COVID-19 Vaccine Uptake in Ontario: December 14, 2020 to October 10, 2022

This report describes vaccine uptake using data extracted from the Ontario Ministry of Health’s COVaxON application. Data in this report includes the most current information extracted from COVaxON as of October 11, 2022 at approximately 7:00 a.m., and describes vaccinations reported up to October 10, 2022. This report is updated on a bi-weekly basis.

Denominators used in coverage estimates were updated as of September 25, 2022. As a result, estimates are not comparable to those produced prior to the update (refer to the Technical Notes for the data source).

Please visit the interactive Ontario COVID-19 Data Tool to explore COVID-19 vaccination uptake data by public health unit, age group and trends over time.

Background

The COVID-19 vaccination program began in Ontario on December 14, 2020. Currently, all individuals in the province 6 months of age and older are eligible for a complete series of a Health Canada (HC) authorized COVID-19 vaccine and all individuals 5 years of age and older are eligible for a booster dose. Second booster doses are available for individuals 18 years of age and older as well as specific populations. The Moderna Spikevax™ (‘Moderna’) BA.1 Bivalent COVID-19 vaccine product became available in the fall of 2022 and is recommended as a booster dose at a 6 month interval for individuals 18 years of age and older and immunocompromised individuals 12 years of age and older.

Definition of Terms

The following definitions are used to describe vaccine uptake. As vaccine program eligibility varies by age, the definitions below are used to describe uptake among individuals 12 years of age and older. The definitions used to describe vaccine uptake among individuals under 12 years of age (and not eligible for a fall bivalent booster) are described in the Technical Notes.

Completed primary series and at least one booster dose:

- **Completed primary series and any booster dose over 6 months ago** refers to individuals that have completed their primary series and have received any number of HC-authorized COVID-19 vaccine booster doses (e.g. first booster, second booster) over 6 months ago. As 6 months or more has elapsed since their last dose, these individuals are due for an additional booster dose this fall.

- **Completed primary series and any booster dose within the previous 6 months** refers to individuals that have completed their primary series and have received any number of HC-authorized COVID-19 vaccine booster doses (e.g. first booster, second booster) within the previous 6 months. As these individuals have received a recent booster dose, they are considered up-to-date according to provincial recommendations.
Highlights

- To date in Ontario, 596,533 doses of the Moderna Bivalent BA.1 COVID-19 vaccine product have been administered among individuals 12 years of age and older (Figure 2, Table 1).

- 19.5% of individuals 12 years of age and older who completed their primary series have received a booster dose (e.g. first booster dose, second booster dose) in the previous 6 months (Figure 3, Table 2)
  
  - The proportion of individuals that completed their primary series and received a booster dose in the previous 6 months increases with age. Over 50% of adults 70 years of age and older received a booster dose in the previous 6 months.

- 37% of individuals 12 years of age and older who completed their primary series received a booster dose over 6 months ago and are now eligible for an additional booster dose.

- To date, 24.6% of children under 12 years of age have completed their primary series (Figure 4, Table 3)
  
  - 3.3% of children 5 to 11 years of age have received a first booster dose.
Doses Administered Over Time

Figure 1. Number of COVID-19 vaccine doses by dose number and date of dose administration: Ontario

Note:
1. Individuals with sixth doses include immunocompromised individuals who have received an extended 3-dose primary series and a second booster (i.e. a fifth dose).
Table 1. Doses administered by bivalent product administered among individuals 12 years of age and older: Ontario September 12, 2022 to October 10, 2022

<table>
<thead>
<tr>
<th>COVID-19 Vaccine Product</th>
<th>Age (years)</th>
<th>Dose 1</th>
<th>Dose 2</th>
<th>Dose 3</th>
<th>Dose 4</th>
<th>Dose 5</th>
<th>Dose 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Moderna Bivalent BA.1</td>
<td>12-17</td>
<td>8</td>
<td>0</td>
<td>33</td>
<td>85</td>
<td>11</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>18-29</td>
<td>763</td>
<td>195</td>
<td>2,619</td>
<td>23,333</td>
<td>623</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>30-39</td>
<td>608</td>
<td>167</td>
<td>2,604</td>
<td>43,119</td>
<td>1,616</td>
<td>13</td>
</tr>
<tr>
<td></td>
<td>40-49</td>
<td>365</td>
<td>91</td>
<td>2,008</td>
<td>50,445</td>
<td>2,345</td>
<td>22</td>
</tr>
<tr>
<td></td>
<td>50-59</td>
<td>384</td>
<td>116</td>
<td>2,306</td>
<td>74,516</td>
<td>5,732</td>
<td>45</td>
</tr>
<tr>
<td></td>
<td>60-69</td>
<td>611</td>
<td>178</td>
<td>2,619</td>
<td>53,223</td>
<td>70,792</td>
<td>228</td>
</tr>
<tr>
<td></td>
<td>70-79</td>
<td>496</td>
<td>167</td>
<td>1,984</td>
<td>35,990</td>
<td>116,879</td>
<td>201</td>
</tr>
<tr>
<td></td>
<td>80+</td>
<td>193</td>
<td>96</td>
<td>998</td>
<td>16,662</td>
<td>80,951</td>
<td>85</td>
</tr>
<tr>
<td></td>
<td>Total: 12+</td>
<td>3,428</td>
<td>1,010</td>
<td>15,171</td>
<td>297,373</td>
<td>278,949</td>
<td>602</td>
</tr>
</tbody>
</table>

Note:
1. The Moderna Bivalent BA.1 COVID-19 vaccine is authorized as a booster dose, thus it is not expected to be administered as a primary series (e.g. dose 1).
2. Children <5 years of age that received a third dose and children 5-11 years of age that received a fourth dose are likely immunocompromised individuals eligible for a 3-dose extended primary series.
Vaccination coverage

Individuals 12 years of age and older (i.e., eligible for bivalent booster)

Figure 3. Provincial coverage estimates among individuals 12 years of age and older by age group: Ontario, December 14, 2020 to October 10, 2022

[Bar chart showing vaccination coverage by age group, with color codes for series completion and any booster dose, series completion and any booster dose 6+ months ago, and series completion and no booster dose(s).]
<table>
<thead>
<tr>
<th>Age in years</th>
<th>Number of individuals: Series completion and no booster dose(s)</th>
<th>Number of individuals: Series completion and any booster dose 6+ months ago</th>
<th>Number of individuals: Series completion and any booster dose &lt;6 months ago</th>
<th>Coverage (%): Series completion and no booster dose(s)</th>
<th>Coverage (%): Series completion and any booster dose 6+ months ago</th>
<th>Coverage (%): Series completion and any booster dose &lt;6 months ago</th>
</tr>
</thead>
<tbody>
<tr>
<td>12-17</td>
<td>586,961</td>
<td>147,141</td>
<td>49,613</td>
<td>59.8</td>
<td>15</td>
<td>5.1</td>
</tr>
<tr>
<td>18-29</td>
<td>1,131,835</td>
<td>823,596</td>
<td>165,916</td>
<td>44.5</td>
<td>32.4</td>
<td>6.5</td>
</tr>
<tr>
<td>30-39</td>
<td>831,279</td>
<td>790,629</td>
<td>201,633</td>
<td>38.8</td>
<td>36.9</td>
<td>9.4</td>
</tr>
<tr>
<td>40-49</td>
<td>639,749</td>
<td>813,489</td>
<td>209,160</td>
<td>34.1</td>
<td>43.4</td>
<td>11.2</td>
</tr>
<tr>
<td>50-59</td>
<td>528,595</td>
<td>963,784</td>
<td>318,653</td>
<td>26.5</td>
<td>48.3</td>
<td>16.0</td>
</tr>
<tr>
<td>60-69</td>
<td>317,979</td>
<td>745,697</td>
<td>667,310</td>
<td>17.1</td>
<td>40.0</td>
<td>35.8</td>
</tr>
<tr>
<td>70-79</td>
<td>124,965</td>
<td>398,320</td>
<td>632,269</td>
<td>10.2</td>
<td>32.5</td>
<td>51.7</td>
</tr>
<tr>
<td>80+</td>
<td>56,204</td>
<td>246,509</td>
<td>351,013</td>
<td>8.1</td>
<td>35.7</td>
<td>50.8</td>
</tr>
<tr>
<td>Total: 12+</td>
<td>4,217,567</td>
<td>4,929,165</td>
<td>2,595,567</td>
<td>31.7</td>
<td>37.0</td>
<td>19.5</td>
</tr>
</tbody>
</table>
Individuals less than 12 years of age

Figure 4. Provincial COVID-19 vaccine coverage estimates among individuals under 12 years of age: Ontario

Note:
1. Children 0-6 months of age are included in denominators used to calculate coverage estimates, but are not eligible for COVID-19 vaccination.
Table 3. Number of individuals who received a COVID-19 vaccine and coverage estimates among individuals under 12 years of age: Ontario, December 14, 2020 to October 10, 2022

<table>
<thead>
<tr>
<th>Age in years</th>
<th>Number of individuals: Series initiation</th>
<th>Number of individuals: Series completion</th>
<th>Number of individuals: Series completion and a booster</th>
<th>Coverage (%): At least one dose</th>
<th>Coverage (%): Series completion</th>
<th>Coverage (%): Series completion and one booster</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;5</td>
<td>41,326</td>
<td>7,660</td>
<td>50</td>
<td>6.7</td>
<td>1.1</td>
<td>&lt;0.1</td>
</tr>
<tr>
<td>5-11</td>
<td>134,521</td>
<td>402,574</td>
<td>35,714</td>
<td>53.0</td>
<td>40.5</td>
<td>3.3</td>
</tr>
<tr>
<td>Total: &lt;12</td>
<td>175,847</td>
<td>410,234</td>
<td>35,764</td>
<td>34.2</td>
<td>24.6</td>
<td>2.0</td>
</tr>
</tbody>
</table>

Notes:
1. Children 0-6 months of age are included in denominators used for calculate coverage estimates, but are not eligible for COVID-19 vaccination.
2. Children <5 years of age that received a booster dose and children 5-11 years of age that received a second booster dose are likely immunocompromised individuals eligible for a 3-dose extended primary series.
Technical Notes

Definition of Terms

**Vaccine series** refers to the number of vaccine doses that are needed to complete a primary series. COVID-19 vaccine products currently approved by Health Canada have a two-dose (i.e. Moderna Spikevax, Pfizer-BioNTech Comirnaty, AstraZeneca Vaxzevria, COVISHIELD COVID-19 vaccines, Novavax Nuvaxoid, or Medicago Covifenz) or one-dose (i.e. Janssen) schedule.

**Interval** refers to the period of time (e.g. number of days) between doses. For all available COVID-19 vaccines, there is a recommended minimum number of days that an individual must wait between doses of a primary series or between booster dose(s).

**Initiated primary series** refers to individuals that have received only one dose of a two-dose COVID-19 vaccine series whether it is Health Canada (HC) authorized or not, or two doses of a non-HC authorized vaccine.

**Completed primary series** refers to individuals that have received:

- One dose of a one-dose HC-authorized vaccine product (i.e. dose one of one)
- Both doses of a two-dose HC-authorized vaccine series (i.e. dose two of two) including mixed series with HC-authorized vaccine products
- One dose of a non-HC authorized vaccine and one dose of a HC-authorized vaccine (regardless of the order)
- Three doses of a non-HC authorized vaccine product
- Or one dose of HC-authorized and two doses of non-HC-authorized products (regardless of the order).

**Completed primary series and one booster dose** refers to individuals that have completed their primary series (as per the definition above) and have received a booster dose of a HC-authorized vaccine. Note: a dose of non-HC authorized vaccine is not considered a booster dose.

**Completed primary series and two booster doses** refers to individuals that have completed their primary series (as per the definition above) and received two booster doses of a HC-authorized vaccine. Note: doses of non-HC authorized vaccines are not considered booster doses.

**Coverage estimate (at least one dose)** refers to the proportion of the population that has received at least one dose of any COVID-19 vaccine, whether it is HC-authorized or not.

**Coverage estimate (complete primary series)** refers to the proportion of the population that has completed their primary series, as per the definition above.

**Coverage estimate (complete primary series and one booster dose)** refers to the proportion of the population that has completed their primary series (as per the above definition) and received a booster dose of a HC-authorized vaccine.

**Coverage estimate (complete primary series and two booster doses)** refers to the proportion of the population that has completed their primary series (as per the definition above) and received two booster doses of a HC-authorized vaccine.
Data Sources

- COVID-19 vaccination data were based on information successfully extracted from the Ontario Ministry of Health’s COVaxON application as of October 11, 2022 at approximately 7:00 a.m.
- Ontario population estimate data were sourced from Statistics Canada. 5

Data Caveats

- Data presented may differ from other sources for various reasons, including differing extract times and methodologies for processing COVaxON data.
- COVaxON is a dynamic reporting system, which allows ongoing updates to data previously entered. As a result, data extracted from COVaxON represents a snapshot at the time of extraction and may differ from previous or subsequent reports.
- The data represent vaccination information reported in COVaxON. As a result, all counts may be subject to varying degrees of underreporting due to a variety of factors.
- Due to the expanding vaccine program, which now includes single-dose primary series and booster dose options, vaccine terminology has been updated (e.g. "fully vaccinated" has been updated to "completed primary series") and may not align with other sources. For certain populations (e.g. immunocompromised individuals) three doses are recommended to complete the primary series. Due to challenges in identifying these individuals in the COVaxON data, it was not possible to account for a three-dose primary series in the analysis, and these individuals are classified as per the definitions above.
  - Individuals with sixth doses are likely immunocompromised individuals that received an extended 3-dose primary series and a third booster (i.e. a sixth dose).
- Counts reported for doses administered will not align with the number of individuals vaccinated for the following reasons:
  - Counts for the number of doses administered in Ontario exclude doses administered out of province and from non-Ontario stock. However, individuals that received a vaccination out of province or from non-Ontario stock are included in coverage estimates
  - Counts for the number of individuals vaccinated and coverage estimates exclude individuals reported as deceased. However, doses administered to individuals later reported as deceased are included in dose counts.
  - Methods for calculating age differ when reporting on doses administered in the province and vaccinated individuals/coverage estimates. For doses administered, the date of dose administration is used to calculate age and age is interpreted as the age at the time of each dose administration. For individuals vaccinated and coverage estimates the date of data extraction is used to calculate age and age is interpreted as the individual’s current age.
  - Children 0-6 months of age are included in denominators used to calculate coverage estimates for the <5 age group. However, children 0-6 months of age not eligible for COVID-19 vaccination therefore are not included in the numerator.
Vaccination Data Processing

- Data includes clients with a dose administration record recorded in COVaxON which captures a small number of client records with a residential postal code outside of Ontario who may be eligible for vaccination on the basis of working in a high-risk setting (i.e. LTCH) in Ontario.

- Non-valid dose records are excluded. Non-valid records include doses where the status is reported as ‘entered in error’, ‘invalid’, or other similar variations, as well as doses where the status is valid (e.g. ‘administered’) but that are identified as non-valid client records (e.g. client first and last name were reported as ‘test’, ‘do not use’, ‘error’, ‘ignore’, or other similar variations).

- For missing dose administration dates and dose administration dates prior to December 14, 2020, the date the administration record was created is used as a proxy.

- Duplicate dose administration records are excluded (i.e. clients with multiple dose administration records with the same date). Duplicate dose records are identified and excluded using personal identifiers, such as health card number, name, date of birth, and postal code, where available, as well as dose administration date.

- After removing duplicate dose administration records, dose number is assigned based on the dose administration dates reported. Dose administration date is also used to determine the dose interval.

  - For clients with multiple doses reported with different administration dates, the first chronological dose is considered the first dose.

  - To determine a date for the second dose, the first subsequent date on or after the product-specific recommended minimum interval of the first dose product, with a 4-day grace period, is used. Doses administered prior to the product-specific recommended minimum interval, with a 4-day grace period, are not considered valid. For example, if there are two subsequent doses that were 7 days and 21 days from a Moderna Spikevax COVID-19 vaccine first dose, respectively, then the dose that is 21 days from the first dose is used as the second dose. Similarly, if there are two subsequent doses that are 10 days and 12 days from the first dose, respectively, then neither dose is used and the individual is not assigned a second dose. The recommended product specific minimum intervals, with a 4-day grace period, as outlined by the National Advisory Committee on Immunization (NACI) are as follows:

    - Pfizer-BioNTech Comirnaty COVID-19 vaccine: 15 days (19 days with a 4-day grace period). There is currently no maximum interval for second doses (i.e. no recommendation to restart a vaccine series regardless of the length of delay of the second dose).

    - Moderna Spikevax COVID-19 vaccine: 17 days (21 days with a 4-day grace period). There is currently no maximum interval for second doses (i.e. no recommendation to restart a vaccine series regardless of delay of second dose).

    - AstraZeneca Vaxzevria/COVISHIELD COVID-19 vaccine: 24 days (28 days with a 4-day grace period). There is currently no maximum interval for second doses (i.e. no recommendation to restart a vaccine series regardless of delay of second dose).
- Novavax Nuvaxovid™ COVID-19 vaccine: 17 days (21 days with a 4-day grace period). There is currently no maximum interval for second doses (i.e. no recommendation to restart a vaccine series regardless of delay of second dose).

- Medicago Covifenz™ COVID-19 vaccine: 17 days (21 days with a 4-day grace period). There is currently no maximum interval for second doses (i.e. no recommendation to restart a vaccine series regardless of delay of second dose).

- Janssen, Moderna Spikevax Bivalent, non-Health Canada authorized vaccine products or unspecified/missing products: 17 days (21 days with a 4-day grace period).

- To determine a date for the third dose, the first subsequent date 28 days or more after the second dose is used, regardless of the Health Canada authorized vaccine product administered for the second dose (i.e. the dose 3 interval is not product-specific). For example, if there are two subsequent doses that are 10 days and 28 days from a Pfizer Comirnaty COVID-19 vaccine second dose, respectively, then the dose that is 28 days from the second dose is used as the third dose. Similarly, if there are two subsequent doses that are 11 days and 13 days from the second dose, respectively, then neither dose is used and the individual was not assigned a third dose.

- To determine a date for the fourth dose, the first subsequent date 28 days or more after the date of the third dose is used, regardless of the Health Canada authorized vaccine product administered for the third dose (i.e. the dose 4 minimum interval is not product-specific). If multiple doses 28 days or more after the third dose are reported, then the first chronological dose after the third dose is used.

- To determine a date for the fifth dose, the first subsequent date 28 days or more after the date of the fourth dose is used, regardless of the Health Canada authorized vaccine product administered for the fourth dose (i.e. the dose 5 minimum interval is not product-specific). If multiple doses 28 days or more after the fourth dose are reported, then the first chronological dose after the fourth dose is used.

- To determine a date for the sixth dose, the first subsequent date 28 days or more after the date of the fifth dose is used, regardless of the Health Canada authorized vaccine product administered for the fifth dose (i.e. the dose 6 minimum interval is not product-specific). If multiple doses 28 days or more after the fifth dose are reported, then the first chronological date after the fifth dose is used.

- A maximum of six doses are assigned for an individual. If multiple doses 28 days or more after the second dose were reported, then the first chronological dose after the second dose was used. For example, if there were two subsequent doses that were 30 days and 33 days from a Pfizer Comirnaty COVID-19 vaccine second dose, respectively, then the dose that was 30 days from the second dose was used as the third dose.

- Only Health Canada authorised vaccine products are considered for booster doses.
• Age at the time of dose administration and age at the time of data extraction are calculated using the client date of birth and the date of dose administration or date of data extraction, respectively. Ages reported as >=120 years, <0 years, or where date of birth is missing are considered unknown. In Canada, the Pfizer-BioNTech and Moderna Spikevax COVID-19 vaccine are authorized for use in individuals aged 6 months of age and older. The AstraZeneca Vaxzevria/COVISHIELD, Janssen, Novavax, and Medicago COVID-19 vaccines are authorized for use in individuals aged 18 years and older. The Moderna Spikevax BA.1 Bivalent COVID-19 vaccine is authorized for use as a booster in individuals 18 years and older and immunocompromised individuals 12 years of age and older. The Pfizer-BioNTech BA.4/5 Bivalent COVID-19 vaccine is authorized for use as a booster in individuals 12 years of age and older. Based on expected vaccine product use as per NACI and product monographs, clients under 6 months of age that received the Pfizer-BioNTech Comirnaty and Moderna Spikevax COVID-19 vaccine, clients under 18 years of age that received the AstraZeneca Vaxzevria/COVISHIELD, Janssen, Novavax, and Medicago COVID-19 vaccines, clients under 12 years of age that received the Moderna Spikevax BA.1 Bivalent and Pfizer-BioNTech Bivalent BA.4/5 COVID-19 vaccine are considered to have unknown age.

• Clients reporting a gender of ‘Non-binary/third gender’ and ‘Other’ are combined into an ‘Other’ category. ‘Unknown’ gender included clients where gender is reported as ‘Prefer not to say’, ‘Unknown’, or where gender was missing.

Vaccination Data Analysis and Reporting

• Out of province dose administration records as well as doses administered from non-Ontario stock (e.g. doses from federal stock for populations such as the Armed Forces) are included in coverage estimates. However, out of province and non-Ontario stock dose administration records are not included in dose counts.

• Dose numbers are maintained in doses administered counts. For example, if an individual received doses 1 and 2 out of province and a third dose in Ontario, the third dose is counted as a dose 3 administered in Ontario and the first two doses are not counted as they were administered out of province.

• Clients reported as deceased are excluded when describing the number of individuals vaccinated and in coverage estimates, but are included when describing doses administered in the province.

• Age at the time of dose administration (e.g. age at dose 1, age at dose 2, etc.) is used when describing doses administered in Ontario.

• Age at the time of data extraction is used when describing the number of individuals vaccinated and in coverage estimates.

• Clients with unknown age/gender are excluded for age/gender specific analyses, but are included in provincial totals.

• Dose records where the product is reported as other/unknown/missing are excluded from product-specific analysis, but are included in provincial totals.

• Pfizer-BioNTech Comirnaty vaccine product counts include the infant and pediatric vaccine product. Moderna Spikevax COVID-19 vaccine product counts include booster and pediatric doses.
- Coverage estimates shown as 100% may represent estimates of 100% or more. Coverage estimates may be over 100% due to limitations in the vaccination data (numerator) or Ontario population estimates (denominator).

- Doses administered outside of Ontario and prior to December 14, 2020, when the vaccination program began in Ontario, are excluded from trends over time figures but are included in overall counts for calculating coverage estimates.

- Data are shown using the date of dose one administration for coverage estimates for at least one dose; the date the primary series was completed for series completion counts and coverage estimates; the date the first booster dose was received for series completion and first booster counts and coverage estimates; and the date the second booster dose was received for series completion and second booster counts and coverage estimates.
References


5. Statistics Canada. Population projections 2021-2046: Table 1 annual population estimates by age and sex for July 1, 2021 to 2046, health regions, Ontario [unpublished data table]. Ottawa, ON: Government of Canada; 2022 [received 2022 May 9].


