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PHO Rounds: Update on Influenza, COVID-19 and RSV for the 2023-24 Season

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September 26 and October 3, 2023

Disclosures

- Mr. Whelan does not have any conflicts of interest to disclose
- Dr. Mather does not have any conflicts of interest to disclose
- Dr. Hasso does not have any conflicts of interest to disclose

Learning objectives

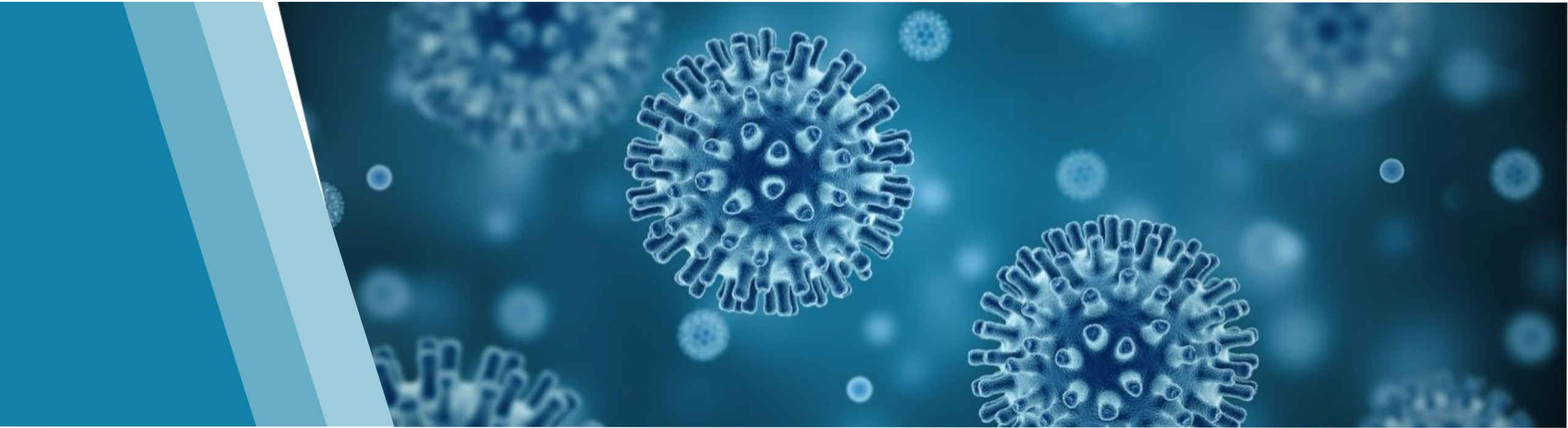
By the end of this session, participants will be able to:

- Summarize the current epidemiological trends in influenza, COVID-19, and respiratory syncytial virus (RSV) activity in Ontario, Canada and internationally
- List the vaccine products available in Ontario for influenza, COVID-19, and RSV for the 2023-24 season
- Describe the use and benefits of antiviral medications for the treatment and prevention of influenza
- Describe the testing options available in Ontario for influenza, COVID-19, and RSV for the 2023-24 season

Outline

1. Influenza, COVID-19 and RSV activity
 - a) Ontario
 - b) Canada
 - c) Internationally
2. Influenza, COVID-19 and RSV Vaccines for 2023-24
3. Antiviral Medications for Influenza and COVID-19
4. COVID-19 and Seasonal Respiratory Virus Testing 2023-24

Respiratory Virus Activity: Ontario and Canada, 2022-23 Surveillance Period



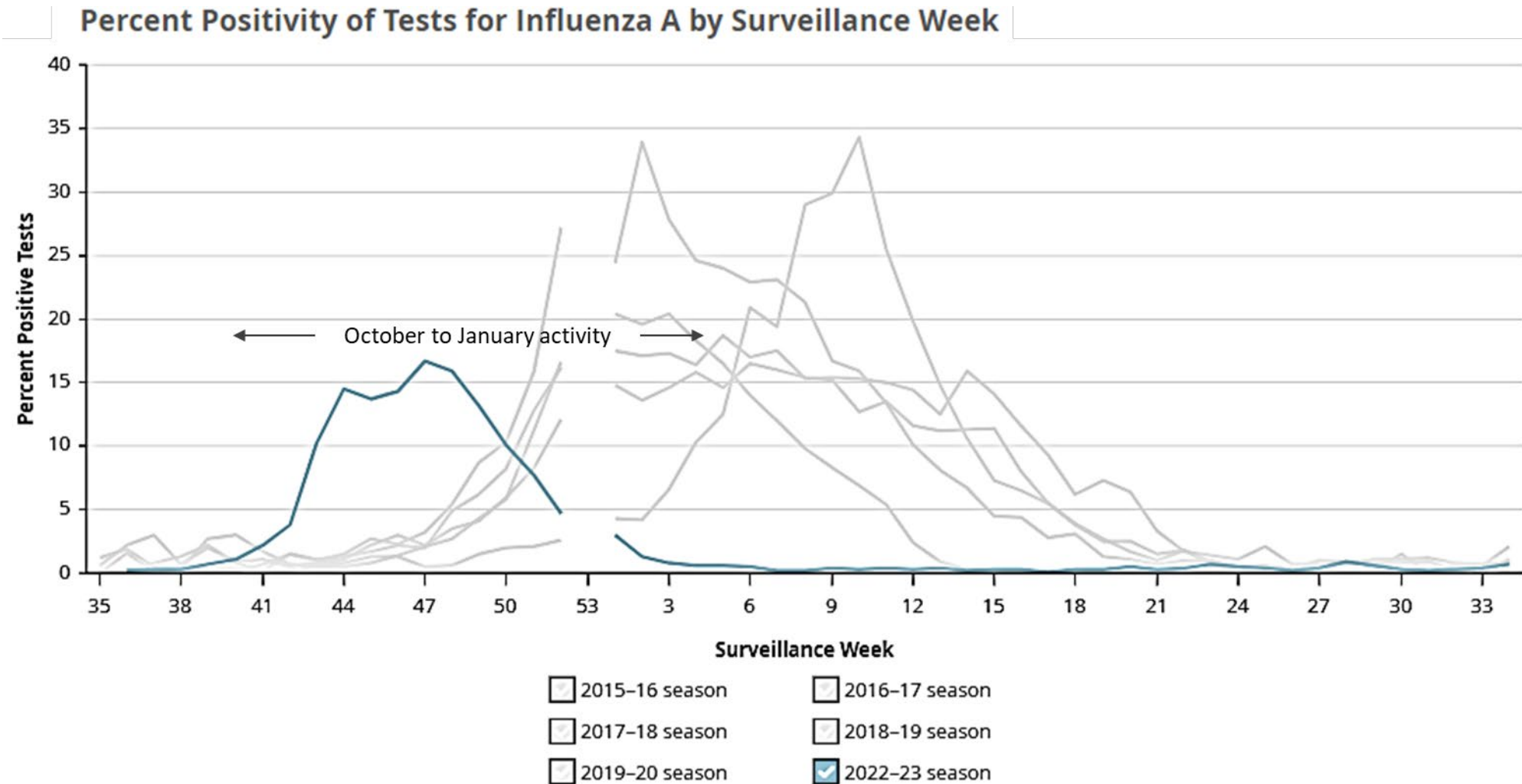
The 2022-23 surveillance period differed from previous ones

- First winter since the pandemic without any broad public health measures in place (e.g., masking, physical distancing)
- The lack of regular seasonal respiratory virus activity since the pandemic meant the population may have had reduced immunity to seasonal influenza, RSV and other respiratory viruses

Polling question #1

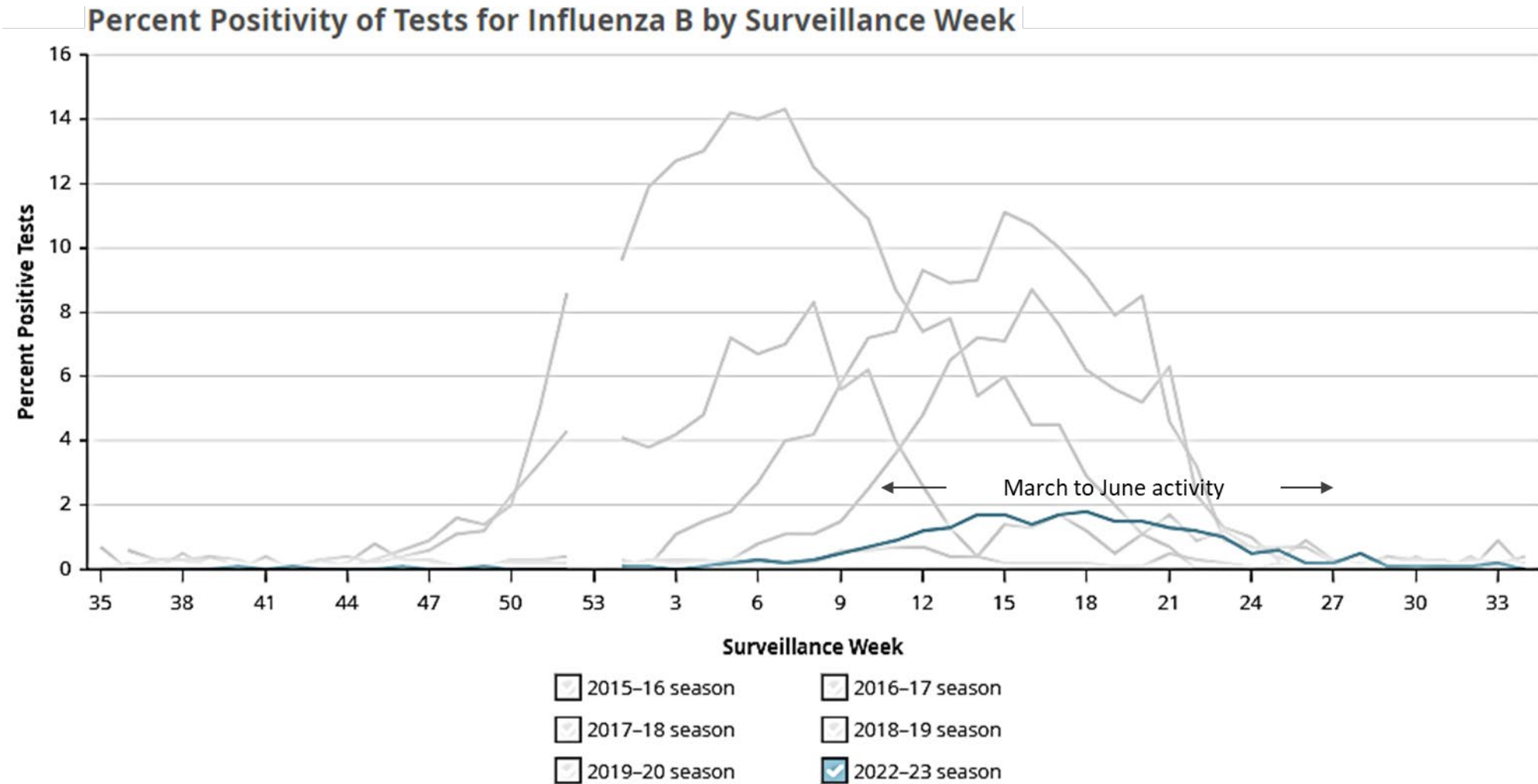
- In what month did the percent positivity for influenza peak during the 2022-23 season in Ontario?
 - A. October
 - B. November
 - C. December
 - D. January

Influenza A activity started and peaked early in the 2022-23 surveillance period



Source: Ontario Agency for Health Protection and Promotion (Public Health Ontario). Ontario respiratory pathogen bulletin [Internet]. Toronto, ON: King's Printer for Ontario; 2023 [cited 2023 Sep 5]. Available from: <https://www.publichealthontario.ca/en/data-and-analysis/infectious-disease/respiratory-pathogens-weekly>

Low influenza B activity occurred in the spring of the 2022-23 surveillance period

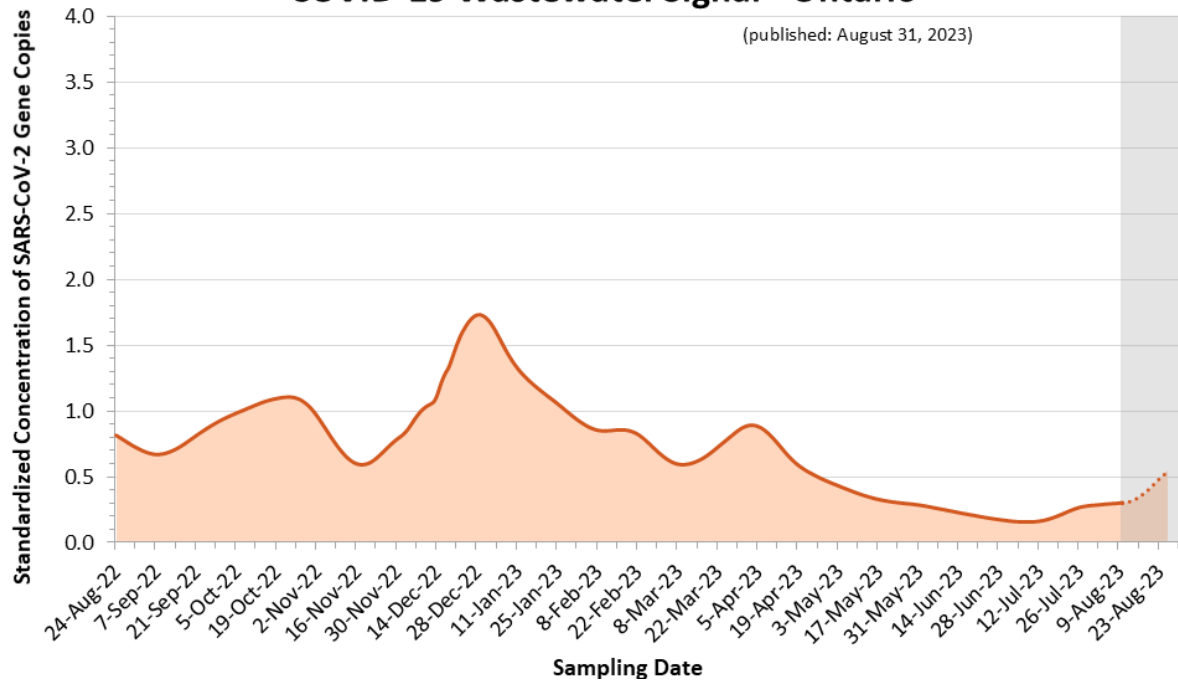


Source: Ontario Agency for Health Protection and Promotion (Public Health Ontario). Ontario respiratory pathogen bulletin [Internet]. Toronto, ON: King's Printer for Ontario; 2023 [cited 2023 Sep 5]. Available from: <https://www.publichealthontario.ca/en/data-and-analysis/infectious-disease/respiratory-pathogens-weekly>

COVID-19 activity peaked in October and December in the 2022-23 surveillance period

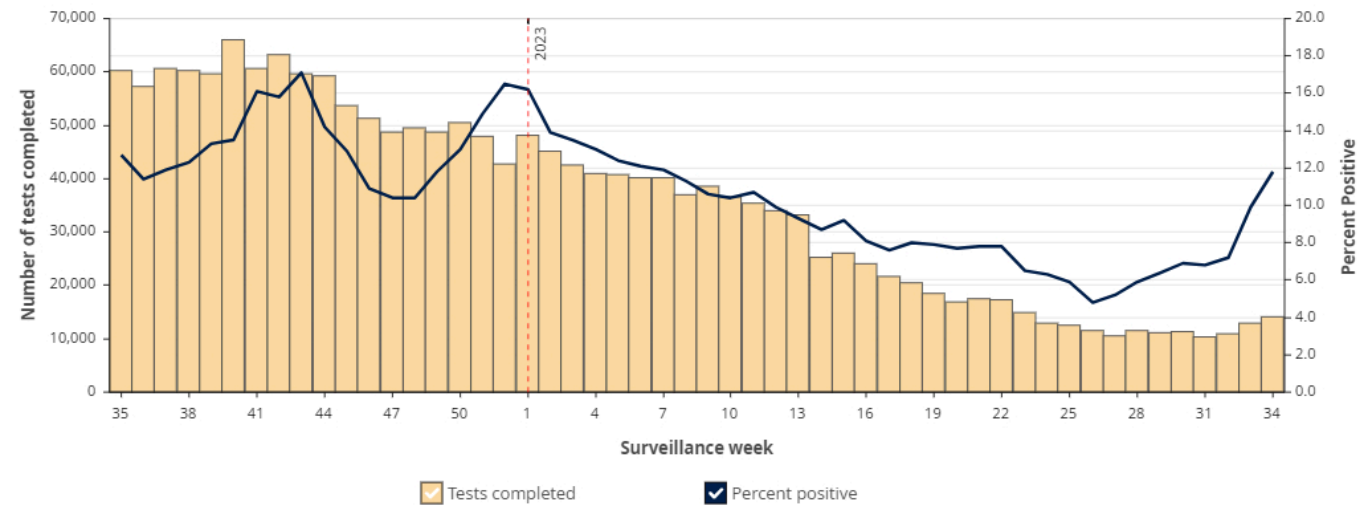
COVID-19 Wastewater Signal - Ontario

(published: August 31, 2023)



Source: Ontario Agency for Health Protection and Promotion (Public Health Ontario). COVID-19 wastewater surveillance in Ontario [Internet]. Toronto, ON: King's Printer for Ontario; 2023 [cited 2023 Sep 5]. Available from: <https://www.publichealthontario.ca/en/Data-and-Analysis/Infectious-Disease/COVID-19-Data-Surveillance/Wastewater>

COVID-19 weekly laboratory tests completed and weekly percent positivity in Ontario from August 28, 2022 to August 26, 2023

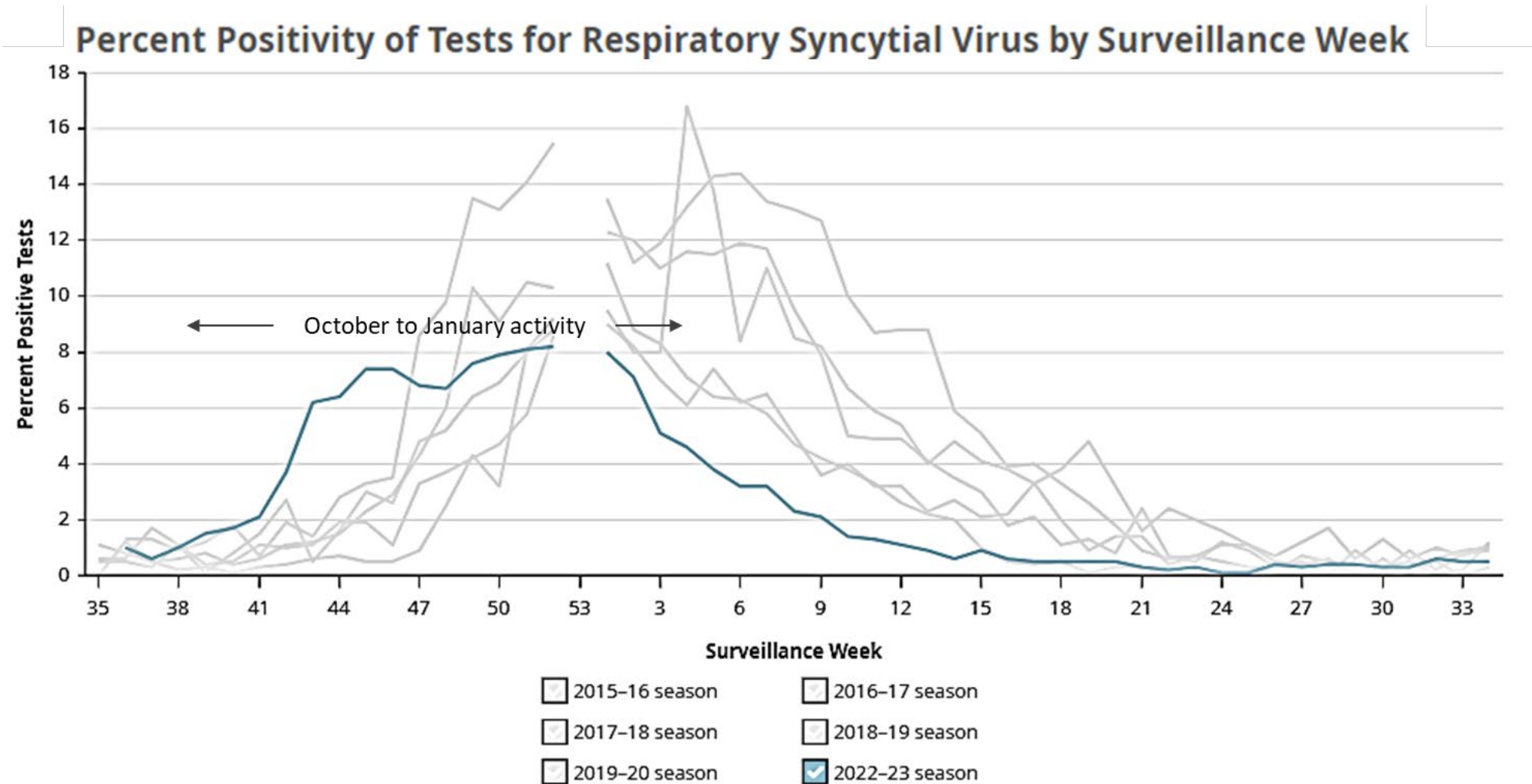


Source: Ontario Agency for Health Protection and Promotion (Public Health Ontario). COVID-19 data tool [Internet]. Toronto, ON: King's Printer for Ontario; 2023 [cited 2023 Sep 5]. Available from: <https://www.publichealthontario.ca/en/Data-and-Analysis/Infectious-Disease/COVID-19-Data-Surveillance/COVID-19-Data-Tool?tab=labTests>

COVID-19 trends were similar across indicators in the 2022-23 surveillance period

- COVID-19 activity peaked in October and late December-early January for:
 - Percent positivity
 - Wastewater
 - Outbreaks
 - Cases
 - Hospital bed occupancy
 - Deaths
- A general decline in activity was seen until June 2023
- COVID-19 activity has been increasing since July

RSV increased in October with sustained activity through to January: 2022-23 surveillance period



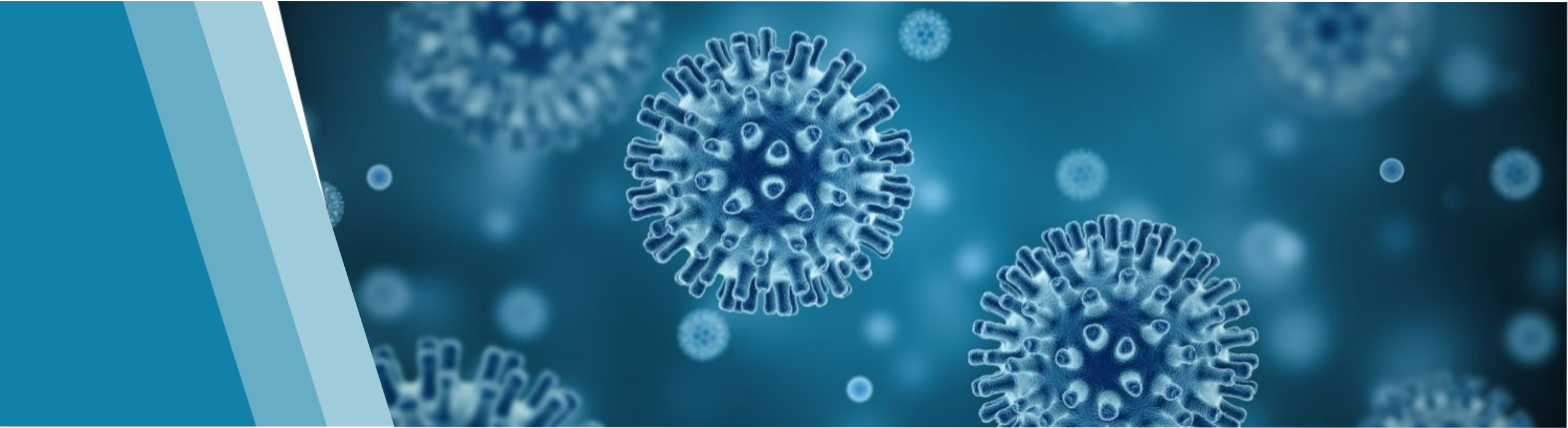
Source: Ontario Agency for Health Protection and Promotion (Public Health Ontario). Ontario respiratory pathogen bulletin [Internet]. Toronto, ON: King's Printer for Ontario; 2023 [cited 2023 Sep 5]. Available from: <https://www.publichealthontario.ca/en/data-and-analysis/infectious-disease/respiratory-pathogens-weekly>

Trends in percent positivity of respiratory viruses in Canada in 2022-23 were similar to those in Ontario

- Influenza A test percent positivity increased through October and peaked at the end of November
 - H3N2 was the dominant influenza A subtype nationally
- COVID-19 activity had peaks in October and late December-early January, followed by a decline until July based on test percent positivity
- RSV test percent positivity increased in October with sustained activity through January before declining

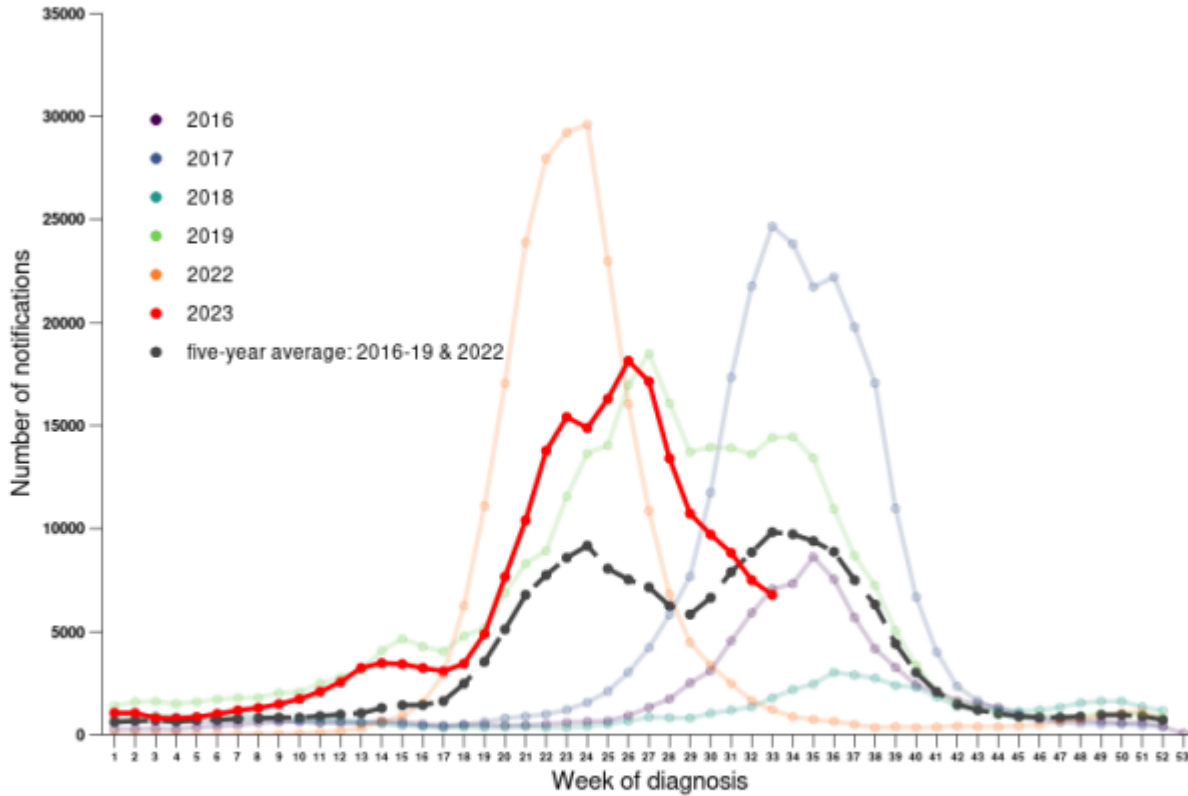
Source: Public Health Agency of Canada. Respiratory virus report, week 34 – ending August 26, 2023 [Internet]. Ottawa, ON: Government of Canada; 2023 [cited 2023 Sep 5]. Available from: <https://www.canada.ca/content/dam/phac-aspc/documents/services/surveillance/respiratory-virus-detections-canada/2022-2023/week-34-ending-august-26-2023/rvdss-en-34.pdf>

Respiratory Virus Activity: Internationally, 2022-23 Season



Influenza season in Australia appears similar to 2019 in terms of timing

Figure 3: Notifications of laboratory-confirmed influenza, Australia, 1 January 2016 to 20 August 2023, by year and week of diagnosis*



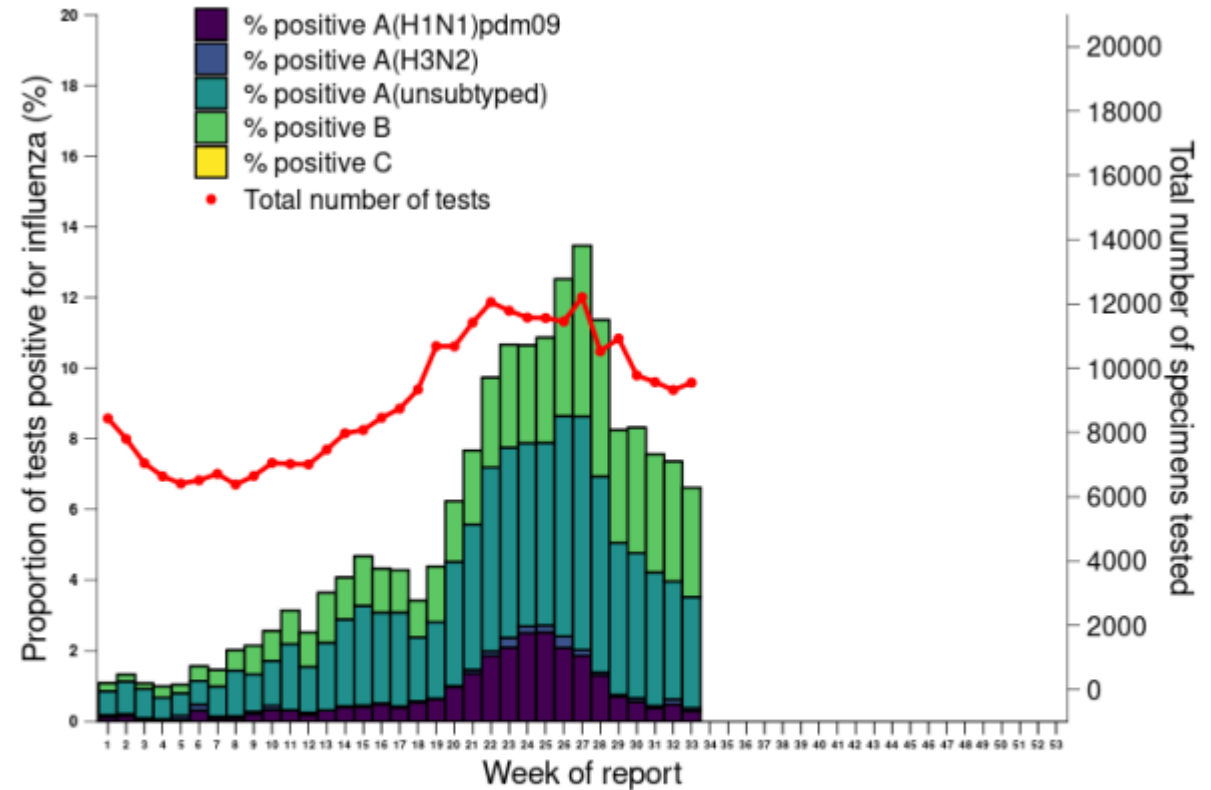
Source: NNDSS

*NNDSS notification data provided for the current and most recent weeks may be incomplete. All data are preliminary and subject to change as updates are received, with most recent weeks considered particularly subject to revisions. The years 2020 and 2021 are excluded when comparing the current season to historical periods when influenza virus has circulated without public health restrictions. Please refer to Data considerations for interpretation of the five-year average.

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Source: Australian Influenza Surveillance Report, Communicable Disease Epidemiology and Surveillance Section (CDESS). Report no. 10, 2023 [Internet]. Canberra, ACT: Government of Australia; 2023 [cited 2023 Sep 18]. Available from: <https://www.health.gov.au/sites/default/files/2023-08/aisr-fortnightly-report-no-10---7-august-to-20-august-2023.pdf>

Figure 4: Proportion of sentinel laboratory tests positive for influenza and total number of specimens tested, 1 January to 20 August 2023, by subtype, year and week*

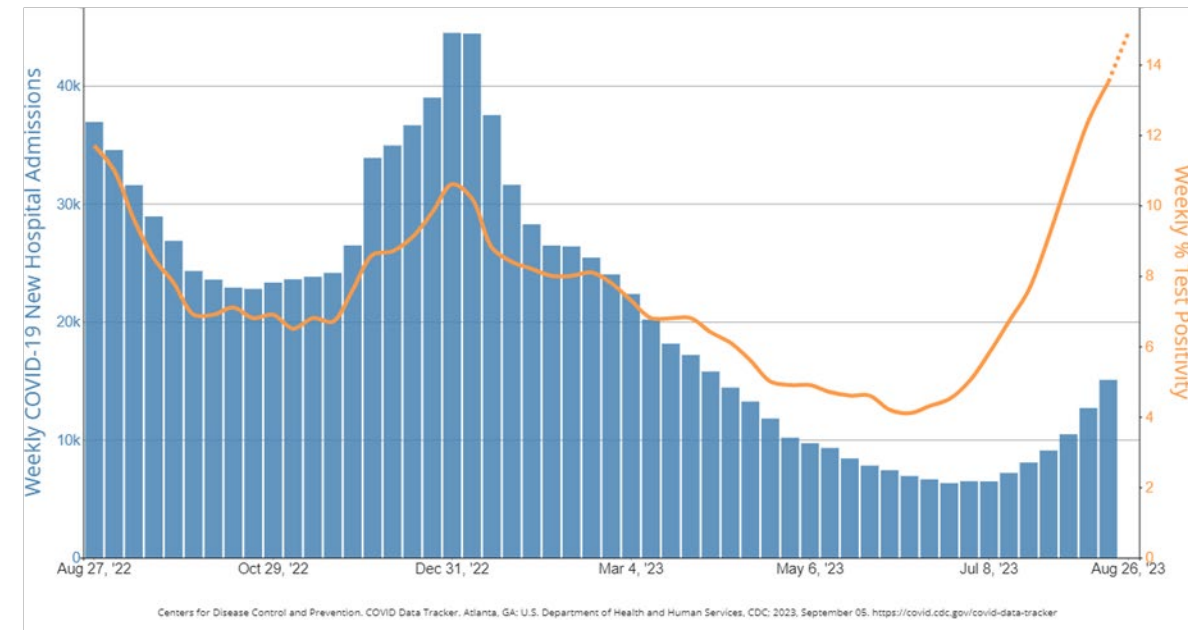


Source: Sentinel laboratories

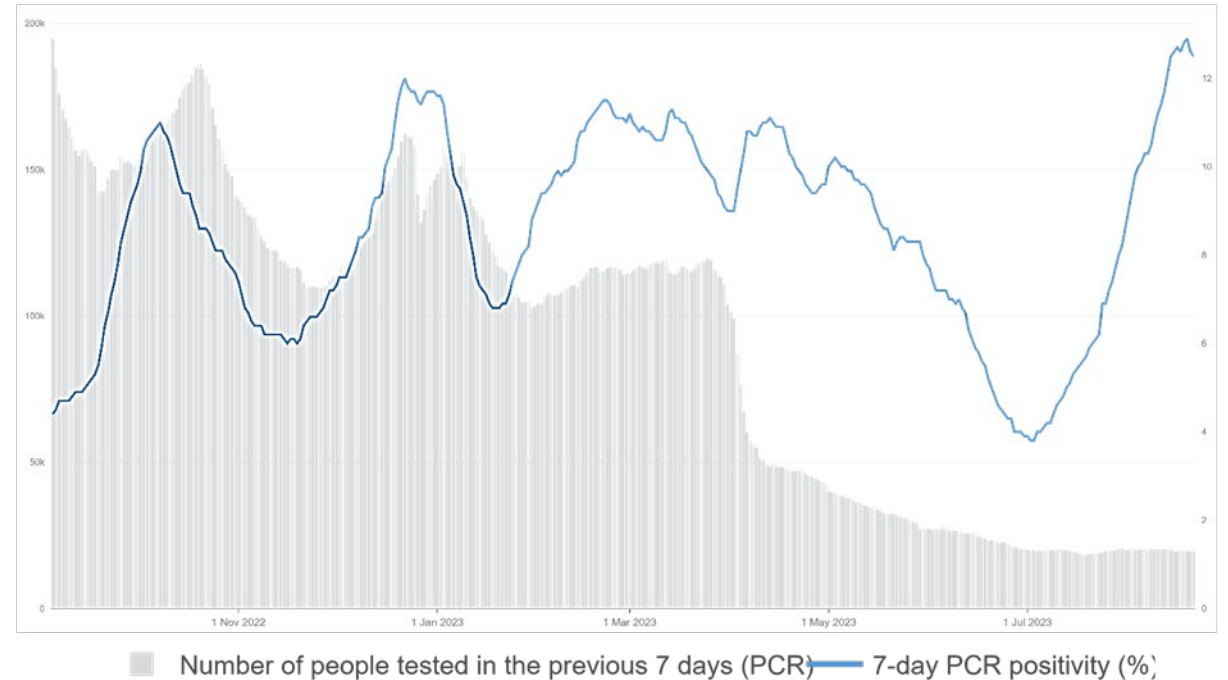
*Total number of tests include all specimens that were tested for influenza, including multiplex panels used to test for SARS-CoV-2. Testing methodologies vary across jurisdictions and laboratories. All data are preliminary and subject to change as updates are received, with most recent weeks considered particularly subject to revisions.

COVID-19: United States and England seeing increasing COVID-19 activity

COVID-19 new hospital admission and COVID-19 nucleic acid amplification test percent positivity, by week, in the United States, reported to CDC



Weekly number of people receiving a PCR test and PCR positivity in England



Source US data: Centers for Disease Control and Prevention (CDC). COVID data tracker [Internet]. Atlanta, GA: CDC; 2023 [cited 2023 Sep 5]. Available from: <https://covid.cdc.gov/covid-data-tracker>

Source England data: UK Health Security Agency. Coronavirus tracker [Internet]. London: Crown Copyright; 2023 [cited 2023 Sep 5]. Available from: <https://coronavirus.data.gov.uk/details/testing?areaType=nation&areaName=England>

RSV in Australia increased and peaked earlier than last year

- In Australia, RSV has been nationally notifiable since 2021
- In 2023, RSV activity increased in Australia earlier than it did in 2022
- RSV activity also peaked earlier in Australia in 2023 than in 2022 and has been declining since June

Source: Immunisation Coalition. RSV activity and surveillance & graph 2023. Victoria, Australia: Immunisation Coalition; 2023 [cited 2023 Sep 5]. Available from: <https://www.immunisationcoalition.org.au/news-data/respiratory-syncytial-virus-rsv-statistics/>

Overall the 2022-23 period was unusual in Ontario compared to pre-pandemic seasons

- Characterized by heightened influenza and RSV activity in November and December in Ontario and also nationally
 - Influenza vaccine effectiveness in Canada was 54% against influenza A H3N2 overall*
- In the first fall and winter without any public health restrictions
 - COVID-19 activity was elevated until the late spring of 2023 with peaks in activity in October and December
 - Gradual decline in activity from January to June before increasing in July
 - Activity continues to increase

* Skowronski DM, Chuang ESY, Sabaiduc S, Kaweski SE, Kim S, Dickinson JA, et al. Vaccine effectiveness estimates from an early-season influenza A(H3N2) epidemic, including unique genetic diversity with reassortment, Canada, 2022/23. Euro Surveill. 2023;28(5):pii=2300043. <https://doi.org/10.2807/1560-7917.ES.2023.28.5.2300043>

Outlook for 2023-24 surveillance period in Ontario

- Similar to pre-pandemic seasons, circulation of influenza and RSV in the community is expected
- Based on southern hemisphere activity, it is possible influenza and RSV activity will start early
 - Influenza A H1 may be the dominant subtype this season
- COVID-19 activity is already increasing based on trends starting at the end of the 2022-23 surveillance period
- Potential immunity gained during 2022-23 influenza, RSV and COVID-19 peaks may have waned
 - Last season emphasized the importance of immunizations

PHO has released the new interactive Ontario Respiratory Virus tool!

Respiratory Virus Activity
June 25, 2023 to July 1, 2023

These images provide a high-level assessment of respiratory virus activity in Ontario. Provincial percent positivity can be used to provide an estimate of the intensity of circulating viruses in the province. Percent positivity for the most recent week is used to assign influenza to either a low, moderate, high or very high category. Weekly indicator change was determined by considering a combination of in Technical Notes). For more details on cases, lab testing, outbreaks, and COVID-19 vaccinations use the blue navigation bar at the top to go to those pages.

COVID-19

Percent positivity: **Low**
Weekly indicator change: **Lower**

Influenza

Percent positivity: **Low**
Weekly indicator change: **Lower**

Respiratory virus activity

Virus	Percent positivity (%)
Adenovirus	2.7%
COVID-19	6.9%
Enterovirus/Rhinovirus	8.9%
Human metapneumovirus	2.8%
Influenza A	0.3%
Influenza B	0.1%
Parainfluenza (all types)	3.3%
Respiratory syncytial virus	0.5%
Seasonal human coronavirus	4.2%

Laboratory confirmed weekly case counts and rates of COVID-19 in Ontario

Laboratory confirmed weekly case counts or rates for selected viruses in Ontario

Influenza A weekly total tests, positive tests, or percent positivity by age group in Ontario (PHO Laboratory data)

Notes:
Test positivity for COVID-19 (SARS-CoV-2) is based on information from the Provincial COVID-19 Diagnostic Network, while all other test positivity data used in these figures is from the Public Health Agency of Canada (PHAC). For further details, please refer to the technical notes.

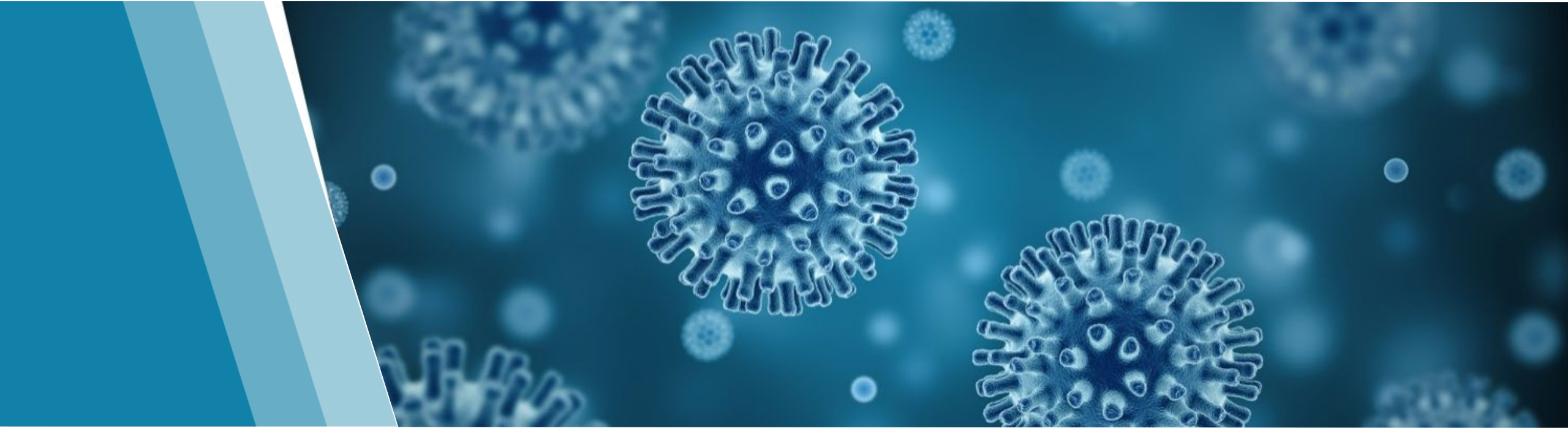
Notes:
COVID-19 and influenza cases are placed in time by reported date. For further details, please refer to the technical notes.

Notes:
COVID-19 and influenza indicators should be compared and assessed with caution due to differences in provincial testing strategy; populations eligible for requirements. There are significantly more COVID-19 tests performed compared to influenza tests. Reported cases of COVID-19 and influenza are placed in time by reported date. For further details, please refer to the technical notes.

Notes:
Data for the most recent weeks may be incomplete as not all testing is finalized. Trends over time should be interpreted with caution as PHO's testing methods and testing eligibility have changed over time. Percent positivity for populations with a small number tested may be unstable and should be interpreted with caution. In weeks when no samples are tested, percent positivity appears as 0.0%. Tests represent unique samples as opposed to individuals or cases; the same individual may be counted multiple times. From November 2018 to October 2019, PHO did not routinely test for human coronavirus and enterovirus. Individuals with unknown age were excluded. For further details, please refer to the technical notes.

- The ORVT combines content from the COVID-19 data tool, Respiratory Virus Overview Ontario and Ontario Respiratory Pathogen Bulletin

Influenza, COVID-19 and RSV Vaccines for 2023-24



Influenza vaccine composition for the Northern Hemisphere

	2022-23 Egg-based Vaccines	2023-24 Egg-based Vaccines
Influenza A strains	A/Victoria/2570/2019 (H1N1)pdm09-like virus A/Darwin/9/2021 (H3N2)-like virus	A/Victoria/4897/2022 (H1N1)pdm09-like virus A/Darwin/9/2021 (H3N2)-like virus
Influenza B strains	B/Austria/1359417/2021 (B/Victoria lineage)-like virus B/Phuket/3073/2013 (B/Yamagata lineage)-like virus*	B/Austria/1359417/2021 (B/Victoria lineage)-like virus B/Phuket/3073/2013 (B/Yamagata lineage)-like virus*

* Not contained in trivalent inactivated vaccine (TIV) product

Adapted from: World Health Organization (WHO). Recommended composition of influenza virus vaccines for use in the 2023-2024 northern hemisphere influenza season [Internet]. Geneva: WHO; 2023 [cited 2023 Aug 8]. Available from: <https://www.who.int/publications/m/item/recommended-composition-of-influenza-virus-vaccines-for-use-in-the-2023-2024-northern-hemisphere-influenza-season>

Universal Influenza Immunization Program (UIIP) vaccines for 2023-24

Age Group	Type of Product	Product Name
6 months to 64 years	Standard-dose quadrivalent (QIV)	FluLaval Tetra Fluzone® Quadrivalent
65 years and over	Standard-dose quadrivalent (QIV)	FluLaval Tetra Fluzone® Quadrivalent
	High-dose quadrivalent (QIV-HD)	Fluzone® High-Dose Quadrivalent
	Adjuvanted trivalent (TIV-adj)	Fluad®

Source: Ontario. Ministry of Health. 2023 / 24 universal influenza immunization program (UIIP) [Internet]. Toronto, ON: King's Printer for Ontario; 2023 [cited 2023 Sep 15]. Available from: <https://www.health.gov.on.ca/en/pro/programs/publichealth/flu/uiip/default.aspx>

Characteristics of UIIP vaccines for adults 65 years and older

Considerations	QIV-HD	TIV-adj	QIV
Composition	<ul style="list-style-type: none"> 60 mcg hemagglutinin per strain 	<ul style="list-style-type: none"> 15 mcg hemagglutinin per strain M059 adjuvant 	<ul style="list-style-type: none"> 15 mcg hemagglutinin per strain
Immunogenicity	<ul style="list-style-type: none"> Superior immune response to additional B strain Expected superior immune response to influenza A strains compared to TIV 	<ul style="list-style-type: none"> Non-inferior immune response compared to TIV Superiority to TIV not consistently demonstrated 	<ul style="list-style-type: none"> Superior immune response to additional B strain Non-inferior immune response to strains contained in TIV
Efficacy and effectiveness	<ul style="list-style-type: none"> Expected better protection compared with TIV, particularly for A(H3N2) Better protection against influenza B strain not contained in TIV 	<ul style="list-style-type: none"> Insufficient evidence to compare TIV-adj with TIV 	<ul style="list-style-type: none"> Better protection against the influenza B strain not contained in TIV
Safety	<ul style="list-style-type: none"> Higher rate of some systemic reactions than QIV; these were mild and transient Serious adverse events were rare and similar in frequency to QIV 	<ul style="list-style-type: none"> Higher rate of injection site reactions, higher or comparable systemic reactions to TIV; these were mild to moderate and transient Serious adverse events were comparable to TIV and uncommon 	<ul style="list-style-type: none"> Similar safety profile to TIV

Source: Ontario. Ministry of Health. 2023 / 24 universal influenza immunization program (UIIP) [Internet]. Toronto, ON: King's Printer for Ontario; 2023 [cited 2023 Sep 15]. Available from: <https://www.health.gov.on.ca/en/pro/programs/publichealth/flu/uiip/default.aspx>

National Advisory Committee on Immunizations (NACI) 2023-24 recommendations for adults 65 years and older

Individual-level decision making

- **When available, high-dose QIV should be used over standard-dose QIV**
 - Based on good evidence of better protection of HD-TIV compared to TIV and the burden of influenza A (H3N2) disease in adults 65 years of age and older

Public health program-level decision making

- Any of the available age-appropriate influenza vaccines should be used

Source: Public Health Agency of Canada; National Advisory Committee on Immunization (NACI). Statement on seasonal influenza vaccine for 2023-2024: an Advisory Committee Statement (ACS). Ottawa, ON: His Majesty the King in Right of Canada, as represented by the Minister of Health; 2023. Available from: <https://www.canada.ca/en/public-health/services/publications/vaccines-immunization/national-advisory-committee-immunization-statement-seasonal-influenza-vaccine-2023-2024.html>

COVID-19 vaccines targeting Omicron XBB.1.5 subvariant (1/2)

- Two monovalent COVID-19 mRNA vaccines targeting the Omicron XBB.1.5 subvariant have been authorized by Health Canada
 - Moderna Spikevax® XBB.1.5 (andusomeran) - authorized Sept 12, 2023
 - Pfizer-BioNTech COMIRNATY Omicron XBB.1.5 vaccine (raxtozinameran) – authorized Sept 28, 2023
 - Both products are authorized for use in individuals six months of age and older who are previously vaccinated (i.e. as a booster dose) as well as those not previously vaccinated (i.e. as a primary series)
- One other monovalent XBB.1.5 COVID-19 vaccine is under review by Health Canada and anticipated to be used in the fall 2023 program:
 - Novovax – protein adjuvant vaccine targeting Omicron XBB1.5

Sources: Health Canada. Drug and vaccine authorizations for COVID-19: list of applications received [Internet]. Ottawa, ON: Government of Canada; 2023 [cited 2023 Sep 4]. Available from: <https://www.canada.ca/en/health-canada/services/drugs-health-products/covid19-industry/drugs-vaccines-treatments/authorization/applications.html>

Moderna Biopharma Canada Corp. Product monograph for Spikevax XBB.1.5 [Internet]. Toronto, ON: Moderna Biopharma Canada Corp.; 2023 [cited 2023 Sep 15]. Available from: <https://covid-vaccine.canada.ca/info/pdf/spikevax-xbb-1-5-pm-en.pdf>

BioNTech Manufacturing GmbH. Product monograph for COMIRNATY® Omicron XBB.1.5 [Internet]. Mainz, Rhineland-Palatinate, Germany: BioNTech Manufacturing GmbH; 2023 [cited 2023 Sep 29]. Available from: <https://covid-vaccine.canada.ca/info/pdf/comirnaty-omicron-xbb-1-5-pm-en.pdf>

COVID-19 vaccines targeting Omicron XBB.1.5 subvariant (2/2)

An Advisory Committee Statement (ACS)
National Advisory Committee on Immunization (NACI)

Addendum to the guidance on the use of COVID-19 vaccines in the fall of 2023

Published: September 12, 2023

PROTECTING AND EMPOWERING CANADIANS TO IMPROVE THEIR HEALTH

Public Health Agency of Canada / Agence de la santé publique du Canada

Canada

Beginning in the fall of 2023 for those previously vaccinated against COVID-19, NACI recommends a dose of the XBB.1.5-containing formulation of COVID-19 vaccine for individuals in the authorized age group if it has been at least 6 months* from the previous COVID-19 vaccine dose or known SARS-CoV-2 infection (whichever is later).

Immunization is particularly important for those at increased risk of COVID-19 infection or severe disease, for example:

- **Adults 65 years of age or older;**
- **Residents of long-term care homes and other congregate living settings;**
- **Individuals with underlying medical conditions that place them at higher risk of severe COVID-19;**
- **Individuals who are pregnant;**
- **Individuals in or from First Nations, Métis and Inuit communities**;**
- **Members of racialized and other equity-deserving communities;**
- **People who provide essential community services.**

(Strong NACI Recommendation)

Source: Public Health Agency of Canada (PHAC). Addendum to guidance on the use of COVID-19 vaccines in the fall of 2023 – September 12, 2023 [Internet]. Ottawa, ON: His Majesty the King in Right of Canada, as represented by the Minister of Health; 2023 [cited 2023 Sep 14]. Available from: <https://www.canada.ca/content/dam/phac-aspc/documents/services/publications/vaccines-immunization/national-advisory-committee-immunization-addendum-guidance-use-covid-19-vaccines-fall-2023/statement.pdf>

Monovalent XBB.1.5 mRNA COVID-19 vaccines

Age Group	Age	Vaccine Dosage (mcg) and Schedule	
		Moderna XBB.1.5	Pfizer-BioNTech XBB.1.5
Unvaccinated Individuals	6 months to 4 years	2 doses - (25 mcg/0.25 mL)	3 doses - (3 mcg/0.2 mL)
	5 to 11 years	1 dose - (25 mcg/0.25 mL)	1 dose - (10 mcg/0.2 or 0.3 mL)
	12 + years	1 dose - (50 mcg/ 0.5 mL)	1 dose - (30 mcg/0.3 mL)
Vaccinated Individuals	6 months to 4 years*	1 dose - (25 mcg/0.25 mL)	1 dose – (3 mcg/0.2 mL)
	5 to 11 years**	1 dose - (25 mcg/0.25 mL)	1 dose – (10 mcg/0.2 or 0.3 mL)
	12 + years**	1 dose - (50 mcg/0.5 mL)	1 dose – (30 mcg/0.3 mL)

*Refers to a completed 2 or 3 dose initial series; **Refers to receipt of at least 1 prior COVID-19 vaccine dose

Sources: Moderna Biopharma Canada Corp. Product monograph for Spikevax XBB.1.5 [Internet]. Toronto, ON: Moderna Biopharma Canada Corp.; 2023 [cited 2023 Sep 15]. Available from: <https://covid-vaccine.canada.ca/info/pdf/spikevax-xbb-1-5-pm-en.pdf>

BioNTech Manufacturing GmbH. Product monograph for COMIRNATY® Omicron XBB.1.5 [Internet]. Mainz, Germany: BioNTech Manufacturing GmbH; 2023 [cited 2023 Sep 29]. Available from: <https://covid-vaccine.canada.ca/info/pdf/comirnaty-omicron-xbb-1-5-pm-en.pdf>

RSV vaccine

- On August 4, 2023 Health Canada authorized the RSV vaccine (Arexvy, manufactured by GSK) for use in Canada for the prevention of lower respiratory tract disease caused by RSV in adults 60 years of age and over
- In the fall 2023, Ontario will offer publicly-funded RSV vaccine to those 60 years of age and older living in long-term care homes, Elder Care Lodges and some retirement home residents
 - The Ontario Immunization Advisory Committee (OIAC) has recommended against routine co-administration of RSV vaccine with influenza and COVID-19 vaccines on a precautionary basis, noting several circumstances where co-administration can be considered with informed consent
- NACI is reviewing the use of RSV vaccines and will provide recommendations and an update to the Canadian Immunization Guide in the future

Sources: Health Canada. Canadian immunization guide: for health professionals [Internet]. Ottawa, ON: Government of Canada; 2023 [cited 2023 Aug 14]. Respiratory syncytial virus (RSV). Available from: <https://www.canada.ca/en/public-health/services/publications/healthy-living/canadian-immunization-guide-part-4-active-vaccines/respiratory-syncytial-virus.html>

Ontario Newsroom. Ministry of Health. News release: connecting Ontarians to the tools they need to stay healthy this respiratory illness season [Internet], 2023 Sep 14 [cited 2023 Sep 15]; Health. Available from: <https://news.ontario.ca/en/release/1003504/connecting-ontarians-to-the-tools-they-need-to-stay-healthy-this-respiratory-illness-season>

Importance of vaccination this respiratory season

- Receiving vaccines to protect against influenza, COVID-19 and RSV is the most effective way to reduce the risk of severe outcomes and complications from these pathogens, including hospitalization and death
- Co-administration of influenza and COVID-19 vaccines can present an important opportunity to provide individuals with these vaccines in a more timely way
- Vaccination may decrease burden on health care system and reduce the risk of co-infection in individuals as well as the occurrence of concurrent outbreaks (outbreaks with more than one virus) in high-risk settings such as long-term care facilities

Antiviral Medications for Influenza and COVID-19



Polling question #2

True or False:

Laboratory confirmation of influenza is required before initiating treatment with antivirals

Antiviral medications for influenza

- Neuraminidase inhibitors (NIs)
 - Blocks exit of the virus from respiratory cells
 - Prevents further replication of the virus
- Used for
 - Treatment of individuals with moderate or severe illness or at risk for complications of influenza
 - Treatment and prophylaxis in outbreaks
- Offer as soon as possible
 - Benefits of treatment are much greater with initiation at less than 12 hours than with initiation at 48 hours
 - Should be initiated beyond 48 hours in those with progressive, severe, or complicated illness or in those at high risk of complications

Antiviral medications for influenza available in Canada

Product	Age	Route	Use
Oseltamivir (Tamiflu)	1 year of age or older* *Not approved for routine treatment of seasonal influenza illness for children <1 year, but can be considered on case-by-case basis	Oral	Primary agent for treatment of suspected or confirmed influenza
Zanamivir (Relenza)	7 years and over	Inhalation	Consider for individuals: <ul style="list-style-type: none"> • not responding to oseltamivir therapy • who have developed influenza while receiving oseltamivir prophylaxis • where influenza B is strongly suspected

During 2022-23, all 599 influenza viruses (379 A(H3N2), 105 A(H1N1) and 115 B) tested by the National Microbiology Laboratory were sensitive to oseltamivir and zanamivir.

Source: Ontario Agency for Health Protection and Promotion (Public Health Ontario). At a glance: influenza antiviral treatment [Internet]. Toronto, ON: Queen's Printer for Ontario; 2021 [cited 2022 Sep 15]. Available from: https://www.publichealthontario.ca/-/media/Documents/F/2020/fact-sheet--antiviral-medications-influenza.pdf?sc_lang=en

Indications for treating influenza

1. Is influenza circulating in your community?

- Ontario Respiratory Virus Tool

2. Does your patient have symptoms compatible with influenza?

3. Is your patient at high risk for the complications of influenza?

or

Does your patient have moderate, progressive, severe or complicated influenza, such as individuals who are hospitalized with influenza?

Source: Ontario Agency for Health Protection and Promotion (Public Health Ontario). At a glance: influenza antiviral treatment [Internet]. Toronto, ON: Queen's Printer for Ontario; 2021 [cited 2022 Sep 15]. Available from: https://www.publichealthontario.ca/-/media/Documents/F/2020/fact-sheet--antiviral-medications-influenza.pdf?sc_lang=en

Does your patient have symptoms compatible with influenza?

- Clinical diagnosis more challenging if influenza and SARS-CoV-2 are co-circulating, and similarity of symptom presentation
- Co-infection with both influenza virus A or B and SARS-CoV-2 may occur
 - Patients with co-infection receiving antivirals for SARS-CoV-2 infection should also receive oseltamivir

AT A GLANCE Key features of influenza, SARS-CoV-2 and Other Common Respiratory Viruses

Table 1: Comparison of key features of influenza, SARS-CoV-2, respiratory syncytial virus (RSV) and rhinovirus

Key features	Seasonal Influenza	SARS-CoV-2 (COVID-19)	Respiratory Syncytial Virus (RSV)	Rhinovirus
Most common symptoms	Sudden onset of fever, cough, chills, headache, fatigue, sore throat, runny or stuffy nose, muscle pain or body aches ^{1,2}	Similar to influenza including shortness of breath with the possibility of other symptoms, including new loss of taste and smell and gastrointestinal symptoms (nausea, vomiting, diarrhea) ^{3,4}	Similar to influenza ^{1,2}	Runny nose, sneezing, cough, sore throat, muscle pain, fatigue, no or mild fever ^{1,2}
More severe manifestation/ complications	Pneumonia, worsening of underlying medical conditions, sepsis, cardiac involvement, neurologic involvement, death ^{1,2}	Similar to influenza with the addition of blood clots in lungs, heart, legs or brain ⁵ and multisystem inflammatory syndrome in children (MIS-C) ^{3,5} , multisystem inflammatory syndrome in adults (MIS-A) ³ , Long-COVID ⁶ and death ^{5,7}	Pneumonia, bronchiolitis, death ¹	Lower respiratory tract infection (pneumonia, bronchiolitis) in infants ¹ , bronchitis ²
Risk groups for complications	Young children; older adults; underlying medical conditions, including immunocompromised; obesity; pregnancy ^{2,7}	Older adults ^{3,7} ; underlying medical conditions, including immunocompromised ^{3,7} ; obesity ³	Infants and children less than 2 years of age with congenital heart disease or chronic lung disease; premature infants; older adults; underlying medical conditions, including immunocompromised ^{1,2}	Young children; immunocompromised; respiratory conditions ¹

Source: Ontario Agency for Health Protection and Promotion (Public Health Ontario). At a glance: key features of influenza, SARS-CoV-2 and other common respiratory viruses [Internet]. Toronto, ON: Queen's Printer for Ontario; 2021 [cited 2022 Sep 15]. Available from: https://www.publichealthontario.ca/-/media/Documents/nCoV/ipac/2020/09/key-features-influenza-covid-19-respiratory-viruses.pdf?sc_lang=en

Is your patient at high-risk for complications of influenza?

- Residents of nursing homes or other chronic care facilities
- Adults 65 years of age and over
- Persons with underlying medical conditions
- Pregnant people and individuals up to four weeks post-partum
- Indigenous peoples
- Children under 5 years of age

Source: Ontario Agency for Health Protection and Promotion (Public Health Ontario). At a glance: influenza antiviral treatment [Internet]. Toronto, ON: Queen's Printer for Ontario; 2021 [cited 2022 Sep 15]. Available from: https://www.publichealthontario.ca/-/media/Documents/F/2020/fact-sheet--antiviral-medications-influenza.pdf?sc_lang=en

COVID-19 antivirals

- Antiviral treatments for COVID-19 can prevent serious illness if taken quickly after symptoms start (within the first few days)
- Individuals in the following categories may be at **higher risk** for serious illness :
 - 60 years of age or older
 - 18 years of age or older and are immunocompromised
 - 18 to 59 years old and at a higher risk of severe COVID-19 including having:
 - one or more underlying medical conditions (such as diabetes, heart or lung disease), or inadequate immunity against COVID-19
- Available antivirals:
 - Paxlovid, Remdesivir, Evusheld (no longer routinely recommended)

Source: Ontario. Ministry of Health. COVID-19 testing and treatment [Internet]. Toronto, ON: King's Printer for Ontario; 2023 [cited 2023 Sep 18]. Antiviral treatments. Available from: <https://www.ontario.ca/page/covid-19-testing-and-treatment#section-5>

COVID and Seasonal Respiratory Virus Testing 2023-24



Respiratory virus testing

- Facilitate the timely detection of respiratory viruses to support:
 - Early clinical intervention
 - Treatment and infection prevention and control measures
- Inform public health response strategies
- Enable the characterization of respiratory illness trends for assessing burden and program impacts
 - Trends over time
 - Viral strains
 - Geographic distribution
 - Vaccine efficacy

Respiratory virus tests in use at PHO

- SARS-CoV-2 PCR
- FLUVID: influenza A, influenza B, SARS-CoV-2 (COVID-19), and respiratory syncytial virus (RSV A + B)
- MRVP: influenza A, influenza A H3 subtype, influenza A H1 (pdm09) subtype, influenza B, respiratory syncytial virus (RSV A/B), parainfluenza (1 – 4), adenovirus, enterovirus, seasonal human coronavirus (OC43, 229E, NL63, HKU1), rhinovirus and human metapneumovirus

Outbreak testing at PHO

- Of outbreaks tested for seasonal respiratory viruses (n=3,641) at PHO during 2022-2023 season (August 28, 2022 to September 02, 2023), 1,699 (46.7%) outbreaks were positive for at least one seasonal respiratory virus
 - The most common seasonal respiratory viruses identified were: entero/rhinovirus in 17.9% (651) outbreaks, RSV in 10.7% (391) outbreaks and seasonal coronavirus in 8.1% (296) outbreaks
 - Influenza A was detected in 6.8% (249) of outbreaks and influenza B in 0.5% (19) of outbreaks
- Of outbreaks tested for SARS-CoV-2 (n=4,052), SARS-CoV-2 was identified in 2,543 (62.8%)

SARS-CoV-2 test information sheet: Updates (February 2023)

- Overall simplification of testing information with updated summary table of specimen collection methods with linked instructions
- Key changes include:
 - ‘Combined oral/oropharyngeal (buccal/throat) and nasal swabbing’ now represents:
 - Combined oral (buccal) and deep nasal swab
 - Combined swab of throat and both nares
 - ‘Saliva’ now represents:
 - Neat (funnel/straw) and mouth rinse – swish and gargle (funnel/straw)
 - Provision of expected performance ranges by specimen type

Source: Ontario Agency for Health Protection and Promotion (Public Health Ontario). Coronavirus disease 2019 (COVID-19)- PCR [Internet]. Toronto, ON: King’s Printer for Ontario; 2023 [updated 2023 Aug 2; cited 2023 Sep 18]. Available from: <https://www.publichealthontario.ca/en/Laboratory-Services/Test-Information-Index/Covid-19>

Testing Eligibility

MRVP	FLUVID
<ul style="list-style-type: none">• Symptomatic hospitalized patients (ward and ICU/CCU)• Symptomatic children (<18 years) seen in the emergency department• Symptomatic residents in institutional settings (non-outbreak)• Samples from the first four symptomatic individuals (including healthcare workers/staff) in an outbreak that requests respiratory virus testing	<ul style="list-style-type: none">• Symptomatic residents and healthcare workers/staff in institutional settings in an outbreak that request COVID-19 and respiratory virus testing beyond the first four specimens that have been tested for SARS-CoV-2 and MRVP

Testing algorithm for respiratory outbreaks

- Only the first four submitted samples from individuals associated with an outbreak are generally eligible for testing with MRVP
- Beyond the first four, other respiratory outbreak samples will be tested for Influenza, SARS-CoV-2 and RSV using the FLUVID assay
- Rapid influenza testing is performed on the first four outbreak samples submitted for respiratory virus testing, if other molecular testing cannot be performed within 24 hours

Testing for asymptomatic residents and staff testing

- Asymptomatic residents and staff in an outbreak are eligible for SARS CoV-2 testing when a COVID-19 outbreak is declared, as directed by public health
- Asymptomatic residents and staff are not tested for other non-COVID-19 respiratory viruses

Key points to ensure appropriate test assignment

- Use the **COVID-19 and Respiratory Virus Test Requisition** (not the General Requisition)
- If patient setting is not provided, the sample will **only** be tested for **SARS-CoV-2**
- Asymptomatic patients will only be tested with **SARS-CoV-2 PCR**
- **NPS is the most sensitive** sample type for respiratory virus testing
- For outbreaks or investigations, requisition must include the **assigned outbreak or investigation number**

Ontario | Ontario
COVID-19 and Respiratory Virus Test Requisition

Date received (yyyy/mm/dd): PHOL No.:

ALL Sections of this form must be completed at every visit

1 - Submitter Lab Number (if applicable): Ordering Clinician (required) Surname, First Name: OHIP/CPSO/Prof. License No.: Name of clinic/facility/health unit: Address: Postal code: Phone: Fax:	2 - Patient Information Health Card No.: Medical Record No.: Last Name: First Name: Date of Birth (yyyy/mm/dd): Sex: <input type="radio"/> M <input type="radio"/> F Address: Postal Code: Patient Phone No.: Investigation or Outbreak No.
<input type="checkbox"/> Hospital Lab (for entry into LIS) Hospital Name: Address (if different from ordering clinician): Postal Code: Phone: Fax:	3 - Travel History Travel to: Date of Travel (yyyy/mm/dd): Date of Return (yyyy/mm/dd):
<input type="checkbox"/> Other Authorized Health Care Provider: Surname, First Name: OHIP/CPSO/Prof. License No.: Name of clinic/facility/health unit: Address: Postal code: Phone: Fax:	4 - Exposure History Exposure to probable, or confirmed case? <input type="radio"/> Yes <input type="radio"/> No Exposure details: Date of symptom onset of contact (yyyy/mm/dd):
6 - Specimen Type (check all that apply) Specimen Collection Date (yyyy/mm/dd): (required)	5 - Test(s) Requested <input type="radio"/> COVID-19 Virus <input type="radio"/> Respiratory Viruses <input type="radio"/> COVID-19 Virus AND Respiratory Viruses 7 - Patient Setting Type <input type="checkbox"/> Assessment <input type="checkbox"/> Family <input type="checkbox"/> Outpatient / FR

Collection kit/molecular transport media

- Samples that are not suitable for rapid testing will be sent directly for MRVP or FLUVID testing
 - Media containing guanidine is unsuitable for influenza rapid testing
- Check the expiry dates for both collection swabs and transport media (tube), as samples collected using expired swabs or tubes will be rejected
- Make sure the sample tubes/containers are labeled properly in accordance with PHO's sample acceptance criteria to avoid rejection









Expiry extensions for COVID-19 testing products

Collection of Health Canada, Ontario Health, and product vendor letters outlining current expiry extensions for COVID-19 testing products being used in Ontario.

Rapid Testing Products

- [BD Veritor](#) 
- [ID Now](#) 
- [Panbio](#) 
- [Roche Diagnostics](#) 
- [BTNX](#) 

Lab-based PCR products

- [GDL Korea](#) 
- [Microbix](#) 
- [Trinity Biotech](#) 
- [Yocon](#) 
- [Spectrum Solutions](#) 
- [Roche Diagnostics](#) 
- [McMaster Molecular Medium](#) 
- [Copan](#) 

Source: Ontario Health. COVID-19 health system response materials [Internet]. Toronto, ON: Ontario Health; 2023 [cited 2023 Sep 18]. Available from: <https://www.ontariohealth.ca/providing-health-care/clinical-resources-education/covid-19/health-system-response-resources>

Test frequency and turnaround time (TAT)

- The TAT for influenza rapid testing is within one day after sample receipt at any PHO site
- The TAT for MRVP testing is up to four days
- FLUVID testing is performed seven days a week at PHO sites
 - TAT: 60% of results are to be completed within 24 hours and 80% to be completed within 48 hours
- TAT may vary according to geographical location and proximity to a PHO testing laboratory

Testing at PHO

Testing outside the standard PHO algorithm

- PHO can be consulted if considering additional testing, e.g. additional testing beyond the first four samples on symptomatic patients in an outbreak
- Use the General Test Requisition (and not the COVID-19 and Respiratory Virus Test Requisition) if only ordering non-COVID/seasonal respiratory virus tests
- To request additional testing in an outbreak setting, contact PHO Customer Service Centre at 416-235-6556 or 1-877-604-4567 (toll-free)

Other respiratory virus testing at PHO

- Avian influenza, novel influenza, and Flu A subtyping
- Antiviral resistance in influenza
- Middle East Respiratory Syndrome Coronavirus (MERS-CoV)
- Enterovirus D68

Testing at PHO (continued)

SARS CoV-2 whole genome sequencing

- As of February 6, 2023, SARS-COV-2 Variant of Concern (VOC) PCR will no longer be performed at PHO, as this test no longer has any clinical, epidemiological or public health utility
- SARS-COV-2 genomic surveillance weekly report

New at PHO for respiratory season 2023-2024

- Influenza and RSV whole genome sequencing (WGS):
 - Circulating strains, molecular subtyping, and surveillance
 - Antiviral resistance
 - Vaccine match
 - Influenza: early, mid, and late season WGS report
 - RSV: one time report

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For More Information About This Presentation, Contact:

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Public Health Ontario keeps Ontarians safe and healthy. Find out more at [PublicHealthOntario.ca](https://www.publichealthontario.ca)