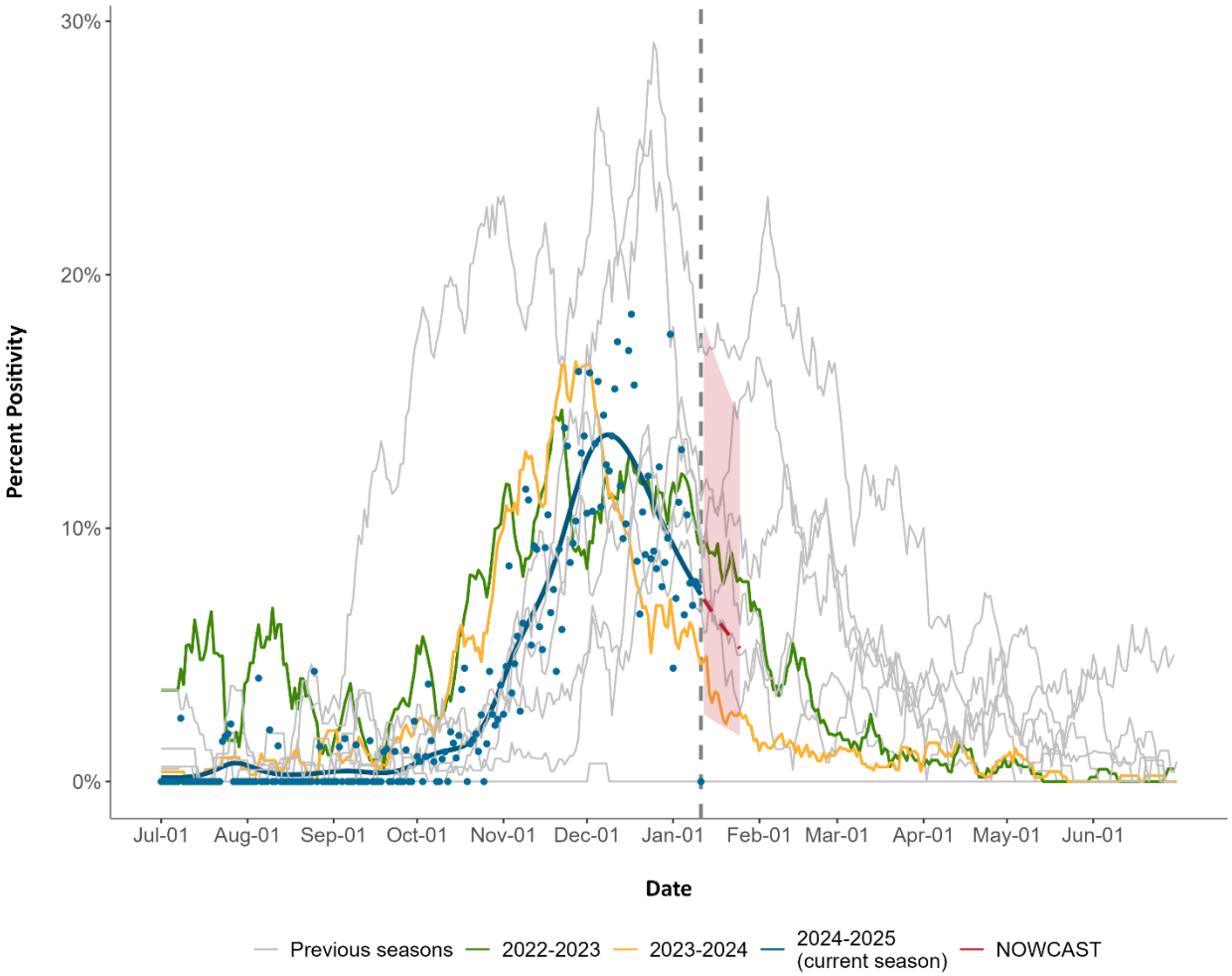
Note: Blue line shows the smoothed daily observed percent positivity (blue dots) for the 2024-25 season. The grey vertical dashed line indicates the most recent day with observed data. The dashed red line represents the estimated viral activity (percent positivity) from nowcast projection modelling, which makes projections using the past two years of daily PHO laboratory data in a generalized additive model (GAM). The light red shaded area represents the 95% prediction interval around the model estimates. The yellow line shows the smoothed, daily observed percent positivity for the 2023-24 season and the green line shows the 2022-23 season. The grey lines show the smoothed daily percent positivity for earlier seasons (i.e., 2015-16 through 2021-22). Notably, surveillance periods are shown starting on July 1st of each year to align with annual influenza and RSV activity.
Data Source: PHO Laboratory Information Management System

Figure 3a: Recent and Projected RSV Activity (Percent Positivity) among Ontarians less than 65 Years of Age



Note: This figure shows a subset of the data presented in Figure 3b below for the 2024-25 (current) season. It is comprised of the most recent eight weeks of data and the two-week projection. The blue line shows the smoothed daily observed percent positivity (blue dots) for the 2024-25 season. The grey vertical dashed line indicates the most recent day with observed data. The dashed red line represents the estimated viral activity (percent positivity) from nowcast projection modelling. The light red shaded area represents the 95% prediction interval around the model estimates.
Data Source: PHO Laboratory Information Management System

Figure 3b: Historic and Projected RSV Activity (Percent Positivity) among Ontarians less than 65 Years of Age

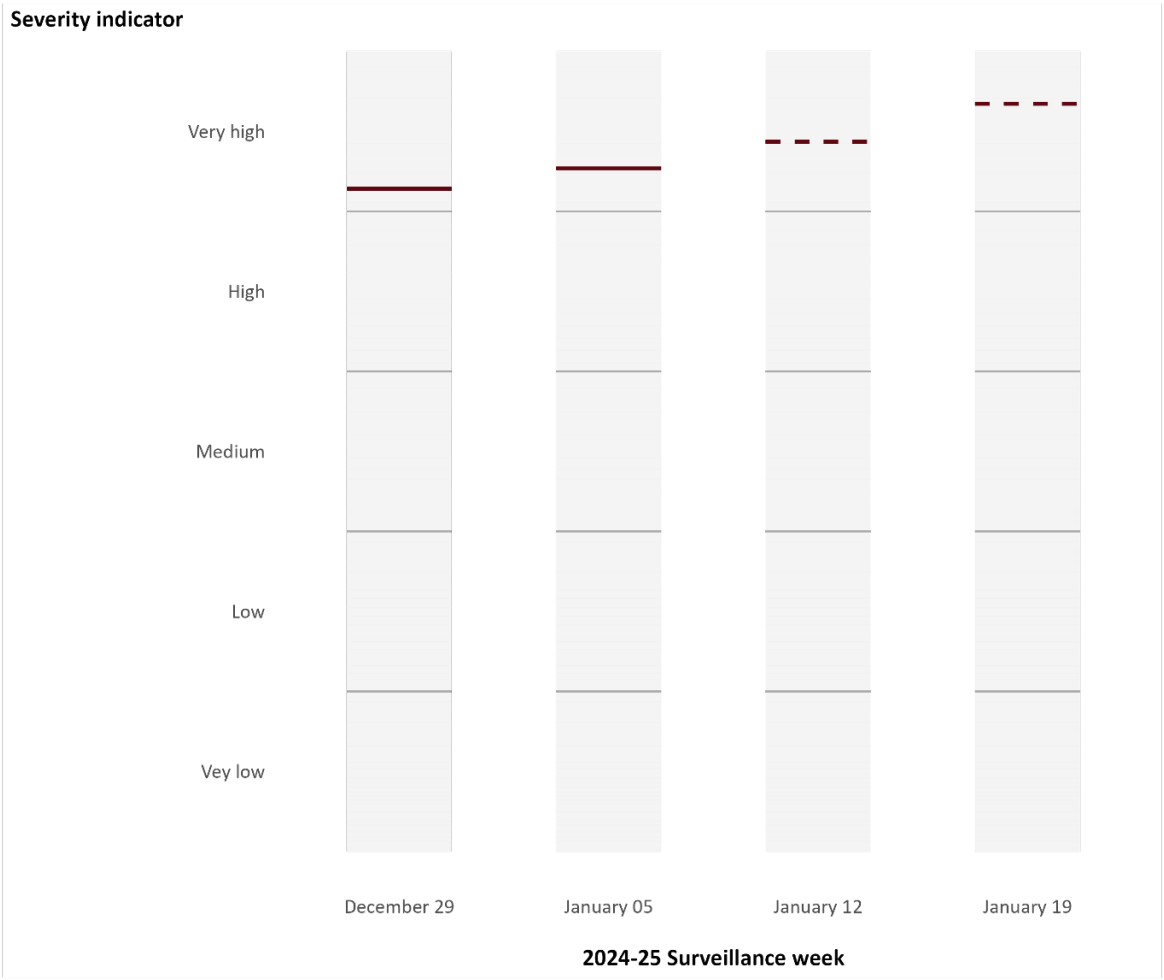


Note: Blue line shows the smoothed daily observed percent positivity (blue dots) for the 2024-25 season. The grey vertical dashed line indicates the most recent day with observed data. The dashed red line represents the estimated viral activity (percent positivity) from nowcast projection modelling, which makes projections using the past two years of daily PHO laboratory data in a generalized additive model (GAM). The light red shaded area represents the 95% prediction interval around the model estimates. The yellow line shows the smoothed, daily observed percent positivity for the 2023-24 season and the green line shows the 2022-23 season. Grey lines show the smoothed daily percent positivity for older seasons (i.e., 2015-16 through 2021-22). Notably, surveillance periods are shown starting on July 1st of each year to align with annual influenza and RSV activity.
Data Source: PHO Laboratory Information Management System

Projections of Severe Viral Respiratory Disease

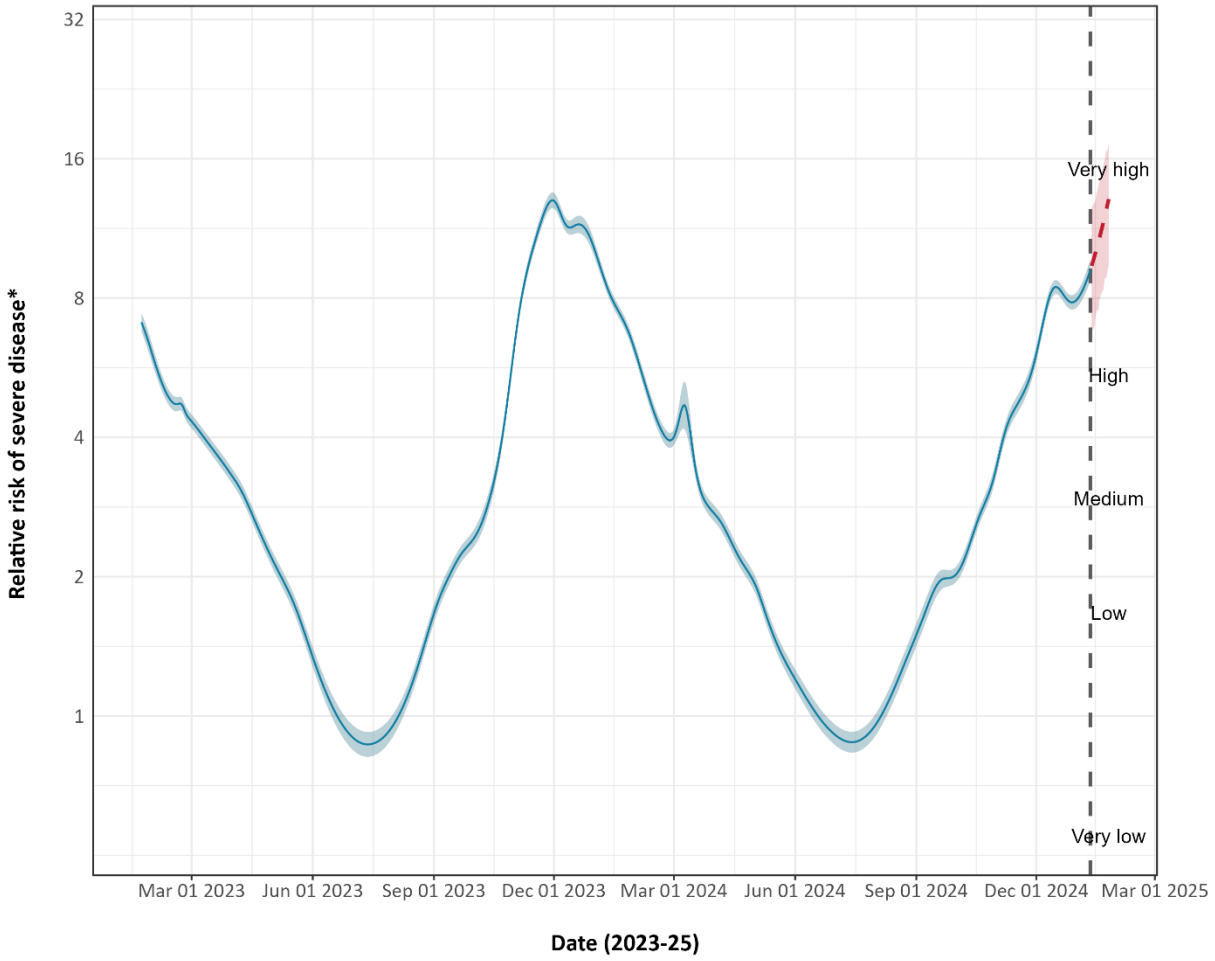
Weekly indicators of the current and projected risk of severe viral respiratory disease (i.e., requiring hospitalization) among the pediatric and the general adult population in Ontario, relative to the lowest period of activity over the past two years, were determined using a combination of data sources and statistical approaches as outlined in the methods section below. Further details are provided in the Technical Notes and Appendix A.

Figure 4a: Estimated Level of Severe Viral Respiratory Disease Risk in the Ontario Pediatric Population (<18 Years) During the Most Recent Two-Week Period of Available Data* and Projected Risk Levels for the Next Two Weeks**



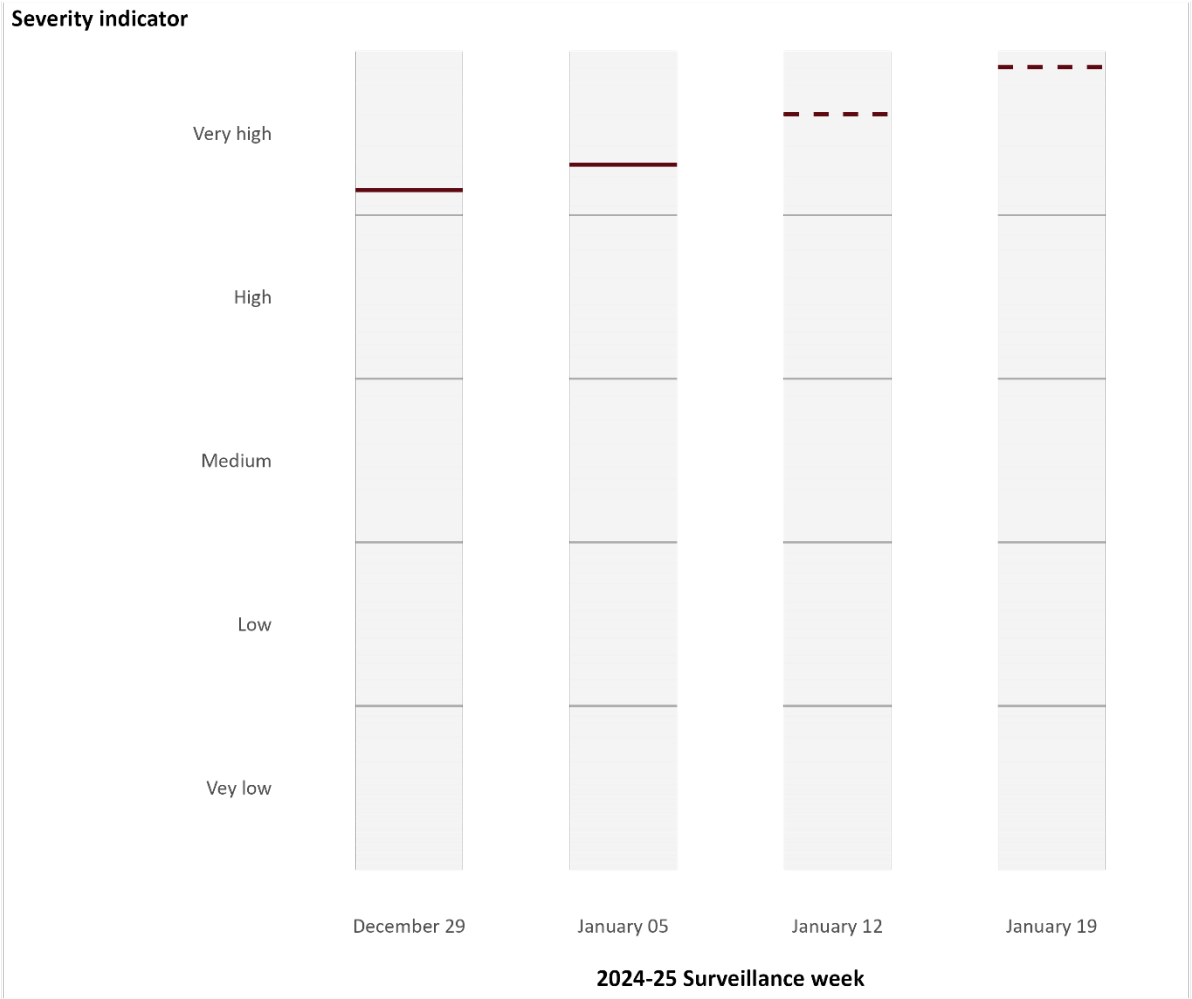
Note: Dark grey horizontal lines are the category thresholds and are based on historic levels of risk from a reference period of low incidence that occurred from June 1, 2023 through July 31, 2023. The category thresholds are: very low, low, moderate, high, and very high risk. Coloured horizontal bars indicate the observed (solid line) or projected (dashed line) maximum daily risk in a given week. When shown, dark green lines represent very low risk, green lines represent low risk, yellow lines represent medium risk, red lines represent high risk, and dark red lines represent very high risk. Y-axis is shown as a percentile of relative risk based on observed data; thus, projections exceeding the maximum observed risk are displayed at the 100th percentile (i.e., at the top of the severity range). Refer to the Appendix A for additional details on methodology.
*Weeks starting on December 29 and January 5; **Weeks starting on January 12 and January 19
Data Sources: PHO Laboratory Information Management System; Ontario Laboratories Information System (OLIS); Ministry of Health

Figure 4b: Estimated Level of Daily Severe Viral Respiratory Disease Risk in the Ontario Pediatric (<18 Years) Population, Using Nowcast Model up to January 25, 2025



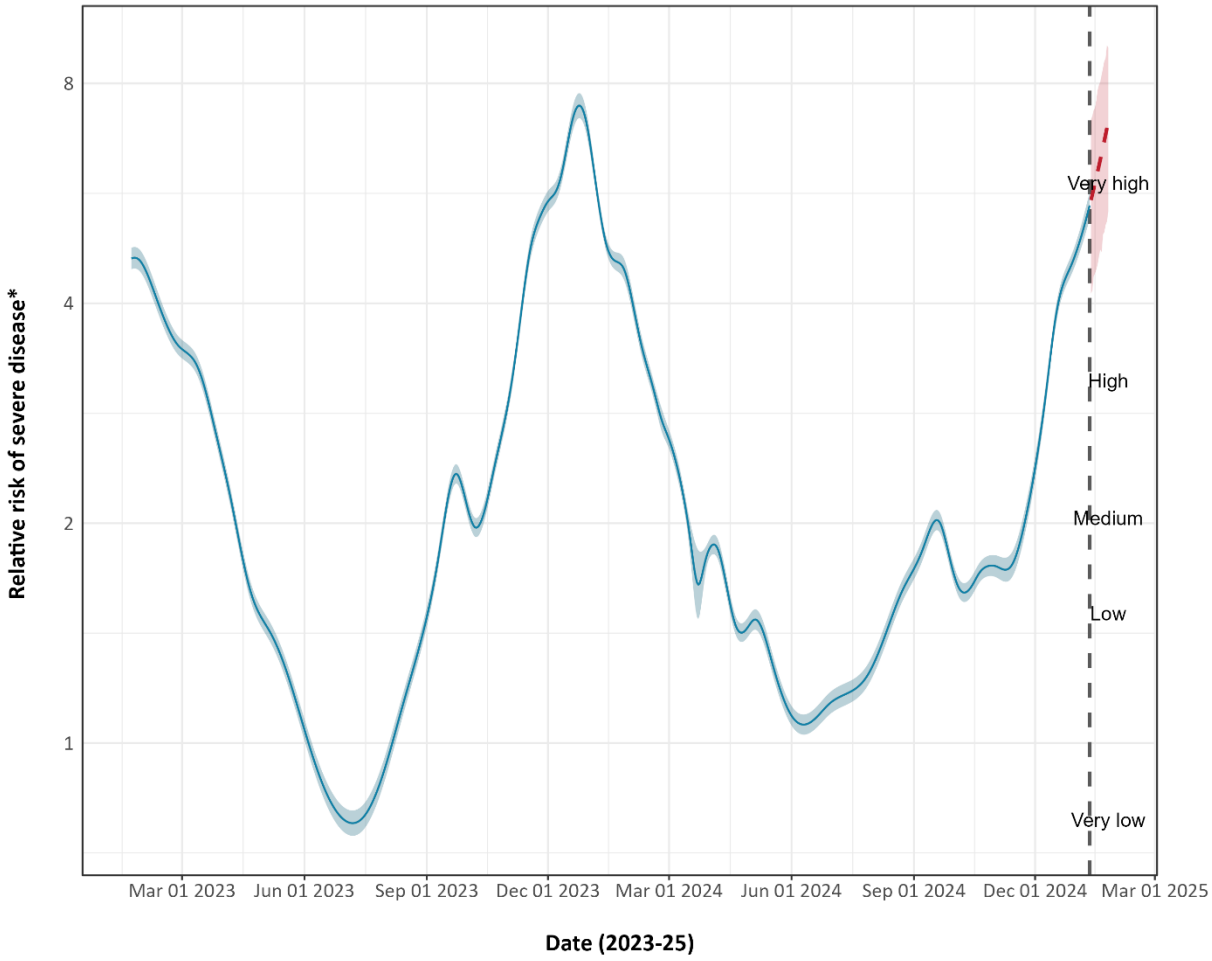
Note: Blue curve represents the estimated relative risk of severe disease from nowcast modelling, which uses the past two years of daily PHO and OLIS data in a generalized linear model. Dashed red line represents the projected relative risk. The vertical grey dashed line indicates the most recent day with observed data, after which projections are presented by the red dashed line. The light blue shaded area represents the 95% confidence interval and the red shaded area represents the 95% prediction interval. The grey horizontal lines represent the historical threshold values, as indicated (i.e., very low, low, moderate, high, or very high relative risk of severe disease).
Update: To better contextualize current projections, the time period for the figure above has been expanded to include the two most recent years of data.
*The y-axis uses a log scale and shows the risk of severe disease relative to a reference period of low incidence that occurred from June 1, 2023 through July 31, 2023. A relative risk equal to 1 indicates similar risk of severe viral disease as the reference period; a relative risk greater than 1 indicates higher risk of severe disease and a relative risk of less than 1 indicates lower risk of severe disease.
Data Sources: PHO Laboratory Information Management System; Ontario Laboratories Information System (OLIS); Ministry of Health

Figure 5a: Estimated Level of Severe Viral Respiratory Disease Risk in the Ontario General Adult (18-64 Years) Population During Most Recent Two-Week Period of Available Data* and Projected Risk Levels for the Next Two Weeks**



Note: Dark grey horizontal lines are the category thresholds and are based on historic levels of risk from a reference period of low incidence that occurred from June 1, 2023 through July 31, 2023. The category thresholds are: very low, low, moderate, high, and very high risk. Coloured horizontal bars indicate the observed (solid line) or estimated (dashed line) maximum daily risk in a given week. When shown, dark green lines represent very low risk, green lines represent low risk, yellow lines represent medium risk, red lines represent high risk, and dark red lines represent very high risk. Y-axis is shown as a percentile of relative risk based on observed data; thus, projections exceeding the maximum observed risk are displayed at the 100th percentile (i.e., at the top of the severity range). Refer to the Appendix A for additional details on methodology.
*Weeks starting on December 29 and January 5; **Weeks starting on January 12 and January 19
Data Sources: PHO Laboratory Information Management System; Ontario Laboratories Information System (OLIS); Ministry of Health

Figure 5b: Estimated Level of Daily Severe Viral Respiratory Disease Risk in the Ontario General Adult (18-64 Years) Population, Using Nowcast Model up to January 25, 2025



Note: Blue curve represents the estimated relative risk of severe disease from nowcast modelling, which uses the past two years of daily PHO and OLIS data in a generalized linear model. Dashed red line represents the projected relative risk. The vertical grey dashed line indicates the most recent day with observed data, after which projected estimates are presented by the red dashed line. The light blue shaded area represents the 95% confidence interval and the red shaded area represents the 95% prediction interval. The grey horizontal lines represent the historical threshold values, as indicated (i.e., very low, low, moderate, high, or very high relative risk of severe disease).
Update: To better contextualize current projections, the time period for the figure above has been expanded to include the two most recent years of data.
*The y-axis uses a log scale and shows the risk of severe disease relative to a reference period of low incidence that occurred from June 1, 2023 through July 31, 2023. A relative risk equal to 1 indicates similar risk of severe viral disease as the reference period; a relative risk greater than 1 indicates higher risk of severe disease and a relative risk of less than 1 indicates lower risk of severe disease.
Data Sources: PHO Laboratory Information Management System; Ontario Laboratories Information System (OLIS); Ministry of Health

Summary of Methods

Indicators of Pathogen-Specific Community Viral Respiratory Activity

- For the three pathogen-specific indicators of community viral activity, generalized additive models (GAMs) were applied to observed daily pathogen laboratory testing data.
  - For COVID-19, Figure 1a and 1b show OLIS data and related projections for individuals less than 65 years of age; data and projections specific to PHO data (i.e., data used to inform projections of severe disease among the pediatric population) are not shown.
  - For influenza and RSV, PHO laboratory testing data excluded individuals 65 years and older (Figures 2a, 2b, 3a, and 3b).
  - For all pathogens, GAMs were applied to observed percent positivity data for the past two-year period to project the daily pathogen-specific percent positivity forward 14 days, along with 95% prediction intervals.
- Specifically, GAMs were fitted using restricted cubic splines applied to the date of testing, with knots located 28 days apart throughout the summer (i.e., June 1 through August 31, inclusive) and 14 days apart throughout the rest of the surveillance period. The most recent knot is located 14 days from the most recent date of observed data included in the model, meaning that the positivity projection is based on a linear interpolation of percent positivity.

Indicators of Severe Viral Respiratory Disease Risk

- A separate age- and pathogen-specific GAM was applied to observed daily laboratory testing data, and projected values obtained from this model were included in a previously calibrated generalized linear model (GLM) (see Appendix A) to estimate severe viral respiratory disease risk (i.e., for all the three viruses combined) specific to the pediatric and general adult populations. Daily relative risk estimates, along with 95% prediction intervals, are provided in Figures 4b and 5b.
- For each age-group specific indicator calculated above, quintile thresholds were calculated from historic estimated risk levels representing very low, low, medium, high, and very high risk of severe disease.
- See Appendix A for additional methodological details.

Technical Notes

Data Sources

Public Health Ontario (PHO):

- PHO respiratory virus testing data were extracted from the PHO Laboratory Information Management System on January 15, 2025, at 9 a.m., and include data reported up to January 11, 2025.

Ontario Laboratories Information System (OLIS):

- COVID-19 testing data (i.e., tests for SARS-CoV-2) reported by microbiology laboratories in the province were obtained from OLIS on January 15, 2025, and include data reported up to January 11, 2025.

Ministry of Health (MOH) Bed Census (I9):

- Hospital bed occupancy data were obtained from the Ministry of Health on January 14, 2025, and include data reported up to January 11, 2025.

Data and Methodological Caveats

- Additional data caveats and methods are available in the following resources:
  - Interpretation Notes of this report
  - Technical Notes of the Ontario Respiratory Virus Tool[2]
    - Refer to the "Lab Testing" tab of Ontario Respiratory Virus Tool to further explore the laboratory data used in this report.
- COVID-19 and influenza are diseases of public health significance in Ontario and cases 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).[5,6] Other respiratory viruses are only reportable as respiratory infection outbreaks in institutions and public hospitals and therefore testing and case data are limited.
- Percent positivity is calculated from the number of positive tests and the total number of tests performed in a given time period. Percent positivity is only calculated for individuals less than 65 years of age. Testing eligibility for SARS-CoV-2, influenza, and RSV 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 SARS-CoV-2 and Public Health Ontario laboratory's guidance for influenza and RSV.[3,4]
- Decisions regarding public health action and/or infection prevention and control should not solely rely on percent positivity levels 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 also be considered.
- Public Health Ontario Laboratory Information Management System data are based on routine testing for seasonal respiratory viruses and SARS-CoV-2 for select population groups.[4]

- There have been changes to testing criteria and practices over time they may impact testing volumes and the characteristics of individuals tested for different respiratory viruses. Recent changes in Ontario's provincial testing criteria for SARS-CoV-2 may impact testing volumes across the province. As potential impacts of these testing changes on the methods used in this report are currently unknown, ongoing evaluations will be conducted to determine whether additional methodological updates or recalibration may be required. Testing changes may impact the ability to accurately:
  - Compare viral activity between SARS-CoV-2 and other viruses.
  - Compare viral activity of SARS-CoV-2 across seasons.
  - Project viral activity and severity, since projections are informed by viral activity patterns observed in the past two years.
  - Estimate severe illness risk, particularly in the adult population, which is more strongly influenced by changes in SARS-CoV-2 activity.
- PHO will consistently assess the accuracy of these models to ensure accurate and timely projections of respiratory virus activity in Ontario. Thus, refinements to the models and recalibration activities may occur throughout the respiratory virus season with updates reflected in future reports. Considerations for updating models may include: changes in testing eligibility, evolving data availability, emerging variants, and emerging seasonal patterns and trends as the respiratory virus season progresses.

References

1. Albani VVL, Albani RAS, Massad E, Zubelli JP. Nowcasting and forecasting COVID-19 waves: the recursive and stochastic nature of transmission. R Soc Open Sci. 2022;9(8):220489. Available from: https://doi.org/10.1098/rsos.220489
2. Ontario Agency for Health Protection and Promotion (Public Health Ontario). Technical notes: Ontario respiratory virus tool [Internet]. Toronto, ON: King's Printer for Ontario; 2024 [updated 2024 Oct 25; cited 2024 Nov 05]. Available from: https://www.publichealthontario.ca/-/media/data-files/respiratory-virus-tool-technical-notes.pdf?la=en
3. Ontario. Ministry of Health; Ontario. Ministry of Long-Term Care. COVID-19: guidance for the health sector [Internet]. Toronto, ON: King's Printer for Ontario; 2024 [updated 2024 Oct 16; cited 2024 Nov 05]. Available from: https://www.ontario.ca/page/covid-19-testing-and-treatment
4. 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; 2024 [updated 2024 Oct 02; cited 2024 Nov 05]. Available from: https://www.publichealthontario.ca/en/Laboratory-Services/Test-Information-Index/Virus-Respiratory
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

Appendix A: Technical Summary of Statistical Methods

For each pathogen and age group (<18 and 18-64 years), generalized additive models (GAMs) were fitted to observed daily pathogen laboratory percent positivity data for the past two-year period to project daily pathogen-specific percent positivity forward 14 days.

- For the influenza model, influenza A and B percent positivity were modelled separately. In the rare instance of cases co-infected with both influenza A and B, these individuals were classified as influenza B cases (i.e., the rarer of the two viruses) to avoid artificially overinflating the estimated overall influenza activity.
- Projected estimates from each model were combined to estimate an overall influenza projection.

To ensure estimates of disease severity risk accurately reflect observed trends in severe viral respiratory disease (i.e., hospitalizations), and to allow pathogen-specific percent positivity trends to be appropriately combined into a single indicator of age-specific severe disease risk, the following modelling approach was taken.

- Total daily age-specific hospital admissions for COVID-19, influenza, and RSV were identified from Ministry of Health Bed Census Data for the past two-year period or, otherwise, from the earliest date for which data for all three diseases was collected (i.e., November 24, 2022).
    - Notably, we assumed these pathogen-specific hospitalizations were an accurate indicator of severe viral respiratory disease; however, this may be an underestimate of the true level of severe viral respiratory disease in the population as some individuals with severe disease may not seek hospital care or may not be captured in the bed census data.
- In addition to the age-stratified, pathogen-specific percent-positivity models described above, an age-stratified generalized linear model (GLM) was developed using daily pathogen-specific percent positivity, date, and annual and biannual Fourier seasonality terms (to account for underlying viral respiratory disease trends) as independent variables. The total age-specific number of hospitalizations reported for COVID-19, influenza, and RSV, i.e., a proxy for severe viral respiratory disease, was used as the dependent variable.
    - Influenza A and B percent positivity were included as separate age-specific covariates.
    - The calibration model was based on percent positivity and hospitalization data for the period November 24, 2022 through March 23, 2024, as this is when hospitalization data for all three pathogens was readily available from the provincial reporting system.
    - Several model specifications were considered, including different methods to account for seasonality (e.g., number of Fourier terms), approaches for implementing smoothing splines (e.g., cubic regression), and model functional forms (e.g., GLM, GAM). The best fitting model was defined as having the smallest prediction error when compared against a testing data set which was not included when training the model, i.e., the last two weeks of observed data were held back as testing data set.
    - The calibrated model are subsequently applied to the projected virus-specific percent positivity data (described above) to obtain estimates of the projected risk of severe disease (i.e., hospitalization) in the upcoming 14-day period.
    - To ensure the continued accuracy of these calibration weights, ongoing calibration activities and assessments of predictive performance occur throughout the respiratory virus season (with changes documented in future reports).

- The relative risk of severe disease was calculated relative to a period with historically low severe viral respiratory disease risk; i.e., the average estimated daily risk between June 1, 2023 and July 31, 2023 in each age group. For reference, the average total number of new observed hospitalizations for COVID-19, influenza, and RSV (i.e., combined) during this period was:
  - 12.6 per day among the pediatric population, and
  - 52.1 per day among the general adult population.
- Threshold values (i.e., very low, low, medium, high, very high) align with quintile intervals calculated from the above historic severe disease relative risk estimates.
  - For the pediatric population, these threshold values were 1.3, 2.2, 4.0, and 7.5, respectively.
  - For the adult population, these threshold values were 1.3, 1.8, 2.3, and 4.2, respectively.

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