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SURVEILLANCE REPORT

COVID-19 Vaccine Uptake in Ontario: December 14, 2020 to April 3, 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 April 4, 2022 at approximately 7:00 a.m., and describes vaccinations reported up to April 3, 2022.

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 with a three-phased distribution plan.[1] Currently, all individuals in the province five years of age and older are eligible for a complete series of a Health Canada authorized COVID-19 vaccine and all individuals 12 years of age and older are eligible for a booster dose. Second booster doses are available for specific populations.[2,3,4]

Highlights

- Overall 81.8% (12,055,822 individuals) of the Ontario population have completed their primary series.
- 86.0% (12,053,652 individuals) of the Ontario population five years of age and older have completed their primary series.
- 48.7% (7,180,157 individuals) of the Ontario population have completed their primary series and received one booster.
    - The proportion of the population that have completed their primary series and received one booster increases with age.
    - More than 80% of Ontarians aged 70 years and older, and more than half of those aged 40 to 69, have completed their primary series and received one booster dose (Table 1).

Doses Administered Over Time

Figure 1a. Number of COVID-19 vaccine doses administered in Ontario by dose number and date

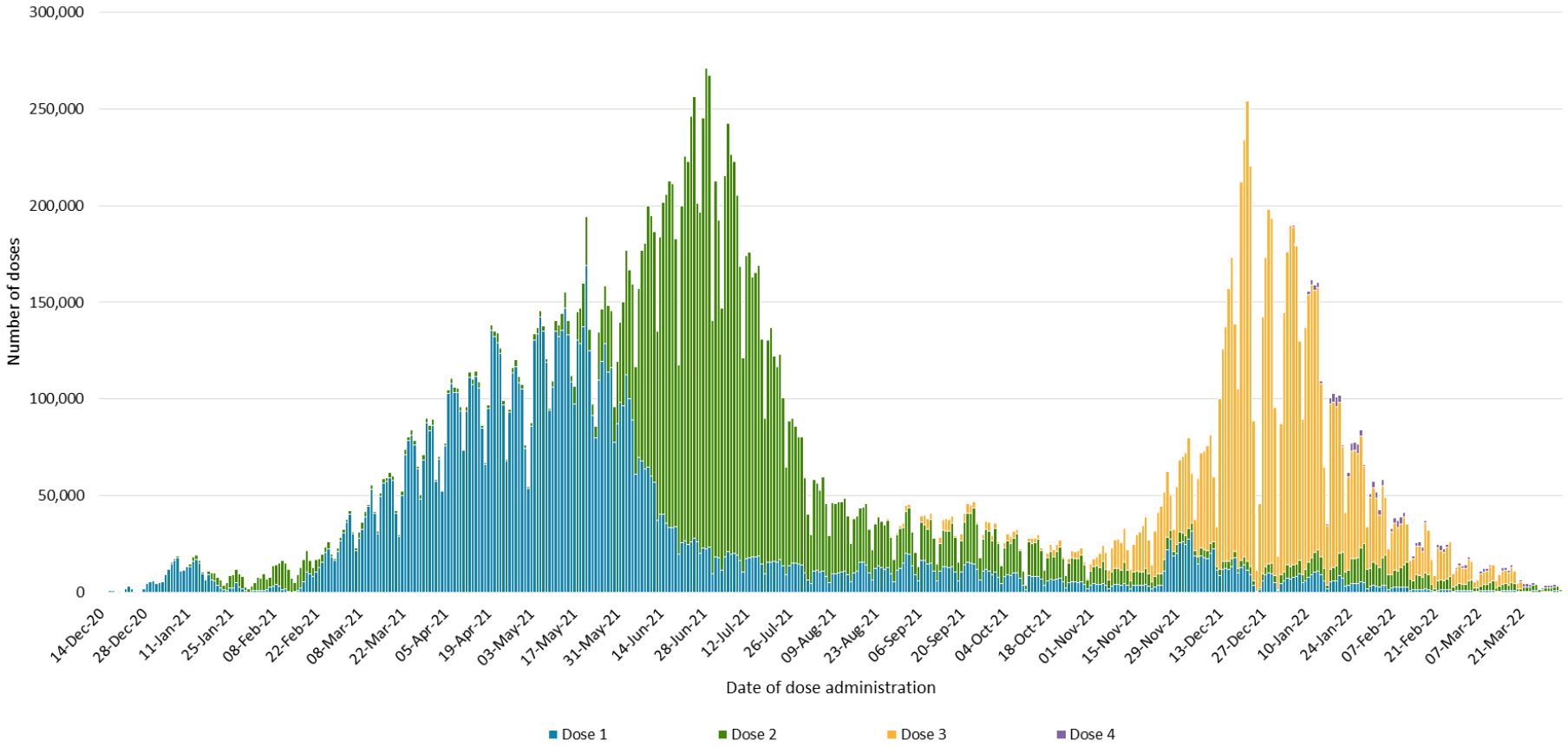
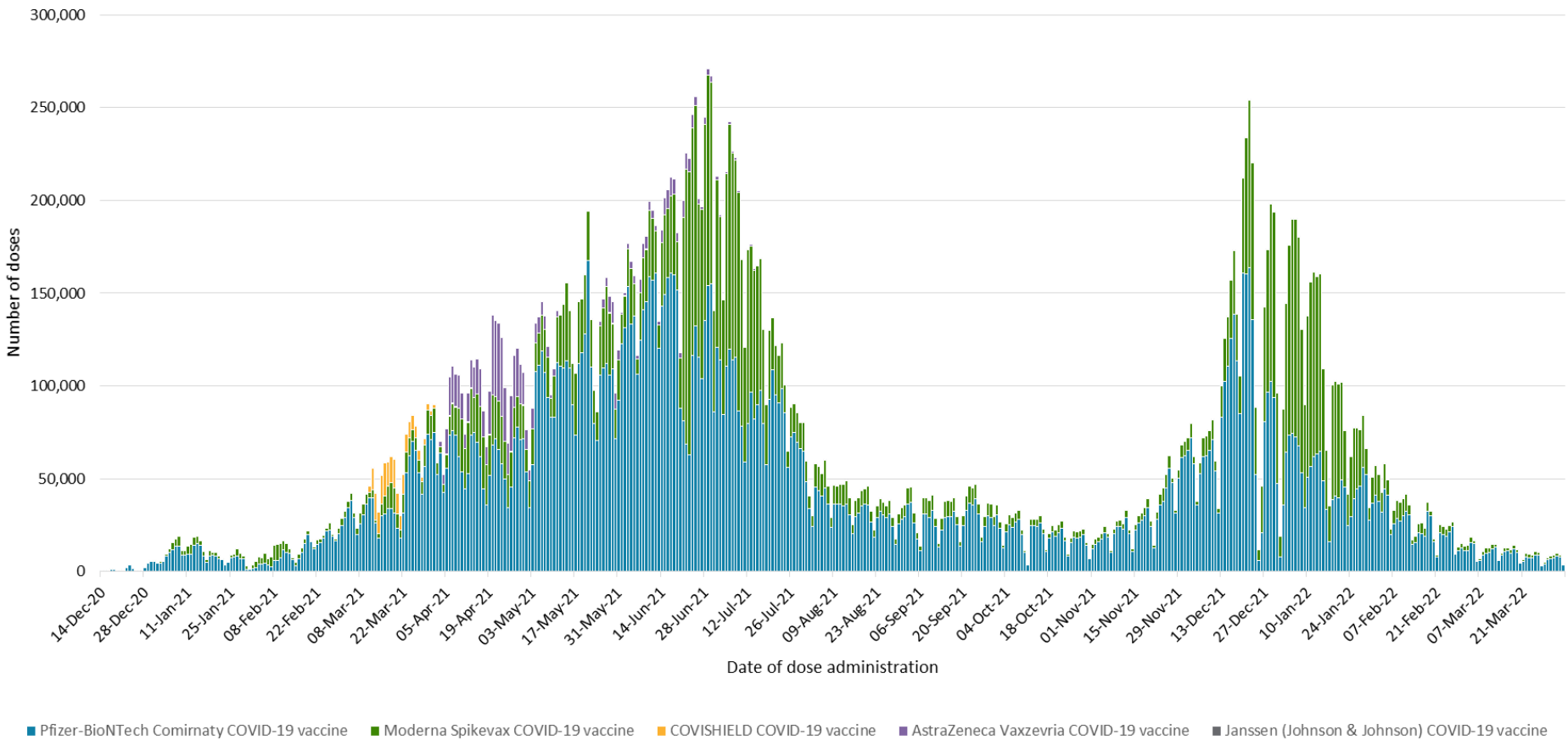


Figure 1b. Number of COVID-19 vaccine doses administered in Ontario by vaccine product and date

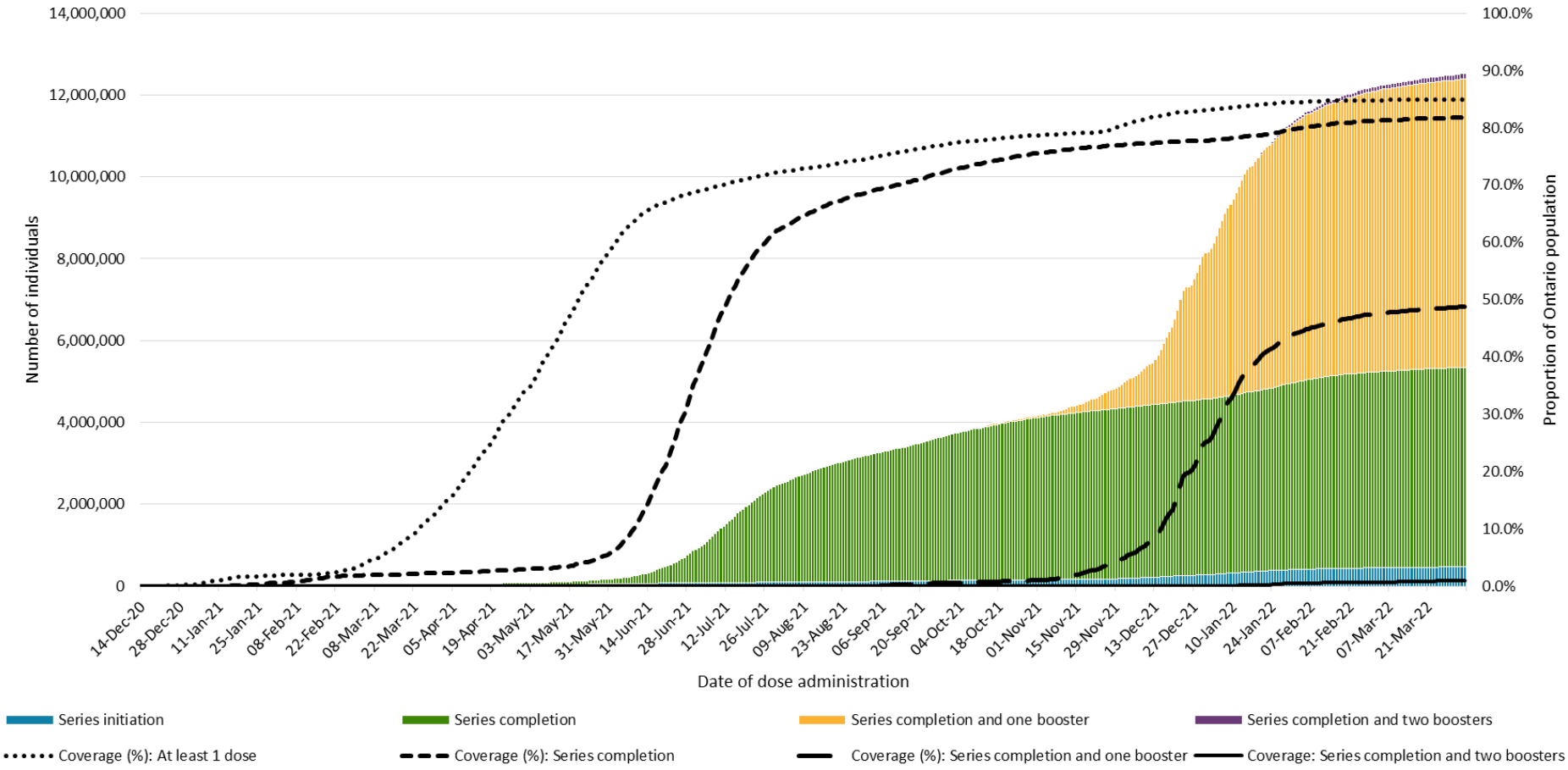


Note:

1. Pfizer-BioNTech Comirnaty COVID-19 vaccine product counts include doses of the Pfizer-BioNTech Comirnaty pediatric product.

Vaccination Coverage Over Time

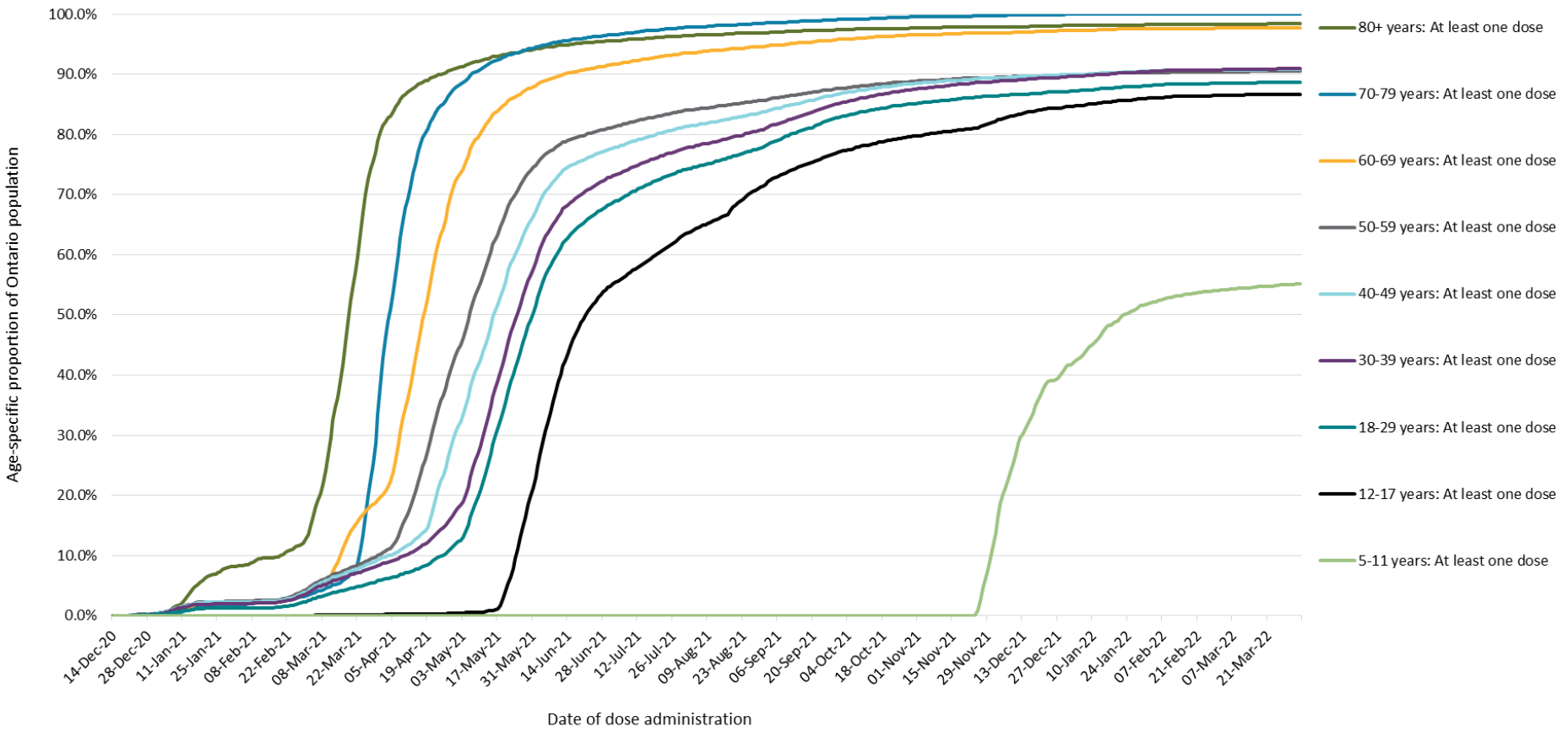
Figure 2. Cumulative number of individuals who received a COVID-19 vaccine and provincial coverage estimates by date



Notes:

1. 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.
2. 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 booster counts and coverage estimates; and the date the second booster dose was received for series completion and 2 booster counts and coverage estimates.

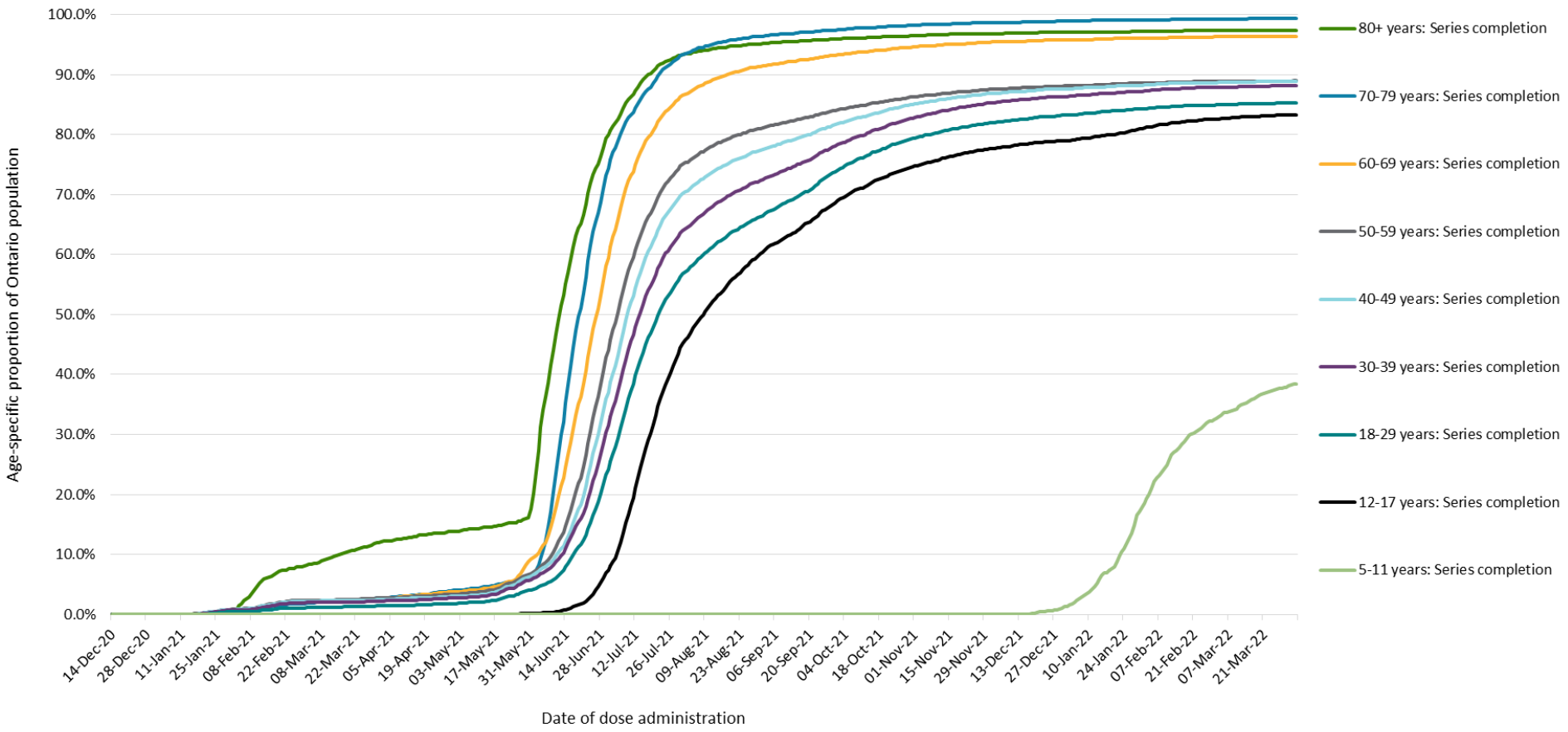
Figure 3a. Provincial COVID-19 vaccine coverage estimates for at least one dose by age group and date



Notes:

1. Coverage estimates are shown using the date of dose one administration.
2. Age-specific proportion indicates the proportion of the Ontario population within a specific age group that have received at least one dose of a COVID-19 vaccine. For example, the number of individuals that are 60-69 years of age who have received at least one dose is shown as the proportion of the Ontario population that is 60-69 years of age.
3. 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 coverage estimates.
4. 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).

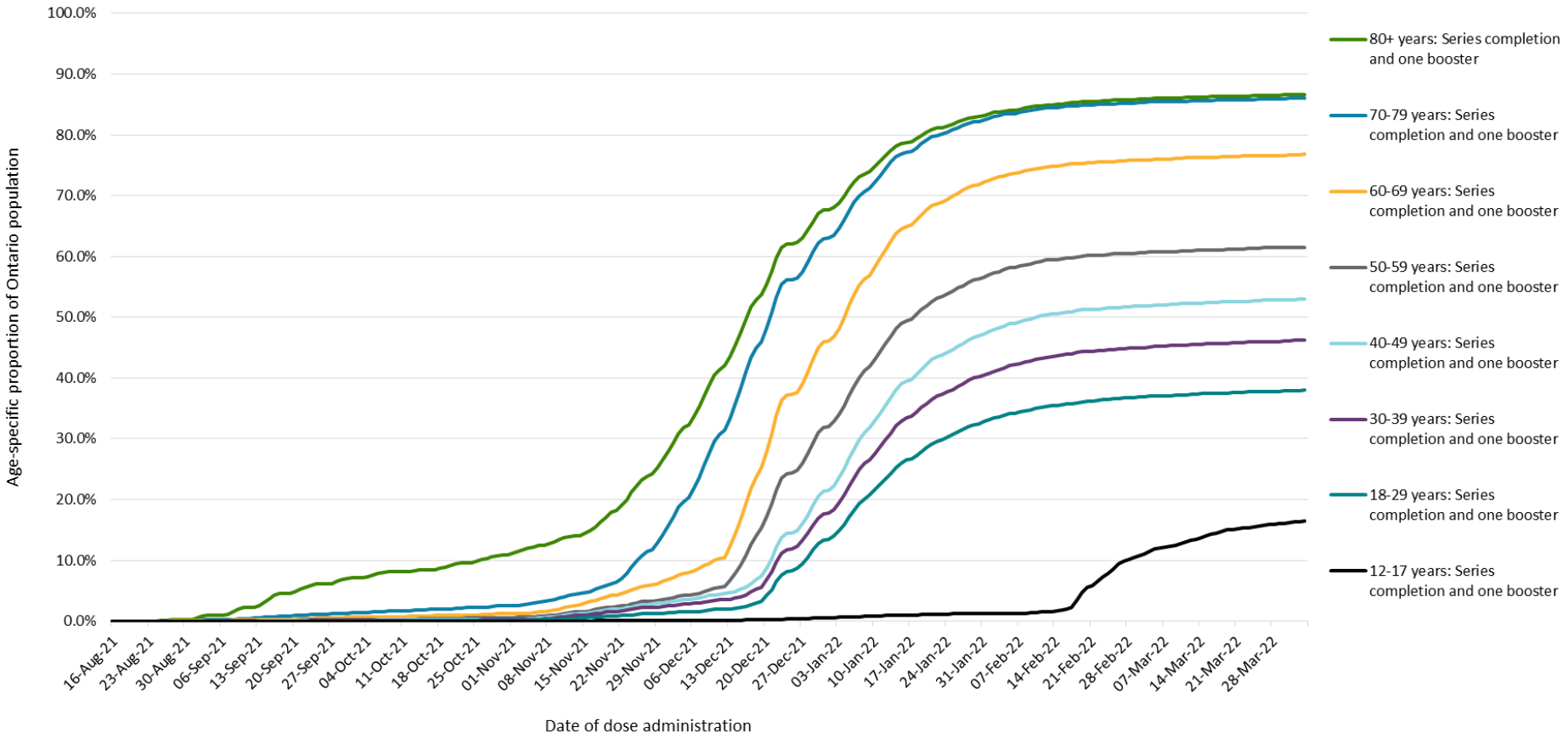
Figure 3b. Provincial COVID-19 vaccine coverage estimates for individuals that completed their primary series by age group and date



Notes:

1. Coverage estimates are shown using the date the primary series was completed.
2. Age-specific proportion indicates the proportion of the Ontario population within a specific age group that have completed their primary series. For example, the number of individuals that are 60-69 years of age who completed their primary series is shown as the proportion of the Ontario population that is 60-69 years of age.
3. 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 coverage estimates.

Figure 3c. Provincial COVID-19 vaccine coverage estimates for individuals that completed their primary series and received one booster dose by age group and date



Notes:

1. Counts are shown using the date of booster dose administration.
2. Age-specific proportion indicates the proportion of the Ontario population within a specific age group that have completed their primary series and received a booster. For example, the number of individuals that are 60-69 years of age who have completed their primary series and received a booster is shown as the proportion of the Ontario population that is 60-69 years of age.
3. 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 coverage estimates.

Vaccination Coverage by Age Group and Gender

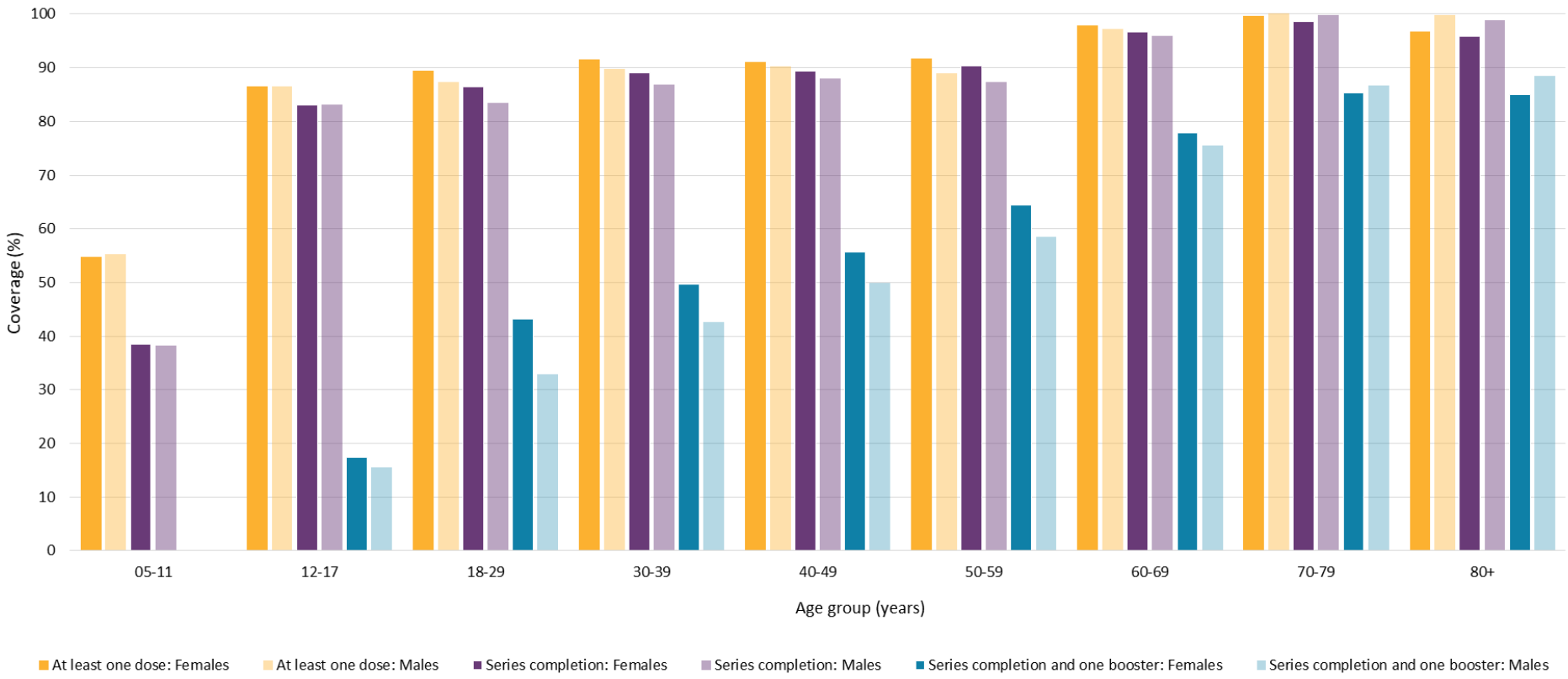
Table 1. Number of individuals who received a COVID-19 vaccine and coverage estimates by gender and age group: Ontario, December 14, 2020 to April 3, 2022

	Number of individuals: Series initiation	Number of individuals: Series completion	Number of individuals: Series completion and one booster	Number of individuals: Series completion and two boosters	Coverage (%): At least one dose	Coverage (%): Series completion	Coverage (%): Series completion and one booster	Coverage (%): Series completion and two boosters
Gender								
Female	218,754	2,314,194	3,766,927	86,512	85.7	82.7	51.7	1.2
Male	247,269	2,552,197	3,264,201	47,663	84.0	80.6	45.5	0.7
Age in years								
5 to 11	180,275	414,224	113	1	55.1	38.4	<0.1	<0.1
12 to 17	33,106	641,938	158,311	80	86.7	83.3	16.5	<0.1
18 to 29	85,400	1,173,686	942,416	1,135	88.6	85.2	38.0	<0.1
30 to 39	56,568	852,533	938,130	2,277	90.9	88.1	46.2	0.1
40 to 49	36,476	664,490	977,830	3,993	90.8	88.8	53.0	0.2
50 to 59	31,597	559,644	1,248,458	8,391	90.5	89.0	61.5	0.4
60 to 69	24,022	346,111	1,337,392	17,469	97.7	96.4	76.8	1.0
70 to 79	11,811	150,561	949,218	26,701	100.0	99.3	86.0	2.4
80 and over	6,577	70,404	493,236	74,910	98.4	97.4	86.6	11.4
Total	**467,270**	**4,875,665**	**7,045,200**	**134,957**	**85.0**	**81.8**	**48.7**	**0.9**

Notes:

1. Counts of individuals by vaccination status are mutually exclusive, but coverage estimates are not.
2. Provincial totals include individuals with unknown age and/or gender.
3. 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).

Figure 4. Provincial COVID-19 vaccine coverage estimates by vaccination status, age group and gender



Note:

1. 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).

Table 2. Number of doses administered in Ontario by product type and age group: Ontario, December 14, 2020 to April 3, 2022

Number of doses	5 to 11 years	12 to 17 years	18 to 29 years	30 to 39 years	40 to 49 years	50 to 59 years	60 to 69 years	70 to 79 years	80 years and older	Total
Pfizer-BioNTech Comirnaty COVID-19 vaccine - Dose 1	648,985	878,485	1,644,351	1,362,967	1,116,343	1,211,585	1,087,540	871,517	480,237	9,307,256
Pfizer-BioNTech Comirnaty COVID-19 vaccine - Dose 2	462,616	847,782	1,316,150	1,091,561	998,699	1,098,397	965,594	754,011	427,685	7,966,142
Pfizer-BioNTech Comirnaty COVID-19 vaccine - Dose 3	5,950	200,857	817,933	424,538	452,936	649,620	733,437	608,314	334,302	4,229,119
Pfizer-BioNTech Comirnaty COVID-19 vaccine - Dose 4	2	123	2,093	1,283	2,093	4,332	7,846	9,376	11,875	39,056
Moderna Spikevax COVID-19 vaccine - Dose 1	0	2,567	472,045	405,343	313,717	327,727	293,122	172,795	131,864	2,119,389
Moderna Spikevax COVID-19 vaccine - Dose 2	0	4,948	727,915	638,991	596,727	662,437	538,009	295,229	171,780	3,636,116
Moderna Spikevax COVID-19 vaccine - Dose 3	0	2,295	161,332	519,137	538,417	641,004	591,077	320,519	180,090	2,953,911
Moderna Spikevax COVID-19 vaccine - Dose 4	0	3	346	1,277	2,267	4,974	10,918	18,793	60,963	99,544
AstraZeneca Vaxzevria/ COVISHIELD COVID-19 vaccine - Dose 1	0	0	487	14,276	224,948	309,179	275,966	36,491	3,411	864,777
AstraZeneca Vaxzevria/ COVISHIELD COVID-19 vaccine - Dose 2	0	0	298	1,662	23,918	54,246	126,560	15,771	1,278	223,739
AstraZeneca Vaxzevria/ COVISHIELD COVID-19 vaccine - Dose 3	0	0	2	0	4	13	14	6	1	40
AstraZeneca Vaxzevria/ COVISHIELD COVID-19 vaccine - Dose 4	0	0	0	0	0	0	0	1	0	1
Janssen (Johnson & Johnson) COVID-19 vaccine - Dose 1	0	0	479	845	728	561	281	95	21	3,011
Janssen (Johnson & Johnson) COVID-19 vaccine - Dose 2	0	0	15	13	28	15	5	2	0	80
Janssen (Johnson & Johnson) COVID-19 vaccine - Dose 3	0	0	3	6	13	12	12	12	4	62

Number of doses	5 to 11 years	12 to 17 years	18 to 29 years	30 to 39 years	40 to 49 years	50 to 59 years	60 to 69 years	70 to 79 years	80 years and older	Total
Janssen (Johnson & Johnson) COVID-19 vaccine - Dose 4	0	0	0	0	0	0	0	0	0	0
Total: Dose 1	**648,985**	**881,052**	**2,117,362**	**1,783,431**	**1,655,736**	**1,849,052**	**1,656,909**	**1,080,898**	**615,533**	**12,294,433**
Total: Dose 2	**462,616**	**852,730**	**2,044,378**	**1,732,227**	**1,619,372**	**1,815,095**	**1,630,168**	**1,065,013**	**600,743**	**11,826,077**
Total: Dose 3	**5,950**	**203,152**	**979,270**	**943,681**	**991,370**	**1,290,649**	**1,324,540**	**928,851**	**514,397**	**7,183,132**
Total: Dose 4	**2**	**126**	**2,439**	**2,560**	**4,360**	**9,306**	**18,764**	**28,170**	**72,838**	**138,601**
Total: All doses	**1,117,553**	**1,937,060**	**5,143,449**	**4,461,899**	**4,270,838**	**4,964,102**	**4,630,381**	**3,102,932**	**1,803,511**	**31,442,243**

Notes:

1. Provincial totals include individuals with unknown age.
2. Total dose counts include dose records where the dose was reported as administered in Ontario but the product was other, unknown or missing.
3. Pfizer-BioNTech Comirnaty COVID-19 vaccine product counts include doses of the Pfizer-BioNTech Comirnaty pediatric product.

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 completion of a primary series and receipt of a 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 **April 4, 2022 at approximately 7:00 a.m.** for vaccination records created on or after June 1, 2021 and **March 31, 2022 at approximately 7:00 a.m**. for vaccination records created up to May 31, 2021.

- Ontario population estimate data were sourced from Statistics Canada. Population estimates 2001-2020: Table 1 annual population estimates by age and sex for July 1, 2001 to 2020, health regions, Ontario [unpublished data table]. Ottawa, ON: Government of Canada; 2021 [received April 22, 2021].

Data Caveats

- 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.

- 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 1 administration is used and age is interpreted as the age at the time of dose 1 administration. For individuals vaccinated and coverage estimates the date of data extraction is used and age is interpreted as the individual's current age.

- 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. As a result, the counts reported for doses administered will not align with the number of individuals immunized.

    - In order to describe the individuals currently vaccinated in Ontario, 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: Vaccination Data

- Data presented may differ from other sources for various reasons, including differing extract times and methodologies for processing COVaxON data. Further details pertaining to the methodology for this report are described below.

- Data includes clients with a dose administration record recorded in COVaxON which includes 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.

- 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.

- Out of province dose administration records 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 reported 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.

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

- Dose administration date was used to determine the dose number (e.g. the first chronological dose was considered dose 1) as well as the dose interval (e.g. number of days from first to second dose).

- Non-valid dose records were excluded. Non-valid records included doses where the status was reported as ‘entered in error’, ‘invalid’, or other similar variations, as well as doses where the status was valid (e.g. ‘administered’) but that were 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).

- Duplicate dose administration records were excluded (i.e. clients with multiple dose administration records with the same date). Duplicate dose records were 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 1, dose 2, and dose 3 were assigned based on the dose administration dates reported.

    - For clients with multiple doses reported with different administration dates, the first chronological dose was 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, was used. Doses administered prior to the product-specific recommended minimum interval, with a 4-day grace period, were not considered valid. For example, if there were two subsequent doses that were 7 days and 21 days from a Moderna Spikevax COVID-19 vaccine first dose, respectively, then the dose that was 21 days from the first dose was used as the second dose. Similarly, if there were two subsequent doses that were 10 days and 12 days from the first dose, respectively, then neither dose was used and the individual was 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).[5] 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).[5] 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).[5] 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).[5] 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).[5] There is currently no maximum interval for second doses (i.e. no recommendation to restart a vaccine series regardless of delay of second dose).

    - Non-Health Canada authorized products or unspecified 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 was used, regardless of the vaccine product of the second dose (i.e. the dose 3 interval was not product-specific). For example, if there were two subsequent doses that were 10 days and 28 days from a Pfizer Comirnaty COVID-19 vaccine second dose, respectively, then the dose that was 28 days from the second dose was used as the third dose. Similarly, if there were two subsequent doses that were 11 days and 13 days from the second dose, respectively, then neither dose was 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 was used, regardless of the vaccine product of the third dose (i.e. the dose 4 minimum interval was 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.

- A maximum of four doses were 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.

- Age at the time of dose 1 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.
    - Age at the time of dose 1 administration and age at the time of data extraction were calculated using the client date of birth and the date of dose 1 administration or date of data extraction, respectively. Ages reported as >=120 years, <0 years, or where date of birth was missing were considered unknown. In Canada, the Pfizer-BioNTech Comirnaty COVID-19 vaccine is authorized for use in individuals 5 and older. The Moderna Spikevax COVID-19 vaccine is authorized for use in individuals aged 12 years and older. The AstraZeneca Vaxzevria/COVISHIELD COVID-19, Janssen, Novavax, and Medicago vaccines are authorized for use in individuals aged 18 years and older.[6-7] Based on expected vaccine product use as per NACI and product monographs, clients under 12 years of age that received the Moderna Spikevax COVID-19 vaccine, and clients under 18 years of age that received the AstraZeneca Vaxzevria/COVISHIELD COVID-19, Janssen, Novavax, and Medicago vaccines, were also considered to have unknown age.
- Clients reporting a gender of 'Non-binary/third gender' and 'Other' were combined into an 'Other' category. 'Unknown' gender included clients where gender was reported as 'Prefer not to say', 'Unknown', or where gender was missing.
- Organization postal code and public health unit were assigned using institution-specific IDs.
- Postal code of residence was extracted from the client residential address. For clients where the public health unit of residence was not reported and the postal code of residence was available, the postal code of residence was used to assign clients to a public health unit of residence.

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