

## RÉSUMÉ ÉPIDÉMIOLOGIQUE DÉTAILLÉ

# Surveillance génomique du nouveau variant BA.2.20 du SRAS-CoV-2 en Ontario

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## Introduction

Le présent résumé reflète les cas de la nouvelle sous-lignée BA.2.20 du SRAS-CoV-2 relevés par séquençage du génome entier (SGE) par Santé publique Ontario (SPO) en date du 28 avril 2022, et par les laboratoires partenaires du Réseau génomique COVID-19 de l'Ontario (RGCO) en date du 27 avril 2022. Le RGCO effectue un SGE d'échantillons de SRAS-CoV-2 choisis au hasard dans le cadre des activités de surveillance génomique représentative, ainsi qu'un séquençage ciblé d'échantillons spécifiques.

## Contexte

Le génome du SRAS-CoV-2, le virus à l'origine de la COVID-19, subit fréquemment des modifications alors qu'il se propage dans la population. L'accumulation de ces mutations génomiques peut provoquer l'apparition de nouvelles sous-lignées du virus, ce qui se produit couramment. La séquence du génome de chacune de ces nouvelles sous-lignées, ou variants, diffère légèrement. Il n'y a aucune différence dans la capacité de transmission ou de causer une maladie pour bon nombre de ces variants, mais certains peuvent être plus virulents, plus transmissibles, et/ou permettre au virus d'échapper à la défense immunitaire acquise naturellement ou par la vaccination.

Le variant préoccupant du SRAS-CoV-2 B.1.1.529 (Omicron) est apparu en Afrique du Sud à la fin de novembre 2021. Il s'est rapidement propagé partout dans le monde et a délogé le B.1.617.2 (Delta) comme lignée dominante dans de nombreux pays<sup>1,2</sup>. En date du 4 mai 2022, de nombreuses sous-lignées de B.1.1.529 (Omicron) ont été identifiées par séquençage du génome entier, dont BA.1, BA.2, BA.3, BA.4 et BA.5<sup>3</sup>. La sous-lignée BA.2 a plus précisément été recensée dans au moins 118 pays, y compris au Canada et aux États-Unis<sup>4</sup>. Les sous-lignées BA.2 (90,7 %) et BA.1.1 (8,7 %) étaient les plus prévalentes en Ontario en date du 16 avril 2022. Au cours des 12 dernières semaines, le taux de croissance hebdomadaire de BA.2 a été 1,67 fois supérieur à celui de BA.1.1<sup>5</sup>.

Une nouvelle sous-lignée de BA.2 se propage de plus en plus, principalement en Ontario et dans quelques États américains<sup>6</sup>. Le groupe de désignation Pango a nommé cette sous-lignée BA.2.20 le 19 avril 2022. Elle se distingue de la lignée parente BA.2 par deux mutations majeures supplémentaires. La première se trouve dans le gène S; le nucléide A22005C provoque un changement de l'acide-amino. La deuxième se trouve quant à elle dans le gène C28498T, qui n'entraîne pas de changement de l'acide-amino. Les conséquences de ces mutations sur la transmission, le risque de maladie grave, la réinfection et l'infection post-vaccinale ne sont pas connues à l'heure actuelle.

Pour les fins de ce rapport, la présence de la mutation N148T dans la protéine S a été utilisée comme marqueur intermédiaire pour identifier les cas de BA.2.20, car la mise à niveau des outils de bioinformatique sont en cours. Environ 99 % des génomes de BA.2 séquencés contiennent à la fois les mutations N148T et C28498T, selon les données de séquençage du génome entier de SPO.

La mutation N148T a été observée dans d'autres lignées du SRAS-CoV-2, soit B.1.636, B.1.1.343, B.1.1.63, B.1.556, B.1.1.462, B.56, B.1.81, B.1.1.7 et AL.1 dans une faible proportion (< 1,0 %)7. Le rôle de cette mutation dans ces lignées n'a fait l'objet d'aucune enquête dans les rapports précédents. D'autres études sont requises pour connaître l'importance fonctionnelle de la mutation N148T.

## Faits saillants

- La nouvelle sous-lignée BA.2.20 du SRAS-CoV-2 croît principalement en Ontario. Cette croissance concertée dans une région précise a mené à sa désignation officielle par le groupe Pango.
- La proportion des cas de BA.2.20 est demeurée stable dans les quatre dernières semaines, à environ 5,5 %.
- Neuf cent quatre-vingt-seize cas de BA.2.20 ont été identifiés jusqu'ici en Ontario.
  - L'échantillon du premier cas a été prélevé le 14 février 2022.
- La plus grande proportion de cas de BA.2.20 a été recensée chez les 20-39 ans (38,9 %), suivis des 40-59 ans (30,9 %).
- Les deux bureaux de santé publique ayant enregistré les plus grands nombres de cas de BA.2.20 ont été ceux de Toronto (18,8 %) et de Middlesex-London (12,7 %).
- Au total, 1,9 % des cas de BA.2.20 ont été recensés dans le cadre du programme de dépistage aux frontières de l'Agence de santé publique du Canada.
- La plupart des cas ont été dépistés chez les personnes qui avaient reçu une dose de rappel (62,0 %) et celles qui avaient complété leur série de vaccins (23,0 %).
- Le RGCO va continuer de suivre la croissance et les caractéristiques de BA.2.20 au moyen de la surveillance génomique.

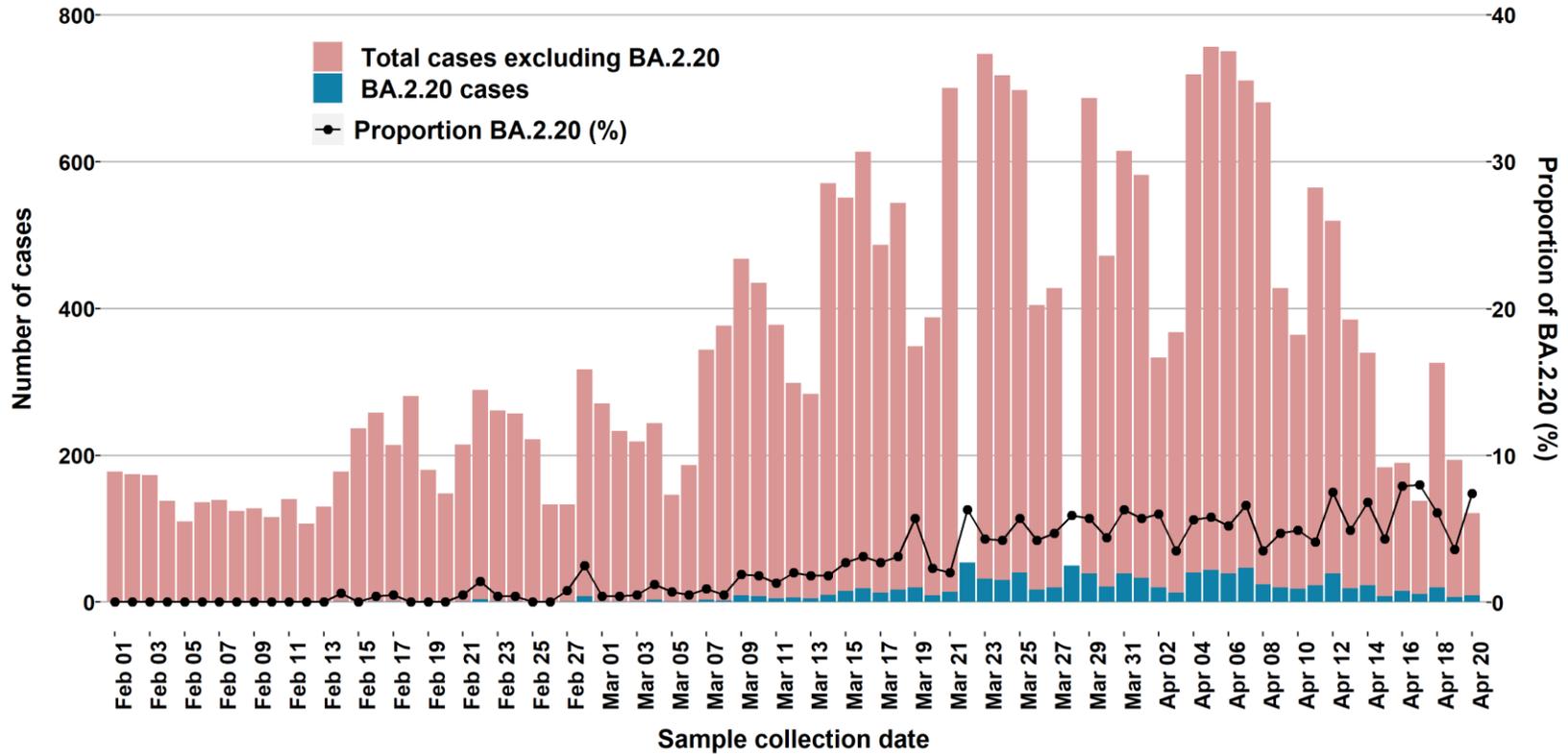
Ce rapport tient compte de tous les cas séquencés par le RGCO, indépendamment de la raison du séquençage (c.-à-d. surveillance représentative, voyage international, enquête sur une éclosion, demande spéciale, etc.). L'admissibilité aux tests est actuellement restreinte aux populations à risque élevé. Par conséquent, les proportions ne sont pas représentatives de l'ensemble des cas de BA.2 dans la province.

Consultez le [rapport hebdomadaire sur le séquençage du génome entier du SRAS-CoV-2](#) pour connaître les proportions selon la surveillance représentative. Veuillez prendre note que le BA.2.20 pourrait ne pas être inclus dans ce rapport hebdomadaire car les outils de désignation de la lignée sont en cours de mise à jour.

Les cas de BA.2.20 ne peuvent tous être recensés et inclus dans ce rapport car seule une proportion des échantillons est séquencée.

# Epidemic Curve

**Figure 1: Number and proportion of BA.2.20 cases among all sequenced cases by sample collection date, Ontario, February 1 to April 20, 2022**



**Note:** Results may not be representative of Ontario overall. Total cases in this figure includes all lineages except for BA.2.20. Not all BA.2.20 cases in Ontario would have been detected in this time period as only a proportion of samples are sequenced. Details on the proportion of eligible samples sequenced by the OCGN can be found in the technical notes. Not all sequencing and bioinformatics analyses for recent weeks were complete at the time of data extraction. As such, the total cases sequenced for recent weeks will increase over time.

**Data source:** PHO, The Hospital for Sick Children, Kingston Health Sciences Centre, Shared Hospital Laboratory, Hamilton Regional Laboratory Medicine Program

**Table 1: Number of BA.2.20 and all sequenced cases, and proportion of BA.2.20 cases by week, Ontario, February 1 to April 20, 2022**

Week	BA.2.20 cases	Total cases	Proportion BA.2.20
February 1 - March 26, 2022	355	16,629	2.1%
Week 13 (March 27 to April 2)	222	3,965	5.6%
Week 14 (April 3 to April 9)	227	4,415	5.1%
Week 15 (April 10 to April 16)	145	2,548	5.7%
Week 16 (April 17 to April 20*)	47	804	5.8%
<b>Total</b>	<b>996</b>	<b>28,091</b>	<b>3.5%</b>

**Note:** \*Partial week, week 16 is from April 17 to 23.

Results may not be representative of Ontario overall. Not all BA.2.20 cases in Ontario would have been detected in this time period as only a proportion of samples are sequenced. Not all sequencing and bioinformatics analyses for recent weeks were complete at the time of data extraction. As such, the total cases sequenced for recent weeks will increase over time.

**Data source:** PHO, The Hospital for Sick Children, Kingston Health Sciences Centre, Shared Hospital Laboratory, Hamilton Regional Laboratory Medicine Program

## Sex and Age Group

**Table 2: Number and percentage (column %) of BA.2.20 cases by sex and age group, Ontario, February 1 to April 20, 2022**

Sex/Age group	February 1 - March 26, 2022	Week 13 (March 27 to April 2)	Week 14 (April 3 to April 9)	Week 15 (April 10 to April 16)	Week 16 (April 17 to April 20*)	Total
Sex: Female	215 (60.6%)	120 (54.1%)	131 (57.7%)	88 (60.7%)	27 (57.4%)	581 (58.3%)
Sex: Male	137 (38.6%)	101 (45.5%)	93 (41.0%)	57 (39.3%)	19 (40.4%)	407 (40.9%)
Sex: Unknown	3 (0.8%)	1 (0.5%)	3 (1.3%)	0 (0.0%)	1 (2.1%)	8 (0.8%)
Ages: 0-4	8 (2.3%)	6 (2.7%)	6 (2.6%)	3 (2.1%)	1 (2.1%)	24 (2.4%)
Ages: 5-11	10 (2.8%)	4 (1.8%)	12 (5.3%)	1 (0.7%)	0 (0.0%)	27 (2.7%)
Ages: 12-19	28 (7.9%)	14 (6.3%)	8 (3.5%)	6 (4.1%)	1 (2.1%)	57 (5.7%)
Ages: 20-39	136 (38.3%)	95 (42.8%)	91 (40.1%)	52 (35.9%)	13 (27.7%)	387 (38.9%)
Ages: 40-59	121 (34.1%)	59 (26.6%)	69 (30.4%)	43 (29.7%)	16 (34.0%)	308 (30.9%)
Ages: 60-79	38 (10.7%)	32 (14.4%)	27 (11.9%)	23 (15.9%)	7 (14.9%)	127 (12.8%)
Ages: 80 and over	14 (3.9%)	12 (5.4%)	14 (6.2%)	17 (11.7%)	9 (19.1%)	66 (6.6%)
Total cases	355 (100%)	222 (100%)	227 (100%)	145 (100%)	47 (100%)	996 (100%)

**Note:** \*Partial week, week 16 is from April 17 to 23.

Sex was assigned based on the sex field in CCM. If a case did not link to CCM (1.2%), or if sex was missing in CCM, sex was treated as unknown. Age was calculated based on sample collection date and birth date provided by the OCGN submitter. Birth date from CCM was used if birth date was not provided by the OCGN submitter. If birth date was missing in CCM, age was treated as unknown. If sample collection date was missing, login date was used. Results may not be representative of Ontario overall. Not all BA.2.20 cases in Ontario would have been detected in this time period as only a proportion of samples are sequenced. Not all sequencing and bioinformatics analyses for recent weeks were complete at the time of data extraction. As such, the total cases sequenced for recent weeks will increase over time.

**Data source:** PHO, The Hospital for Sick Children, Kingston Health Sciences Centre, Shared Hospital Laboratory, Hamilton Regional Laboratory Medicine Program, CCM

## Geography

**Table 3: Number and percentage (column %) of BA.2.20 cases by public health unit and week, Ontario, February 1 to April 20, 2022**

Region/Public Health Unit	February 1 - March 26, 2022	Week 13 (March 27 to April 2)	Week 14 (April 3 to April 9)	Week 15 (April 10 to April 16)	Week 16 (April 17 to April 20*)	Total
Northwestern Health Unit	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
Thunder Bay District Health Unit	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
TOTAL NORTH WEST	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
Algoma Public Health	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
North Bay Parry Sound District Health Unit	0 (0.0%)	1 (0.5%)	0 (0.0%)	4 (2.8%)	0 (0.0%)	5 (0.5%)
Porcupine Health Unit	1 (0.3%)	0 (0.0%)	1 (0.4%)	0 (0.0%)	0 (0.0%)	2 (0.2%)
Public Health Sudbury & Districts	2 (0.6%)	0 (0.0%)	0 (0.0%)	1 (0.7%)	0 (0.0%)	3 (0.3%)
Timiskaming Health Unit	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
TOTAL NORTH EAST	3 (0.8%)	1 (0.5%)	1 (0.4%)	5 (3.4%)	0 (0.0%)	10 (1.0%)
Ottawa Public Health	3 (0.8%)	2 (0.9%)	2 (0.9%)	9 (6.2%)	14 (29.8%)	30 (3.0%)
Eastern Ontario Health Unit	0 (0.0%)	5 (2.3%)	3 (1.3%)	1 (0.7%)	1 (2.1%)	10 (1.0%)
Hastings Prince Edward Public Health	2 (0.6%)	4 (1.8%)	0 (0.0%)	3 (2.1%)	0 (0.0%)	9 (0.9%)

Region/Public Health Unit	February 1 - March 26, 2022	Week 13 (March 27 to April 2)	Week 14 (April 3 to April 9)	Week 15 (April 10 to April 16)	Week 16 (April 17 to April 20*)	Total
Kingston, Frontenac and Lennox & Addington Public Health	3 (0.8%)	5 (2.3%)	2 (0.9%)	3 (2.1%)	1 (2.1%)	14 (1.4%)
Leeds, Grenville & Lanark District Health Unit	1 (0.3%)	1 (0.5%)	1 (0.4%)	1 (0.7%)	2 (4.3%)	6 (0.6%)
Renfrew County and District Health Unit	2 (0.6%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	2 (0.2%)
<b>TOTAL EASTERN</b>	<b>11 (3.1%)</b>	<b>17 (7.7%)</b>	<b>8 (3.5%)</b>	<b>17 (11.7%)</b>	<b>18 (38.3%)</b>	<b>71 (7.1%)</b>
Durham Region Health Department	7 (2.0%)	8 (3.6%)	8 (3.5%)	8 (5.5%)	2 (4.3%)	33 (3.3%)
Haliburton, Kawartha, Pine Ridge District Health Unit	2 (0.6%)	0 (0.0%)	2 (0.9%)	1 (0.7%)	0 (0.0%)	5 (0.5%)
Peel Public Health	20 (5.6%)	12 (5.4%)	13 (5.7%)	8 (5.5%)	2 (4.3%)	55 (5.5%)
Peterborough Public Health	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (0.7%)	3 (6.4%)	4 (0.4%)
Simcoe Muskoka District Health Unit	16 (4.5%)	16 (7.2%)	17 (7.5%)	7 (4.8%)	1 (2.1%)	57 (5.7%)
York Region Public Health	21 (5.9%)	16 (7.2%)	16 (7.0%)	6 (4.1%)	0 (0.0%)	59 (5.9%)
<b>TOTAL CENTRAL EAST</b>	<b>66 (18.6%)</b>	<b>52 (23.4%)</b>	<b>56 (24.7%)</b>	<b>31 (21.4%)</b>	<b>8 (17.0%)</b>	<b>213 (21.4%)</b>
Toronto Public Health	68 (19.2%)	47 (21.2%)	32 (14.1%)	33 (22.8%)	7 (14.9%)	187 (18.8%)
<b>TOTAL TORONTO</b>	<b>68 (19.2%)</b>	<b>47 (21.2%)</b>	<b>32 (14.1%)</b>	<b>33 (22.8%)</b>	<b>7 (14.9%)</b>	<b>187 (18.8%)</b>
Chatham-Kent Public Health	6 (1.7%)	3 (1.4%)	7 (3.1%)	5 (3.4%)	0 (0.0%)	21 (2.1%)

Region/Public Health Unit	February 1 - March 26, 2022	Week 13 (March 27 to April 2)	Week 14 (April 3 to April 9)	Week 15 (April 10 to April 16)	Week 16 (April 17 to April 20*)	Total
Grey Bruce Health Unit	4 (1.1%)	2 (0.9%)	5 (2.2%)	1 (0.7%)	1 (2.1%)	13 (1.3%)
Huron Perth Public Health	16 (4.5%)	4 (1.8%)	0 (0.0%)	1 (0.7%)	1 (2.1%)	22 (2.2%)
Lambton Public Health	11 (3.1%)	5 (2.3%)	5 (2.2%)	4 (2.8%)	1 (2.1%)	26 (2.6%)
Middlesex-London Health Unit	71 (20.0%)	19 (8.6%)	22 (9.7%)	14 (9.7%)	0 (0.0%)	126 (12.7%)
Southwestern Public Health	19 (5.4%)	11 (5.0%)	8 (3.5%)	2 (1.4%)	1 (2.1%)	41 (4.1%)
Windsor-Essex County Health Unit	14 (3.9%)	3 (1.4%)	4 (1.8%)	0 (0.0%)	1 (2.1%)	22 (2.2%)
<b>TOTAL SOUTH WEST</b>	<b>141 (39.7%)</b>	<b>47 (21.2%)</b>	<b>51 (22.5%)</b>	<b>27 (18.6%)</b>	<b>5 (10.6%)</b>	<b>271 (27.2%)</b>
Brant County Health Unit	6 (1.7%)	4 (1.8%)	11 (4.8%)	5 (3.4%)	0 (0.0%)	26 (2.6%)
City of Hamilton Public Health Services	3 (0.8%)	9 (4.1%)	33 (14.5%)	9 (6.2%)	1 (2.1%)	55 (5.5%)
Haldimand-Norfolk Health Unit	6 (1.7%)	5 (2.3%)	1 (0.4%)	0 (0.0%)	4 (8.5%)	16 (1.6%)
Halton Region Public Health	13 (3.7%)	12 (5.4%)	1 (0.4%)	5 (3.4%)	4 (8.5%)	35 (3.5%)
Niagara Region Public Health	12 (3.4%)	7 (3.2%)	14 (6.2%)	3 (2.1%)	0 (0.0%)	36 (3.6%)
Region of Waterloo Public Health and Emergency Services	12 (3.4%)	17 (7.7%)	13 (5.7%)	9 (6.2%)	0 (0.0%)	51 (5.1%)
Wellington-Dufferin-Guelph Public Health	14 (3.9%)	4 (1.8%)	6 (2.6%)	1 (0.7%)	0 (0.0%)	25 (2.5%)
<b>TOTAL CENTRAL WEST</b>	<b>66 (18.6%)</b>	<b>58 (26.1%)</b>	<b>79 (34.8%)</b>	<b>32 (22.1%)</b>	<b>9 (19.1%)</b>	<b>244 (24.5%)</b>

Region/Public Health Unit	February 1 - March 26, 2022	Week 13 (March 27 to April 2)	Week 14 (April 3 to April 9)	Week 15 (April 10 to April 16)	Week 16 (April 17 to April 20*)	Total
UNKNOWN	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
TOTAL ONTARIO	355 (100%)	222 (100%)	227 (100%)	145 (100%)	47 (100%)	996 (100%)

**Note:** \*Partial week, week 16 is from April 17 to 23.

Results may not be representative of Ontario overall. Public health unit was assigned based on diagnosing health unit in CCM. If a case did not link to CCM (1.2%), OCGN patient postal code was used. Ordering provider postal code was used if patient postal code was missing. Not all BA.2.20 cases in Ontario would have been detected in this time period as only a proportion of samples are sequenced. Not all sequencing and bioinformatics analyses for recent weeks were complete at the time of data extraction. As such, the total cases sequenced for recent weeks will increase over time.

**Data source:** PHO, The Hospital for Sick Children, Kingston Health Sciences Centre, Shared Hospital Laboratory, Hamilton Regional Laboratory Medicine Program, CCM

## Border testing

**Table 4: Number and percentage (column %) of BA.2.20 cases detected through Public Health Agency of Canada's border testing program and sequenced at Public Health Ontario, Ontario, February 1 to April 20, 2022**

Cases	February 1 - March 26, 2022	Week 13 (March 27 to April 2)	Week 14 (April 3 to April 9)	Week 15 (April 10 to April 16)	Week 16 (April 17 to April 20*)	Total
Border testing	11 (3.1%)	3 (1.4%)	2 (0.9%)	3 (2.1%)	0 (0.0%)	19 (1.9%)
Non-border testing/Unknown	344 (96.9%)	219 (98.6%)	225 (99.1%)	142 (97.9%)	47 (100%)	977 (98.1%)
Total cases	355 (100%)	222 (100%)	227 (100%)	145 (100%)	47 (100%)	996 (100%)

**Note:** \*Partial week, week 16 is from April 17 to 23.

Please refer to [COVID-19 testing for travellers](#) for more details on the border testing program led by the Public Health Agency of Canada. This does not include BA.2.20 border cases sequenced by Public Health Agency of Canada at laboratories other than PHO. Not all sequencing and bioinformatics analyses for recent weeks were complete at the time of data extraction. As such, the total cases sequenced for recent weeks will increase over time.

**Data source:** PHO, The Hospital for Sick Children, Kingston Health Sciences Centre, Shared Hospital Laboratory, Hamilton Regional Laboratory Medicine Program

## Severity

**Table 5: Number and percentage (column %) of BA.2.20 and BA.2 cases by severity, Ontario, February 1 to April 20, 2022**

Severity	BA.2.20 cases	BA.2 cases excluding BA.2.20
Ever hospitalized	30 (3.0%)	474 (3.1%)
Deceased	0 (0.0%)	39 (0.3%)
<b>Total cases</b>	<b>984 (100%)</b>	<b>15,261 (100%)</b>

**Note:** Results may not be representative of Ontario overall. BA.2 cases include all BA.2 sub-lineages except for BA.2.20. Cases include only those that linked to CCM (98.8% and 97.0% respectively for BA.2.20 and BA.2 cases). Hospitalized cases include cases that reported hospitalization at time of data extraction. Deceased cases include cases that reported a “Fatal” outcome and the type of death value in CCM was not ‘DOPHS was unrelated to cause of death’ or ‘Under PHU Review’ at the time of data extraction. Not all BA.2.20 and BA.2 cases in Ontario would have been detected in this time period as only a proportion of samples are sequenced. Not all sequencing and bioinformatics analyses for recent weeks were complete at the time of data extraction. As such, the total cases sequenced for recent weeks will increase over time.

**Data source:** PHO, The Hospital for Sick Children, Kingston Health Sciences Centre, Shared Hospital Laboratory, Hamilton Regional Laboratory Medicine Program, CCM

## Vaccination Status

**Table 6: Number and percentage (column %) of BA.2.20 and BA.2 cases by vaccination status, Ontario, February 1 to April 20, 2022**

Vaccination status	BA.2.20 cases	BA.2 cases excluding BA.2.20
Unvaccinated	118 (12.0%)	2,213 (14.5%)
Post-series initiation	5 (0.5%)	267 (1.8%)
Post-series completion	226 (23.0%)	3,685 (24.2%)
Post-booster dose	610 (62.0%)	8,705 (57.1%)
Post-two booster doses	25 (2.5%)	386 (2.5%)
Total cases	984 (100%)	15,256 (100%)

**Note:** BA.2 cases include all BA.2 sub-lineages except for BA.2.20. Cases include only those that linked to CCM (98.8% and 97.0% respectively for BA.2.20 and BA.2). Individuals with a vaccine not approved by Health Canada were excluded. Vaccine category definitions can be found in the [Confirmed Cases of COVID-19 Following Vaccination in Ontario](#) report. A higher proportion of cases reported in post-series completion cases is a reflection of both trends in vaccine administration (increasing number of doses administered over time) and trends in COVID-19 incidence. Not all BA.2.20 and BA.2 cases in Ontario would have been detected in this time period as only a proportion of samples are sequenced. Not all sequencing and bioinformatics analyses for recent weeks were complete at the time of data extraction. As such, the total cases sequenced for recent weeks will increase over time.

**Data source:** PHO, The Hospital for Sick Children, Kingston Health Sciences Centre, Shared Hospital Laboratory, Hamilton Regional Laboratory Medicine Program, CCM, COVaxON

# Technical Notes

## Data Sources

### Public Health Ontario (PHO)

- Data were extracted from the PHO Laboratory Information Management System on April 28, 2022 at approximately 2:00 a.m.
- Data were extracted from the PHO SARS-CoV-2 Whole Genome Sequencing Database on April 28, 2022 at approximately 9:00 a.m.
- List of BA.2 samples with the N148T mutation were received on April 29 at approximately 5:00pm

### The Hospital for Sick Children (HSC)

- Data were received by PHO on April 27, 2022 at approximately 4:30 p.m.
- List of BA.2 samples with the N148T mutation were received on April 28 at approximately 4:45pm

### Kingston Health Sciences Centre (KHSC)

- Data were received by PHO on May 2, 2022 at approximately 12:15 p.m.
- List of BA.2 samples with the N148T mutation were received on April 28 at approximately 11:00am

### Shared Hospital Laboratory (SHL)

- Data were received by PHO on April 27, 2022 at approximately 4:00 p.m.
- List of BA.2 samples with the N148T mutation were received on April 29 at approximately 1:30pm

### Hamilton Regional Laboratory Medicine Program (HRLMP)

- Data were received by PHO on April 27, 2022 at approximately 10:40 p.m.
- List of BA.2 samples with the N148T mutation were received on May 2 at approximately 2:00pm

### Public Health Case and Contact Management Solution (CCM)

- Data were extracted from the Public Health Case and Contact Management Solution on April 25, 2022 at approximately 1:00 p.m.

### Ontario Ministry of Health's COVaxON application (COVaxON)

- COVID-19 vaccination data were based on information successfully extracted from the Ontario Ministry of Health's COVaxON application as of April 25, 2022 at approximately 7:00 a.m.
- COVaxON data was linked to COVID-19 case data from CCM.

## Ontario SARS-CoV-2 Whole Genome Sequencing Strategy

- As of May 2, 2021, Ontario has implemented a strategy of representative surveillance for whole genome sequencing (WGS) of SARS-CoV-2 samples. A proportion of eligible provincial samples are sequenced at one of five Ontario COVID Genomics Network (OCGN) sequencing laboratories. To optimize use of WGS capacity relative to case counts, OCGN switched from sequencing 5% to 20% on February 16; 50% on March 9; 25% on March 30; and 10% on April 13, 2022.
- Targeted sequencing is performed on SARS-CoV-2 samples with a recent history of international travel (including border testing), deceased individuals, and when requested (e.g. outbreak investigations).

## Data Caveats and Methods: Ontario COVID-19 Genomics Network (OCGN)

- Lineage nomenclature is dynamic. Pango lineage naming and assignment may change as more samples are sequenced and analyzed globally.
- Data submitted to PHO from OCGN laboratories have not been independently verified.
- The dates associated with samples submitted by network laboratories vary due to sample logistics and different laboratory information systems. Dates associated with WGS samples were assigned based on a hierarchy: sample collection date > SARS-CoV-2 diagnostic received date > SARS-CoV-2 diagnostic reported date > VOC PCR received date > VOC PCR reported date > WGS received date > WGS reported date.
- Samples from the same case were linked if they had the same health card number or if they had the same first name, last name, and date of birth. If more than one sample was sequenced for a case, the most recent sample was used. This may shift a case to a more recent week if a subsequent sample was sequenced from the same case. A small proportion of cases may have samples that were not linked due to inconsistencies or data entry errors.
- Results for recent weeks are incomplete as not all sequencing and bioinformatics analyses were complete at the time of data extraction.
- Public health unit was assigned using diagnosing health unit in CCM. If the case did not link to CCM (1.2% and 3.0% respectively of BA.2.20 and BA.2 cases), then public health unit was assigned using OCGN patient postal code or ordering provider postal code if patient postal code was missing.

## Data Caveats and Methods: Public Health Case and Contact Management Solution (CCM)

- CCM is a dynamic disease reporting system, which allows for ongoing updates to data previously entered. As a result, data extracted from CCM represent a snapshot at the time of extraction and may differ from other PHO products.
- Methods for processing the CCM case data are described in the Technical Notes of the COVID-19 [Daily Epidemiological Summary](#).
- Data corrections or updates can result in case records being removed and/or updated from past reports.
- Cases were linked to CCM if they had the same health card number or if they had the same first name, last name, and date of birth. Cases may not have linked to CCM due to discrepancies in patient identifiers or if they were not residents of Ontario (diagnosing health unit was reported as MOH).
- Tables for severity and vaccination status only include cases that linked to CCM (98.8% and 97.0% respectively of BA.2.20 and BA.2 cases).
- Data on hospital admissions and deaths are likely under-reported as these events may occur after the completion of public health follow up of cases. Cases that were admitted to hospital or died after follow-up was completed may not be captured in CCM.
- Hospitalization includes all cases hospitalized (or that had their hospital stay extended) because of COVID-19. It includes cases that have been discharged from hospital as well as cases that are currently hospitalized. Includes Intensive Care Unit (ICU) cases but not emergency room visits. Hospitalizations were identified by a reported hospital admission date or reported 'Yes' for hospitalization/ICU.
- For surveillance purposes, a COVID-19 death is defined as a death resulting from a clinically compatible illness unless there is a clear alternative cause of death that cannot be related to COVID-19 (e.g., trauma, medically assisted death). There should be no period of complete recovery from COVID-19 between illness and reported death.
- Deaths are determined by using the outcome and Type of Death fields in CCM. COVID-19 deaths are counted where the Outcome value is 'Fatal' and the Type of Death value is not 'DOPHS was unrelated to cause of death' or 'Under PHU Review'.

## Data Caveats and Methods: COVaxON

- In order to identify cases post-vaccination, vaccine uptake data extracted from the Ontario Ministry of Health's (MOH) COVaxON application was linked to case data extracted from the MOH's Public Health Case and Contact Management Solution (CCM).
  - Clients in COVaxON and CCM were linked using health card number as well as other personal identifiers, including name, date of birth, gender, and postal code.
- Linkage was done using processed COVaxON and CCM data. Methods for processing COVaxON vaccine uptake data are described in the Technical Notes of the [COVID-19 Vaccine Uptake Report](#) and methods for processing post-vaccination cases are described in the Technical Notes of the [Confirmed Cases of COVID-19 Post Vaccination Report](#).
- Only cases that have received Health Canada authorized vaccines including, Pfizer-BioNTech Comirnaty™, Moderna Spikevax™, AstraZeneca Vaxzevria™/COVISHIELD, and Janssen are included. Cases that received one or more doses of a non-Health Canada authorized vaccine are excluded.
- A higher proportion of cases reported in post-series completion is a reflection of both trends in vaccine administration (increasing number of doses administered over time) and trends in COVID-19 incidence. Further details on vaccine administration trends in Ontario are described in the [COVID-19 Vaccine Uptake Report](#).
- For vaccine category definitions, please refer to [Confirmed Cases of COVID-19 Following Vaccination in Ontario](#).

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