

## SURVEILLANCE REPORT

# Immunization Coverage Report for School-Based Programs in Ontario: 2019-20, 2020-21 and 2021-22 School Years with Impact of Catch-up Programs

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## Purpose

This report describes immunization coverage for Ontario's three school-based immunization programs – hepatitis B (Hep B), human papillomavirus (HPV) and quadrivalent meningococcal conjugate (MCV4). The objectives are to assess the impact of the COVID-19 pandemic on these immunization programs for the most recent school year, and to assess the progress of catch-up programs for previous pandemic-affected school years. Due to potential delays in immunization assessment and data entry brought about by the pandemic, an update to estimates for 12- and 17-year-olds previously published for 2019-20 and 2020-21<sup>1</sup> is provided as of August 31 of the respective school years; new estimates for the 2021-22 school year are also included. Further, coverage estimates reflecting catch-up activities as of August 31, 2022 are provided for the 2019-20 and 2020-21 school years. Further details on specific definitions and methods for this report can be found in the [Technical Notes](#).

This report builds on established methods used by Public Health Ontario (PHO) for immunization coverage assessment from previous school year reports. Please see the Full report<sup>2</sup> and Technical Annex for the 2018-19 school year for more details on coverage assessment methods. Immunization coverage for students for *Immunization of School Pupils Act (ISPA)*<sup>3</sup> designated diseases will be assessed in a separate report.

## Background

### Immunization Coverage

Immunization coverage refers to the proportion of a population that is appropriately immunized against a vaccine preventable disease (VPD) at a point in time. Achieving and maintaining high immunization coverage is essential for the effective prevention and control of VPDs.

### Ontario's Publicly-Funded School-Based Immunization Programs

In Ontario, three publicly-funded school-based immunization programs<sup>4</sup> are typically delivered by PHUs to grade 7 students, in contrast to most other childhood and adolescent vaccines that are delivered by primary care providers. Program delivery focuses on grade 7 students (i.e. 12-year-olds), however catch-up activities also occur. Vaccine schedules for the three school-based programs vary in dose number; the MCV4 program is a one-dose schedule, while Hepatitis B and HPV school-based programs

are two-dose schedules, with rare exceptions. Immunization coverage for school-aged children is assessed using data from the Digital Health Immunization Repository (DHIR), Ontario's provincial immunization repository. The collection and entry of immunization information in the DHIR is largely driven by the *Immunization of School Pupils Act (ISPA)*<sup>3</sup> for MCV4 and other routine infant and childhood immunizations. PHUs rely on parental and/or provider reporting for immunizations administered in primary care, whereas adolescent immunizations administered in school-based immunization programs are entered directly by the PHUs into the DHIR. Parental and/or provider reporting may also include vaccines administered elsewhere (e.g., another province/country, physician office) as well as vaccines privately purchased (e.g., before travel). Capture of these doses has the potential to increase the immunization coverage attributed to the school-based programs.

## Impact of COVID-19 on School-Based Immunization Programs

The COVID-19 pandemic has posed significant challenges to the delivery of immunization services in schools. Public health measures to mitigate COVID-19 transmission, such as school closures and public health immunization staff redeployment to the COVID-19 response, reduced access to school-based immunization programs. Province-wide school closures in Ontario covered the periods of March 12, 2020 to the end of June 2020 and a significant portion of the 2020-21 school year, in addition to local closures driven by outbreak response.<sup>5</sup> Some PHUs partnered with primary care providers to administer doses of school-based immunizations through a vaccine special release process, however, vaccines administered in primary care were not consistently reported back to PHUs for entry in the DHIR and thus may not be reflected in this analysis. Additionally, with the extension of the COVID-19 immunization program's eligibility on May 23, 2021 to include 12- to 17-year-olds, immunization catch-up activities planned for the summer of 2021 may have been postponed to prioritize the adolescent COVID-19 immunization program. Varying degrees of local catch-up activities were performed throughout the school year (e.g., community clinics, school-based clinics), however PHUs faced potential challenges to delivering school-based immunization programs. The Ministry expanded eligibility for school-based programs in the fall of 2021 and further extended them in 2022.<sup>6</sup> HPV eligibility was extended to August 31, 2023 for female students who graduated in 2019-20, 2020-21 or 2021-22, and Hep B eligibility was expanded until the end of Grade 12, consistent with HPV and MCV4 programs. While in-person school resumed for most of the 2021-22 school year, school-based delivery did not fully resume until the 2022-23 school year due to public health measures in schools.

## Highlights

### Temporal Trends in Coverage

- Immunization coverage as of August 31<sup>st</sup> of the respective school year was generally higher in 2021-22 compared to 2019-20 and 2020-21 ([Figure 1](#)). However, the COVID-19 pandemic continued to impact PHU delivery of school-based immunization programs and entry/assessment of immunization records, as coverage estimates for all school years were substantially lower than in pre-pandemic school years; updated estimates for the 2019-20 and 2020-21 school years reflected a marginal increase from the previous assessment in 2021.<sup>1</sup>
- Provincial coverage estimates reflecting completion of the immunization series (i.e., up-to-date) for the school-based immunization programs for 12-year-olds for the 2019-20, 2020-21 and 2021-22 school years, respectively, are shown in [Figures 2a](#) and are outlined below.
  - 26.2%, 19.2% and 29.8% for Hep B

- 5.8%, 2.6% and 15.6% for HPV
- 67.8%, 21.2% and 42.8% for MCV4
- The up-to-date (UTD) estimate for MCV4 for the 2019-20 school year is higher compared to the 2020-21 school year. This one-dose program is typically delivered in the fall, and the start of the 2019-20 school year was unaffected by COVID-19.
- Many 12-year-olds in 2019-20 initiated but did not complete their Hep B or HPV immunization series. Fewer students in the 2020-21 and 2021-22 school years initiated their series compared to previous years.
- Provincial coverage estimates reflecting completion of the immunization series (i.e. up-to-date) among 17-year-olds for the 2019-20, 2020-21 and 2021-22 school years, respectively, are shown in [Figures 2b](#) and are outlined below:
  - 77.3%, 77.8% and 74.9% for Hep B
  - 63.4%, 63.4% and 64.1% for HPV
  - 93.9%, 93.8% and 90.6% for MCV4
- Overall coverage estimates are higher among 17-year-olds as many would have completed their series as part of the grade 7 program prior to the pandemic and/or have had a longer period of time to receive doses as part of catch-up activities.

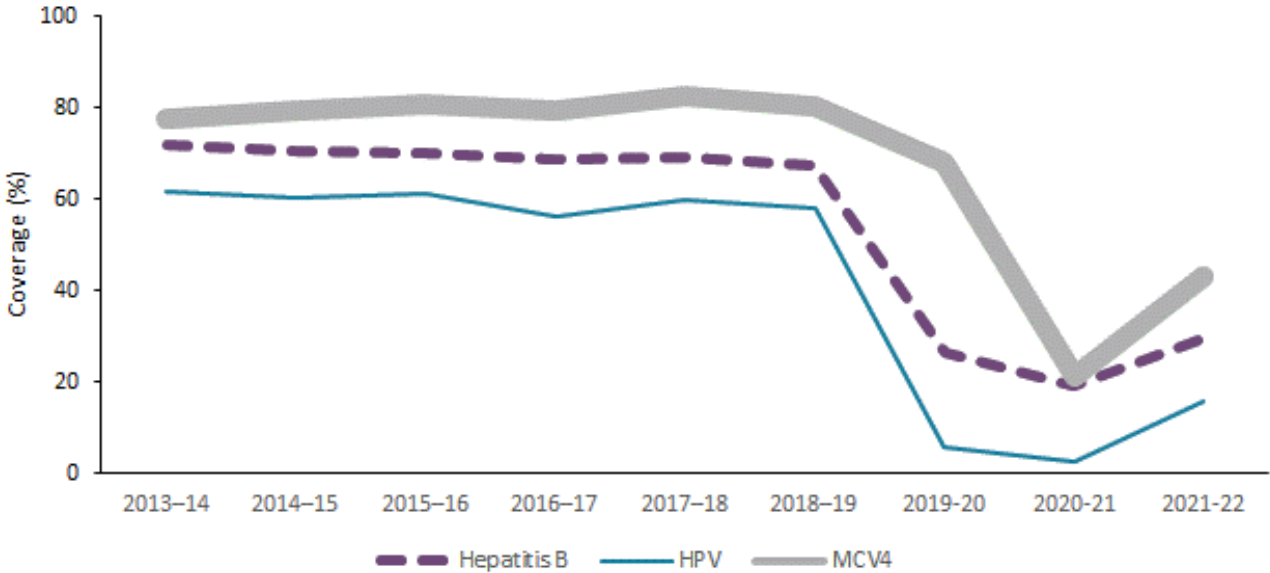
## Coverage Reflecting Catch-up Programs

- Catch-up programs in the years following the 2019-20 and 2020-21 school years resulted in large increases in coverage among 12-year-olds ([Figure 3](#)). Despite these gains, coverage remains lower than prior to the pandemic (2018-19).
- As of August 31, 2022, UTD immunization coverage reflecting catch-up activities for the 2019-20 and 2020-21 school years, respectively, are outlined below:
  - 50.8% and 37.5% for Hep B
  - 36.3% and 23.4% for HPV
  - 79.1% and 52.4% for MCV4
- There was significant geographic and temporal variability in coverage among PHUs. Few PHUs attained coverage similar to pre-pandemic levels, even with catch-up programs ([Figures 4a-4c](#), [Tables 1a-1c](#) and [Tables 2a-2c](#)).

# Results

## Temporal Trends in Coverage

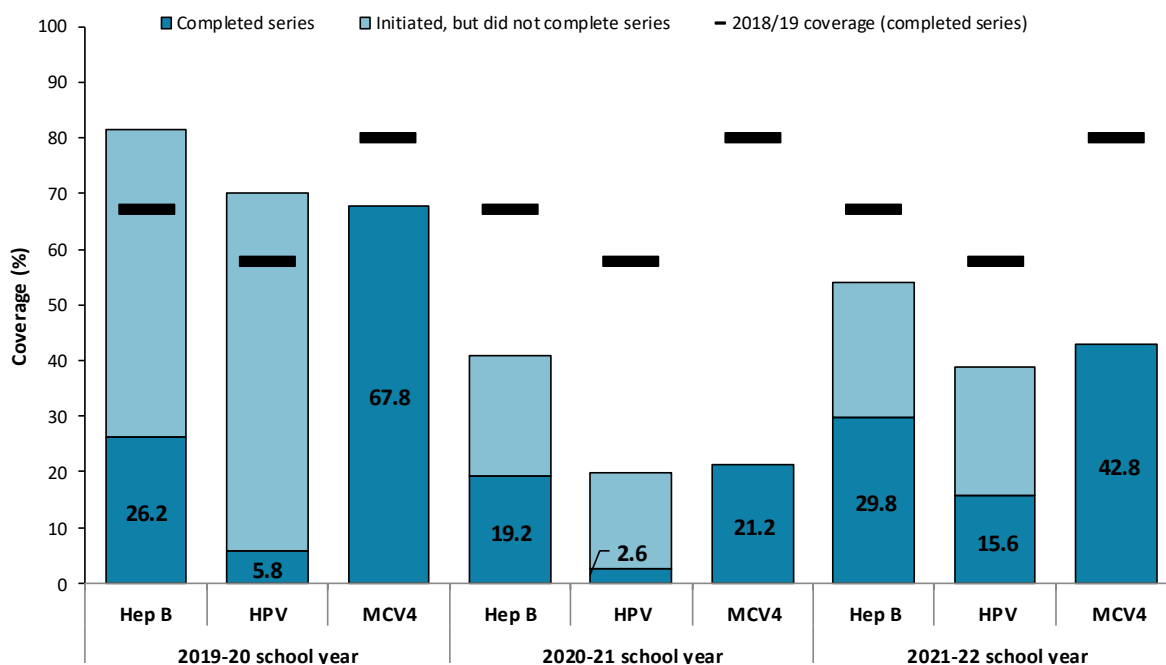
**Figure 1. Up-to-date (UTD) immunization coverage for hepatitis B (Hep B), human papillomavirus (HPV) and quadrivalent meningococcal conjugate (MCV4) vaccines among 12-year-olds in Ontario: 2013-14 to 2021-22 school years**



**Notes:**

- UTD immunization coverage estimates reflect immunizations received as of August 31<sup>st</sup> of the respective school years.
- Coverage estimates for previous school years (i.e. prior to 2019-20) are point-in-time estimates from previous annual reports and were not re-calculated.
- HPV coverage estimates for 2013-14 to 2015-16 school years represent 13-year-old female cohorts, whereas as of the 2016-17 school year, estimates represent all genders for 12-year-old students. Students who completed either a valid two-dose or three-dose series were considered up-to-date for all assessment years.

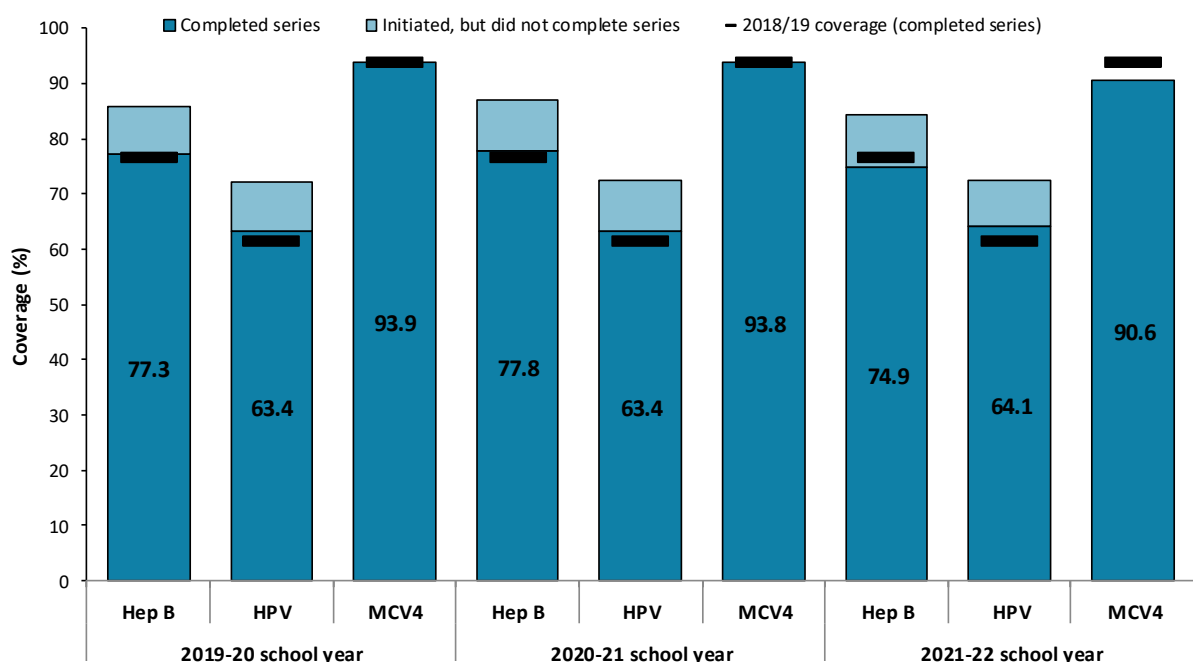
**Figure 2a. Up-to-date (UTD) immunization coverage for school-based immunization programs among 12-year-olds in Ontario: 2019-20, 2020-21 and 2021-22 school years**



**Notes:**

- UTD immunization coverage estimates reflect the proportion of students who completed the series and received all recommended doses for their age by August 31<sup>st</sup> of the corresponding school year. Students who initiated but did not complete the series received at least one valid dose but did not receive all recommended doses for their age by August 31<sup>st</sup> of the corresponding school year.
- 2018-19 coverage estimates are included for comparison; they are from previous annual reports and have not been re-calculated.
- In the 2016–17 school year, the HPV program was expanded to include males, in addition to females who have been included in the program since the 2007–08 school year. Coverage is therefore assessed for all genders for 12-year-olds for the 2018-19 to 2021-22 school years.

**Figure 2b. Up-to-date (UTD) immunization coverage for school-based immunization programs among 17-year-olds in Ontario: 2019-20, 2020-21 and 2021-22 school years**

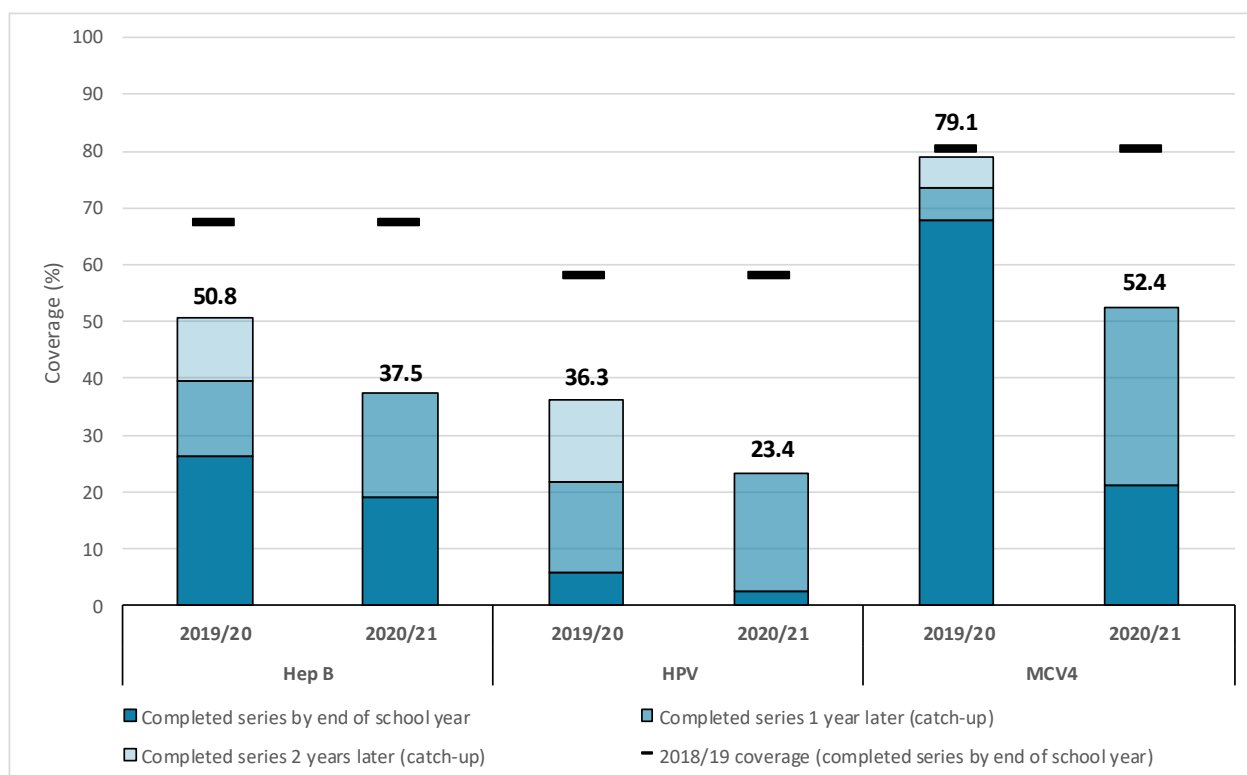


**Notes:**

- UTD immunization coverage estimates reflect the proportion of students who completed the series and received all recommended doses for their age by August 31<sup>st</sup> of the corresponding school year. Students who initiated but did not complete the series received at least one valid dose but did not receive all recommended doses for their age by August 31<sup>st</sup> of the corresponding school year.
- 2018-19 coverage estimates are included for comparison; they are from previous annual reports and have not been re-calculated.
- In the 2016–17 school year, the grade 7 HPV program was expanded to include males; males in older grades were not made eligible. Coverage is therefore assessed for females only for 17-year-olds in the 2018-19, 2019-20 and 2020-21 school years, while all genders were included in the 2021-22 school year. Coverage Reflecting Catch-up Programs.

## Coverage Reflecting Catch-up Programs

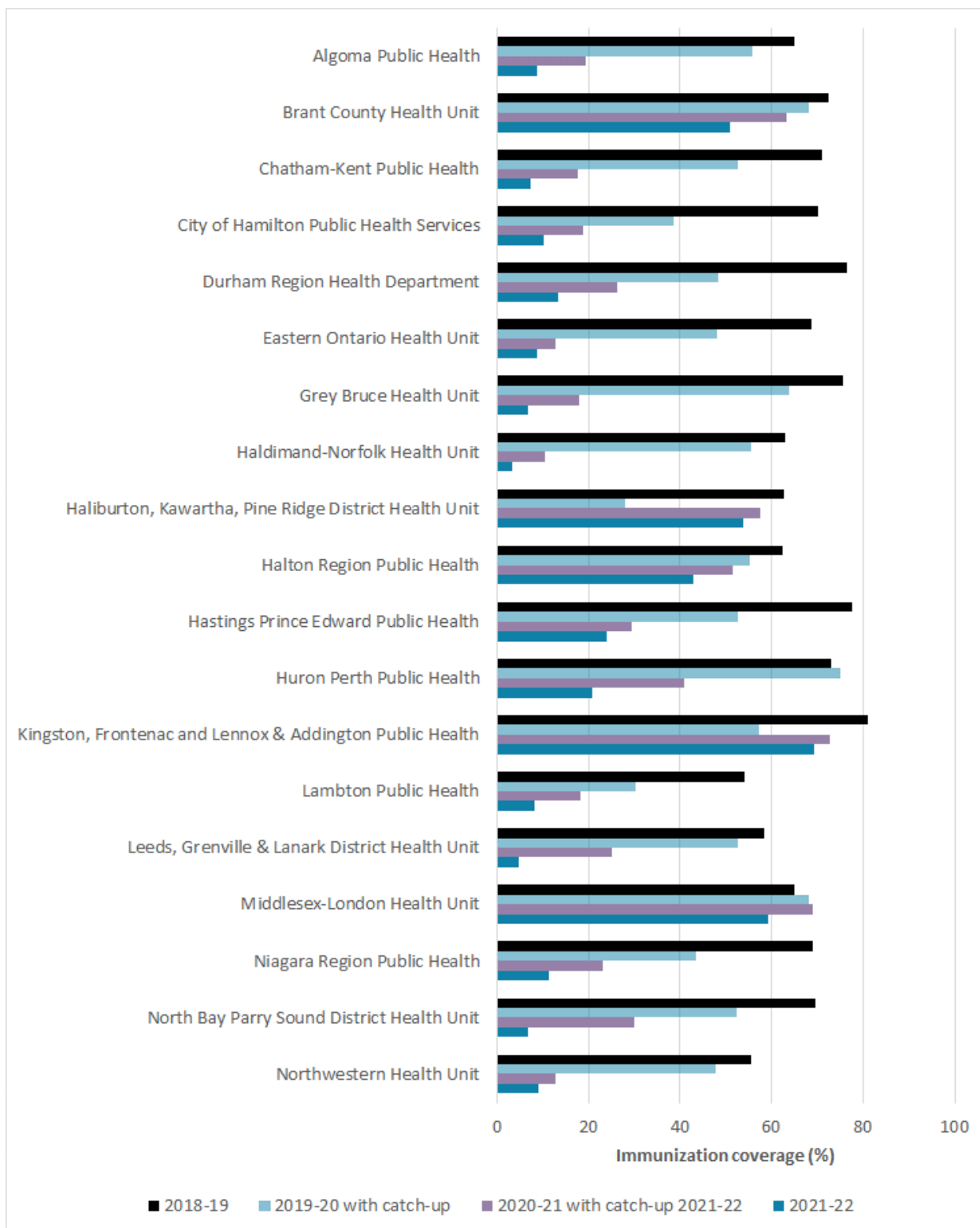
**Figure 3. Up-to-date (UTD) immunization coverage with catch-up for school-based immunization programs among 12-year olds for the 2019-20 and 2020-21 school years in Ontario**



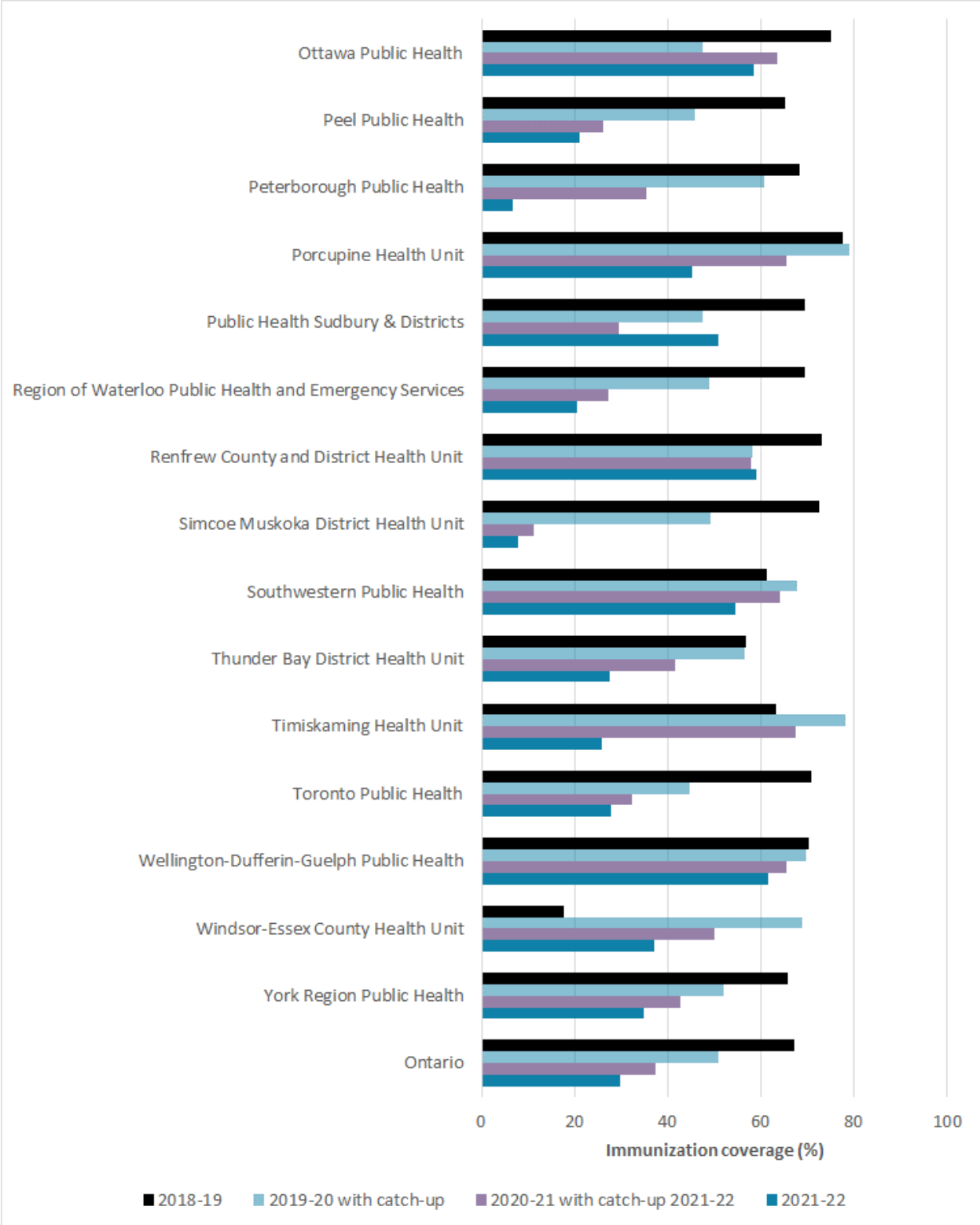
### Notes:

- UTD immunization coverage estimates reflect the proportion of students who completed the series and received all recommended doses for their age by August 31<sup>st</sup> of the corresponding school year or catch-up period.
- 2018-19 coverage estimates are included for comparison; they are from previous annual reports and have not been re-calculated.
- In the 2016-17 school year, the HPV program was expanded to include males, in addition to females who have been included in the program since the 2007-08 school year. Coverage is therefore assessed for all genders for 12-year-olds for the 2018-19 to 2021-22 school years.

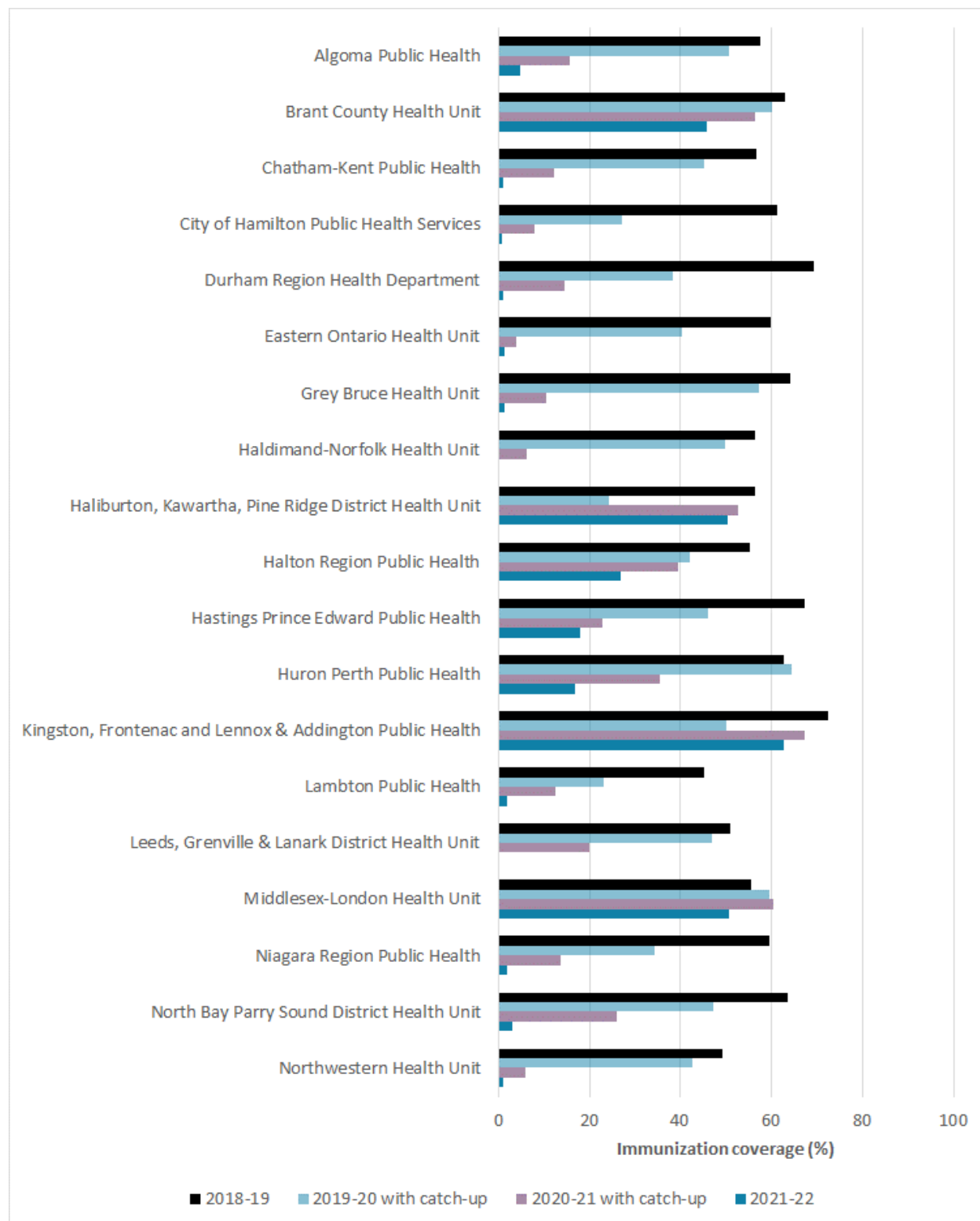
**Figure 4a. Up-to-date (UTD) immunization coverage for hepatitis B vaccine among 12-year-olds by public health unit in Ontario for 2018-19 and 2021-22, with catch-up as of August 31, 2022 for 2019-20 and 2020-21**

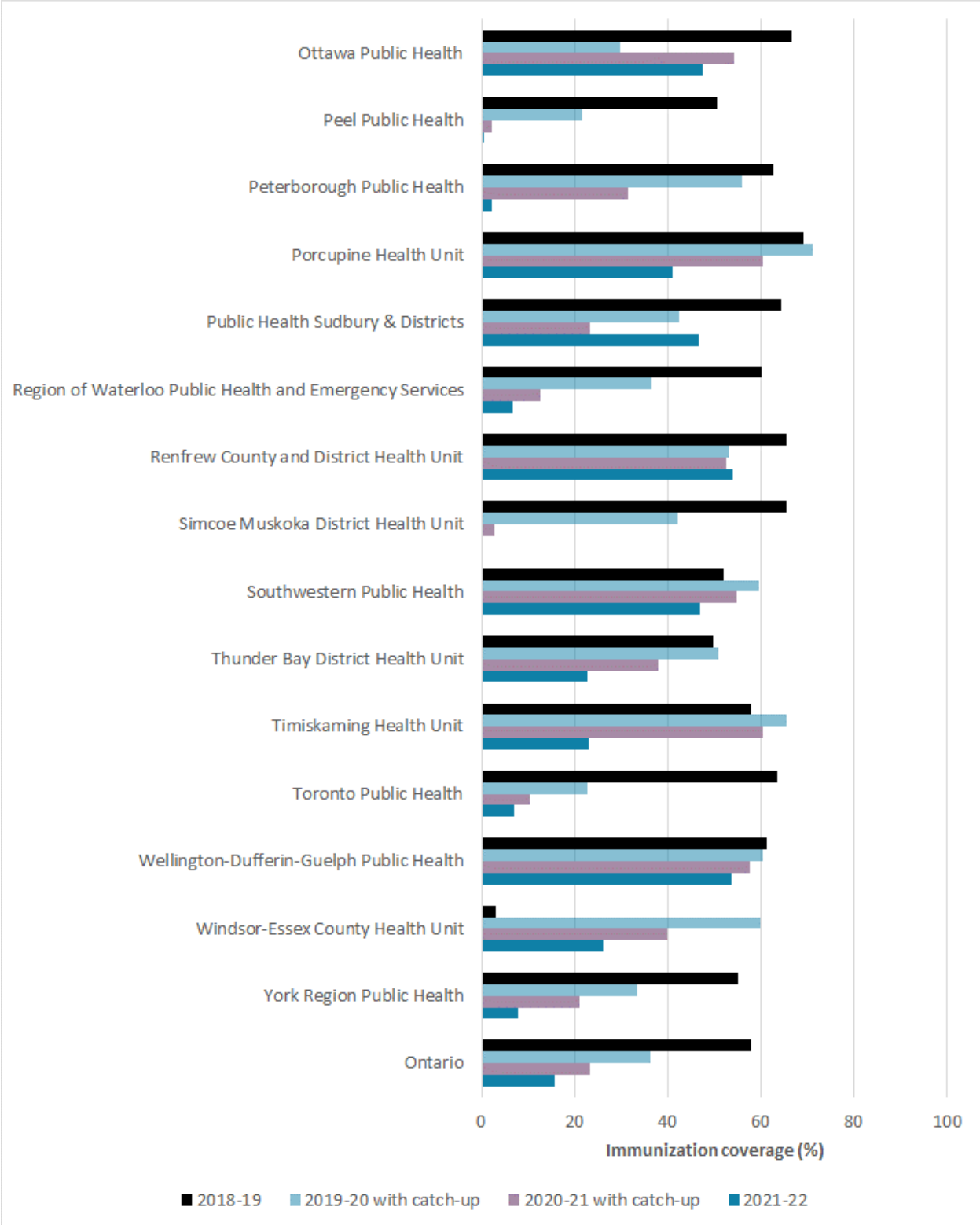




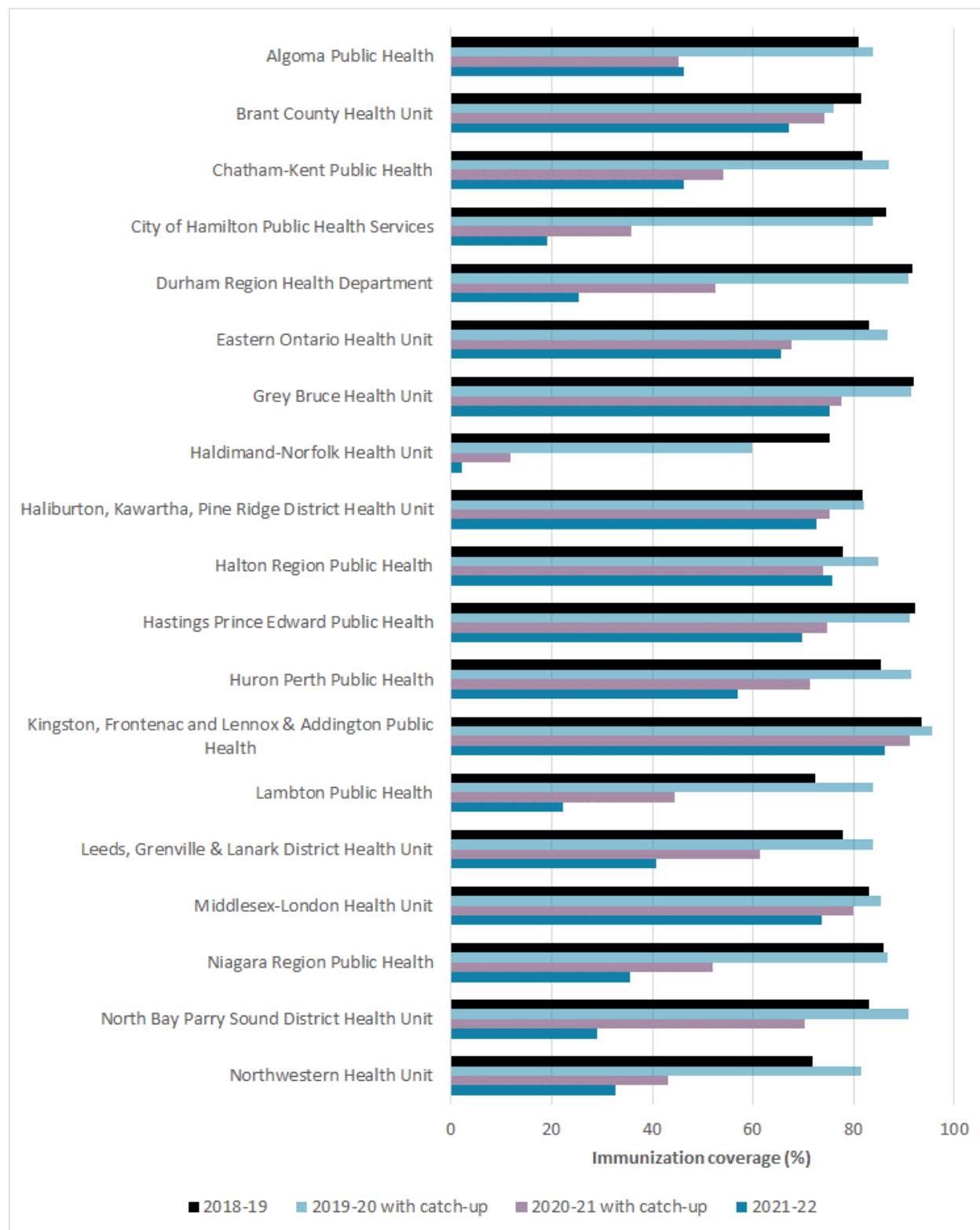


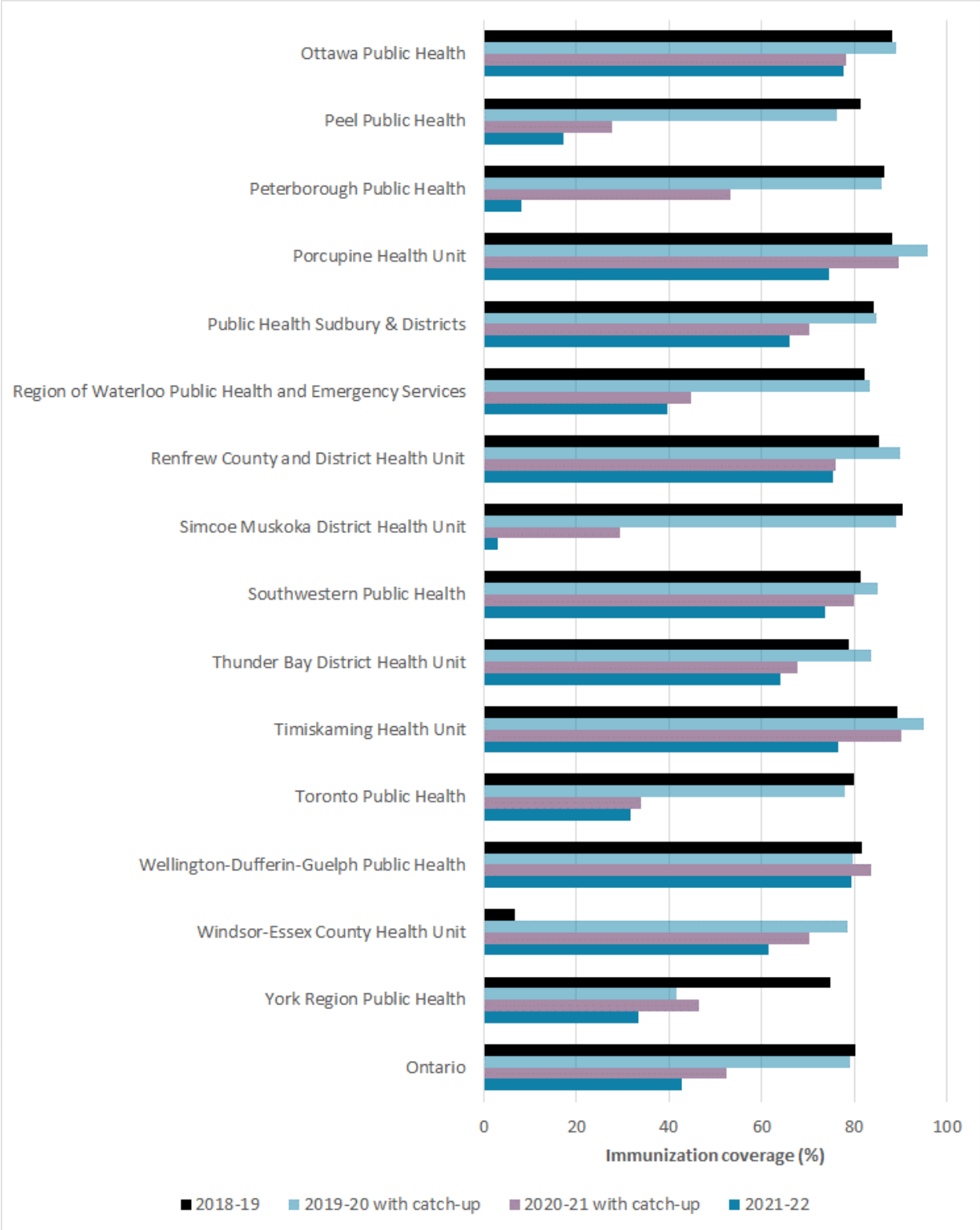
**Figure 4b. Up-to-date (UTD) immunization coverage for human papillomavirus vaccine among 12-year-olds by public health unit in Ontario for 2018-19 and 2021-22, with catch-up as of August 31, 2022 for 2019-20 and 2020-21**





**Figure 4c. Up-to-date (UTD) immunization coverage for quadrivalent meningococcal conjugate vaccine among 12-year-olds by public health unit in Ontario for 2018-19 and 2021-22, with catch-up as of August 31, 2022 for 2019-20 and 2020-21**





## Supplementary Tables

**Table 1a. Up-to-date (UTD) immunization coverage for hepatitis B vaccine among 12-year-olds by public health unit in Ontario for 2018-19 and 2021-22, with catch-up as of August 31, 2022 for 2019-20 and 2020-21**

Public Health Unit	2018-19 UTD (%)	2019-20 UTD (%)	2019-20 UTD (%) with catch-up	2020-21 UTD (%)	2020-21 UTD (%) with catch-up	2021-22 UTD (%)
Algoma Public Health	64.9	5.9	55.9	5.1	19.3	8.8
Brant County Health Unit	72.5	23.9	68.1	13.3	63.3	51.1
Chatham-Kent Public Health	71.0	7.2	52.7	8.2	17.6	7.3
City of Hamilton Public Health Services	70.3	14.8	38.5	12.7	18.9	10.1
Durham Region Health Department	76.4	17.7	48.4	15.5	26.3	13.4
Eastern Ontario Health Unit	68.6	10.5	48.0	9.2	12.6	8.6
Grey Bruce Health Unit	75.6	10.8	63.9	8.5	17.9	6.7
Haldimand-Norfolk Health Unit	63.1	18.1	55.4	5.0	10.6	3.2
Haliburton, Kawartha, Pine Ridge District Health Unit	62.8	6.9	28.0	8.4	57.5	53.7
Halton Region Public Health	62.5	34.5	55.2	24.3	51.4	43.0
Hastings Prince Edward Public Health	77.6	16.2	52.8	6.1	29.3	23.9
Huron Perth Public Health	73.1	57.2	74.9	6.3	40.9	20.9
Kingston, Frontenac and Lennox & Addington Public Health	81.1	19.2	57.3	16.6	72.7	69.2
Lambton Public Health	53.9	13.4	30.2	7.5	18.1	8.1

<b>Public Health Unit</b>	<b>2018-19 UTD (%)</b>	<b>2019-20 UTD (%)</b>	<b>2019-20 UTD (%) with catch-up</b>	<b>2020-21 UTD (%)</b>	<b>2020-21 UTD (%) with catch-up</b>	<b>2021-22 UTD (%)</b>
Leeds, Grenville & Lanark District Health Unit	58.4	6.8	52.6	6.3	25.1	4.9
Middlesex-London Health Unit	65.1	28.0	68.1	20.3	69.1	59.3
Niagara Region Public Health	69.1	14.3	43.3	12.2	23.1	11.4
North Bay Parry Sound District Health Unit	69.6	19.0	52.3	16.5	30.0	6.8
Northwestern Health Unit	55.4	34.4	47.9	7.4	12.7	9.1
Ottawa Public Health	75.0	32.4	47.5	22.7	63.4	58.4
Peel Public Health	65.2	31.9	45.7	22.7	26.0	21.2
Peterborough Public Health	68.2	10.3	60.6	15.1	35.3	6.8
Porcupine Health Unit	77.5	41.9	78.9	9.5	65.4	45.3
Public Health Sudbury & Districts	69.5	14.9	47.6	8.9	29.5	51.0
Region of Waterloo Public Health and Emergency Services	69.5	20.7	48.9	15.8	27.2	20.6
Renfrew County and District Health Unit	73.1	13.2	58.1	9.3	57.7	58.9
Simcoe Muskoka District Health Unit	72.6	10.8	49.1	8.4	11.1	8.0
Southwestern Public Health	61.3	24.4	67.8	9.7	64.0	54.6
Thunder Bay District Health Unit	56.8	15.3	56.4	15.8	41.5	27.4
Timiskaming Health Unit	63.2	41.8	78.1	21.1	67.5	25.8

Public Health Unit	2018-19 UTD (%)	2019-20 UTD (%)	2019-20 UTD (%) with catch-up	2020-21 UTD (%)	2020-21 UTD (%) with catch-up	2021-22 UTD (%)
Toronto Public Health	70.9	31.2	44.7	24.4	32.4	27.7
Wellington-Dufferin-Guelph Public Health	70.4	43.8	69.7	16.9	65.5	61.6
Windsor-Essex County Health Unit	17.6	25.9	68.9	18.8	50.1	37.0
York Region Public Health	65.9	34.6	52.0	32.6	42.6	34.8
Ontario	67.3	26.2	50.8	19.2	37.5	29.8

**Notes:**

- UTD reflects up-to-date coverage for immunizations received as of August 31<sup>st</sup> of the relevant school year; catch-up reflects immunizations received as of August 31, 2022.
- 2018-19 coverage estimates are included for comparison; they are from previous annual reports and have not been re-calculated.



**Table 1b. Up-to-date (UTD) immunization coverage for human papillomavirus vaccine among 12-year-olds by public health unit in Ontario for 2018-19 and 2021-22, with catch-up as of August 31, 2022 for 2019-20 and 2020-21**

Public Health Unit	2018-19 UTD (%)	2019-20 UTD (%)	2019-20 UTD (%) with catch-up	2020-21 UTD (%)	2020-21 UTD (%) with catch-up	2021-22 UTD (%)
Algoma Public Health	57.5	1.1	50.7	1.1	15.8	4.7
Brant County Health Unit	62.8	17.9	60.2	6.4	56.4	45.9
Chatham-Kent Public Health	56.6	1.2	45.2	3.3	12.3	0.9
City of Hamilton Public Health Services	61.2	1.4	27.1	1.5	8.1	0.7
Durham Region Health Department	69.3	1.4	38.2	2.7	14.5	0.9
Eastern Ontario Health Unit	59.7	1.6	40.3	0.9	3.9	1.2
Grey Bruce Health Unit	64.2	3.9	57.3	1.7	10.6	1.2
Haldimand-Norfolk Health Unit	56.3	13.8	49.7	0.6	6.1	0.1
Haliburton, Kawartha, Pine Ridge District Health Unit	56.4	3.0	24.3	4.2	52.6	50.2
Halton Region Public Health	55.3	12.5	42.1	2.6	39.4	26.9
Hastings Prince Edward Public Health	67.1	9.2	46.1	1.0	22.7	17.9
Huron Perth Public Health	62.5	50.1	64.4	1.8	35.4	16.8
Kingston, Frontenac and Lennox & Addington Public Health	72.5	8.5	50.2	6.6	67.1	62.7
Lambton Public Health	45.2	5.2	23.2	2.1	12.5	2.0

<b>Public Health Unit</b>	<b>2018-19 UTD (%)</b>	<b>2019-20 UTD (%)</b>	<b>2019-20 UTD (%) with catch-up</b>	<b>2020-21 UTD (%)</b>	<b>2020-21 UTD (%) with catch-up</b>	<b>2021-22 UTD (%)</b>
Leeds, Grenville & Lanark District Health Unit	50.9	0.9	46.9	0.4	20.1	0.3
Middlesex-London Health Unit	55.6	14.5	59.6	5.7	60.4	50.7
Niagara Region Public Health	59.6	2.9	34.3	2.6	13.7	1.9
North Bay Parry Sound District Health Unit	63.5	12.6	47.1	12.9	25.9	3.0
Northwestern Health Unit	49.3	26.7	42.7	0.8	6.1	1.0
Ottawa Public Health	66.7	10.7	29.9	3.8	54.2	47.4
Peel Public Health	50.4	0.6	21.5	0.3	2.1	0.4
Peterborough Public Health	62.6	3.2	56.0	10.2	31.4	2.2
Porcupine Health Unit	69.2	35.5	71.0	4.5	60.5	40.9
Public Health Sudbury & Districts	64.2	7.2	42.3	1.7	23.2	46.7
Region of Waterloo Public Health and Emergency Services	60.1	2.5	36.5	1.1	12.6	6.6
Renfrew County and District Health Unit	65.4	4.6	53.0	1.1	52.6	54.0
Simcoe Muskoka District Health Unit	65.5	0.6	42.2	0.3	2.7	0.3
Southwestern Public Health	51.9	18.8	59.4	3.4	54.8	46.9
Thunder Bay District Health Unit	49.7	7.6	50.8	9.5	37.9	22.7
Timiskaming Health Unit	57.9	34.2	65.4	11.0	60.3	23.1

Public Health Unit	2018-19 UTD (%)	2019-20 UTD (%)	2019-20 UTD (%) with catch-up	2020-21 UTD (%)	2020-21 UTD (%) with catch-up	2021-22 UTD (%)
Toronto Public Health	63.4	0.9	22.6	1.0	10.5	6.9
Wellington-Dufferin-Guelph Public Health	61.1	33.9	60.5	7.5	57.6	53.7
Windsor-Essex County Health Unit	3.1	10.2	59.9	5.8	39.8	26.0
York Region Public Health	55.0	0.6	33.3	3.4	21.0	7.7
Ontario	57.9	5.8	36.3	2.6	23.4	15.6

**Notes:**

- UTD reflects up-to-date coverage for immunizations received as of August 31<sup>st</sup> of the relevant school year; catch-up reflects immunizations received as of August 31, 2022.
- 2018-19 coverage estimates are included for comparison; they are from previous annual reports and have not been re-calculated.
- In the 2016–17 school year, the HPV program was expanded to include males, in addition to females who have been included in the program since the 2007–08 school year. Coverage is therefore assessed for all genders for 12-year-olds for the 2018-19 to 2021-22 school years.

**Table 1c. Up-to-date (UTD) immunization coverage for quadrivalent meningococcal conjugate vaccine among 12-year-olds by public health unit in Ontario for 2018-19 and 2021-22, with catch-up as of August 31, 2022 for 2019-20 and 2020-21**

Public Health Unit	2018-19 UTD (%)	2019-20 UTD (%)	2019-20 UTD (%) with catch-up	2020-21 UTD (%)	2020-21 UTD (%) with catch-up	2021-22 UTD (%)
Algoma Public Health	81.1	76.7	83.8	17.4	45.2	46.4
Brant County Health Unit	81.6	22.5	76.0	57.5	74.3	67.2
Chatham-Kent Public Health	81.9	80.4	86.9	12.9	54.2	46.3
City of Hamilton Public Health Services	86.5	79.9	83.8	21.8	35.8	19.2
Durham Region Health Department	91.6	86.9	91.0	32.6	52.4	25.3
Eastern Ontario Health Unit	83.2	83.3	86.7	3.2	67.7	65.6
Grey Bruce Health Unit	92.0	87.3	91.5	10.7	77.6	75.3
Haldimand-Norfolk Health Unit	75.2	17.6	59.7	6.2	11.7	2.2
Haliburton, Kawartha, Pine Ridge District Health Unit	81.7	78.0	82.1	22.5	75.3	72.6
Halton Region Public Health	77.9	78.1	85.0	31.2	73.9	75.7
Hastings Prince Edward Public Health	92.4	89.1	91.2	8.7	74.6	69.8
Huron Perth Public Health	85.4	89.6	91.4	58.5	71.4	56.9
Kingston, Frontenac and Lennox & Addington Public Health	93.4	90.0	95.5	46.0	91.2	86.3
Lambton Public Health	72.4	80.5	83.8	19.6	44.4	22.3

<b>Public Health Unit</b>	<b>2018-19 UTD (%)</b>	<b>2019-20 UTD (%)</b>	<b>2019-20 UTD (%) with catch-up</b>	<b>2020-21 UTD (%)</b>	<b>2020-21 UTD (%) with catch-up</b>	<b>2021-22 UTD (%)</b>
Leeds, Grenville & Lanark District Health Unit	78.0	72.9	83.8	39.4	61.5	40.7
Middlesex-London Health Unit	83.0	79.9	85.3	71.2	79.9	73.6
Niagara Region Public Health	85.8	83.3	86.8	14.1	51.9	35.6
North Bay Parry Sound District Health Unit	83.0	85.4	91.1	36.8	70.2	29.0
Northwestern Health Unit	71.9	76.8	81.6	3.2	43.0	32.8
Ottawa Public Health	88.0	85.8	89.1	25.6	78.1	77.7
Peel Public Health	81.2	69.3	76.3	2.4	27.7	17.1
Peterborough Public Health	86.3	78.3	85.7	43.3	53.1	8.1
Porcupine Health Unit	88.2	89.5	95.9	77.2	89.4	74.6
Public Health Sudbury & Districts	84.3	79.9	84.8	20.7	70.3	66.1
Region of Waterloo Public Health and Emergency Services	82.0	75.0	83.3	7.9	44.6	39.6
Renfrew County and District Health Unit	85.4	82.8	89.8	9.9	76.0	75.2
Simcoe Muskoka District Health Unit	90.4	84.7	89.0	1.7	29.3	3.1
Southwestern Public Health	81.4	78.0	84.9	72.2	79.8	73.5
Thunder Bay District Health Unit	78.7	75.0	83.5	37.9	67.6	64.0
Timiskaming Health Unit	89.1	90.1	94.9	79.2	90.2	76.6

Public Health Unit	2018-19 UTD (%)	2019-20 UTD (%)	2019-20 UTD (%) with catch-up	2020-21 UTD (%)	2020-21 UTD (%) with catch-up	2021-22 UTD (%)
Toronto Public Health	79.9	73.4	77.9	6.2	34.0	31.7
Wellington-Dufferin-Guelph Public Health	81.6	46.9	79.6	36.8	83.5	79.3
Windsor-Essex County Health Unit	6.6	19.2	78.5	32.2	70.1	61.6
York Region Public Health	74.8	5.1	41.5	21.9	46.4	33.4
Ontario	80.1	67.8	79.1	21.2	52.4	42.8

**Notes:**

- UTD reflects up-to-date coverage for immunizations received as of August 31<sup>st</sup> of the relevant school year; UTD with catch-up reflects immunizations received as of August 31, 2022.
- 2018-19 coverage estimates are included for comparison; they are from previous annual reports and have not been re-calculated.

**Table 2a. Up-to-date (UTD) immunization coverage for hepatitis B vaccine among 17-year-olds by public health unit in Ontario for 2018-19 and 2021-22, with catch-up as of August 31st, 2022 for 2019-20 and 2020-21**

Public Health Unit	2018-19 UTD (%)	2019-20 UTD (%)	2019-20 UTD (%) with catch-up	2020-21 UTD (%)	2020-21 UTD (%) with catch-up	2021-22 UTD (%)
Algoma Public Health	85.2	83.5	83.5	82.2	82.2	76.9
Brant County Health Unit	85.3	83.8	83.9	84.5	84.5	81.7
Chatham-Kent Public Health	79.9	80.8	80.8	78.6	78.6	75.5
City of Hamilton Public Health Services	71.5	72.1	72.1	75.8	75.9	76.4
Durham Region Health Department	84.9	84.7	84.7	85.7	85.7	85.3
Eastern Ontario Health Unit	79.6	79.6	79.6	79.2	79.2	72.9
Grey Bruce Health Unit	84.0	82.9	82.9	88.7	88.7	83.5
Haldimand-Norfolk Health Unit	76.1	74.1	74.1	72.2	72.2	67.0
Haliburton, Kawartha, Pine Ridge District Health Unit	70.1	69.3	69.3	71.9	71.9	74.7
Halton Region Public Health	71.2	74.5	74.6	69.0	69.1	66.5
Hastings Prince Edward Public Health	73.0	74.6	74.8	77.0	77.0	73.3
Huron Perth Public Health	77.2	77.2	77.3	80.6	80.8	80.6
Kingston, Frontenac and Lennox & Addington Public Health	84.3	86.8	86.9	84.9	84.9	84.7
Lambton Public Health	51.7	64.9	65.0	59.7	59.7	58.3

<b>Public Health Unit</b>	<b>2018-19 UTD (%)</b>	<b>2019-20 UTD (%)</b>	<b>2019-20 UTD (%) with catch-up</b>	<b>2020-21 UTD (%)</b>	<b>2020-21 UTD (%) with catch-up</b>	<b>2021-22 UTD (%)</b>
Leeds, Grenville & Lanark District Health Unit	72.8	71.7	71.7	74.4	74.5	73.1
Middlesex-London Health Unit	69.6	72.5	72.5	69.8	69.9	67.2
Niagara Region Public Health	82.7	80.7	80.8	80.6	80.6	78.8
North Bay Parry Sound District Health Unit	80.0	79.3	79.7	77.2	77.6	72.7
Northwestern Health Unit	67.2	79.5	79.6	78.8	78.8	75.3
Ottawa Public Health	79.5	80.1	80.1	79.7	79.8	75.9
Peel Public Health	74.2	78.6	78.7	83.5	83.6	82.2
Peterborough Public Health	70.3	78.2	78.3	78.0	78.0	77.8
Porcupine Health Unit	81.1	81.0	81.2	80.3	80.3	79.6
Public Health Sudbury & Districts	82.3	81.7	81.8	79.5	79.5	77.8
Region of Waterloo Public Health and Emergency Services	80.7	79.2	79.2	79.2	79.2	74.6
Renfrew County and District Health Unit	80.2	77.1	77.2	72.5	72.5	74.4
Simcoe Muskoka District Health Unit	80.6	81.0	81.0	78.2	78.2	76.1
Southwestern Public Health	72.9	74.3	74.4	72.0	72.0	74.0
Thunder Bay District Health Unit	76.3	77.1	77.3	75.3	75.4	64.9



Public Health Unit	2018-19 UTD (%)	2019-20 UTD (%)	2019-20 UTD (%) with catch-up	2020-21 UTD (%)	2020-21 UTD (%) with catch-up	2021-22 UTD (%)
Timiskaming Health Unit	75.1	77.1	78.1	75.1	75.1	78.0
Toronto Public Health	77.7	76.7	76.7	79.8	79.9	74.1
Wellington-Dufferin-Guelph Public Health	76.2	77.8	77.8	79.0	79.0	75.0
Windsor-Essex County Health Unit	75.1	75.1	75.1	74.7	74.7	73.2
York Region Public Health	74.2	72.5	72.5	69.8	69.8	66.3
Ontario	76.6	77.3	77.3	77.8	77.8	74.9

**Notes:**

- UTD reflects up-to-date coverage for immunizations received as of August 31<sup>st</sup> of the relevant school year; catch-up reflects immunizations received as of August 31, 2022.
- 2018-19 coverage estimates are included for comparison; they are from previous annual reports and have not been re-calculated.

**Table 2b. Up-to-date (UTD) immunization coverage for human papillomavirus vaccine among 17-year-olds by public health unit in Ontario for 2018-19 and 2021-22, with catch-up as of August 31, 2022 for 2019-20 and 2020-21**

Public Health Unit	2018-19 UTD (%)	2019-20 UTD (%)	2019-20 UTD (%) with catch-up	2020-21 UTD (%)	2020-21 UTD (%) with catch-up	2021-22 UTD (%)
Algoma Public Health	68.0	69.3	69.3	66.6	66.8	65.0
Brant County Health Unit	71.4	68.5	68.5	74.3	74.5	70.7
Chatham-Kent Public Health	58.2	60.6	60.6	63.4	63.4	63.9
City of Hamilton Public Health Services	51.7	54.7	54.7	57.1	57.1	65.1
Durham Region Health Department	71.8	73.1	73.3	74.5	74.6	77.5
Eastern Ontario Health Unit	67.9	68.2	68.2	65.8	66.0	62.6
Grey Bruce Health Unit	63.8	72.0	72.0	72.6	72.6	72.4
Haldimand-Norfolk Health Unit	18.1	58.5	58.5	56.0	56.0	57.8
Haliburton, Kawartha, Pine Ridge District Health Unit	58.3	59.4	59.4	60.5	60.5	66.3
Halton Region Public Health	52.5	53.5	54.0	49.8	50.4	52.9
Hastings Prince Edward Public Health	61.8	57.4	57.6	60.0	60.0	60.6
Huron Perth Public Health	57.2	58.9	59.0	61.0	61.4	65.3
Kingston, Frontenac and Lennox & Addington Public Health	67.4	70.4	70.9	72.5	72.6	75.3
Lambton Public Health	42.8	40.2	40.3	44.3	44.3	47.2

<b>Public Health Unit</b>	<b>2018-19 UTD (%)</b>	<b>2019-20 UTD (%)</b>	<b>2019-20 UTD (%) with catch-up</b>	<b>2020-21 UTD (%)</b>	<b>2020-21 UTD (%) with catch-up</b>	<b>2021-22 UTD (%)</b>
Leeds, Grenville & Lanark District Health Unit	62.3	58.0	58.6	62.4	62.5	66.5
Middlesex-London Health Unit	36.9	53.1	53.3	54.2	54.5	56.5
Niagara Region Public Health	60.8	62.1	62.1	64.8	64.8	67.4
North Bay Parry Sound District Health Unit	62.7	64.2	64.8	63.0	63.8	65.0
Northwestern Health Unit	53.3	62.8	63.3	67.5	67.5	69.3
Ottawa Public Health	67.0	66.1	66.2	66.6	66.8	63.1
Peel Public Health	62.1	67.4	67.7	60.1	60.4	71.0
Peterborough Public Health	63.2	65.5	66.0	61.1	61.1	68.2
Porcupine Health Unit	62.9	66.2	66.2	69.3	69.6	68.5
Public Health Sudbury & Districts	64.4	60.2	60.7	65.5	65.5	67.2
Region of Waterloo Public Health and Emergency Services	60.4	60.8	60.9	63.7	63.8	60.0
Renfrew County and District Health Unit	48.5	63.6	63.6	68.3	68.3	65.3
Simcoe Muskoka District Health Unit	70.4	69.4	69.6	67.4	67.5	68.2
Southwestern Public Health	53.0	55.7	56.0	55.2	55.3	61.2
Thunder Bay District Health Unit	64.5	57.1	57.3	61.5	61.8	60.5

Public Health Unit	2018-19 UTD (%)	2019-20 UTD (%)	2019-20 UTD (%) with catch-up	2020-21 UTD (%)	2020-21 UTD (%) with catch-up	2021-22 UTD (%)
Timiskaming Health Unit	65.9	68.2	70.3	70.5	70.5	68.8
Toronto Public Health	67.4	68.0	68.1	72.1	72.2	65.5
Wellington-Dufferin-Guelph Public Health	62.6	66.3	66.3	67.4	67.6	65.4
Windsor-Essex County Health Unit	59.0	60.5	60.7	58.6	58.7	60.6
York Region Public Health	61.5	58.8	59.0	56.5	57.0	53.7
Ontario	61.6	63.4	63.6	63.4	63.6	64.1

**Notes:**

- UTD reflects up-to-date coverage for immunizations received as of August 31<sup>st</sup> of the relevant school year; catch-up reflects immunizations received as of August 31, 2022.
- 2018-19 coverage estimates are included for comparison; they are from previous annual reports and have not been re-calculated.
- In the 2016–17 school year, the grade 7 HPV program was expanded to include males; males in older grades were not made eligible. Coverage is therefore assessed for females only for 17-year-olds in the 2018-19, 2019-20 and 2020-21 school years, while all genders were included in the 2021-22 school year.

**Table 2c. Up-to-date (UTD) immunization coverage for quadrivalent meningococcal conjugate vaccine among 17-year-olds by public health unit in Ontario for 2018-19 and 2021-22, with catch-up as of August 31, 2022 for 2019-20 and 2020-21**

Public Health Unit	2018-19 UTD (%)	2019-20 UTD (%)	2019-20 UTD (%) with catch-up	2020-21 UTD (%)	2020-21 UTD (%) with catch-up	2021-22 UTD (%)
Algoma Public Health	97.4	95.0	95.0	95.4	95.4	88.8
Brant County Health Unit	95.3	94.5	94.5	93.1	93.1	91.8
Chatham-Kent Public Health	95.5	94.8	94.8	93.9	93.9	93.4
City of Hamilton Public Health Services	88.6	89.9	90.0	96.1	96.1	90.8
Durham Region Health Department	96.6	96.4	96.4	95.5	95.5	95.3
Eastern Ontario Health Unit	94.9	94.5	94.5	94.0	94.0	90.0
Grey Bruce Health Unit	91.7	92.1	92.2	95.3	95.3	94.4
Haldimand-Norfolk Health Unit	90.5	92.7	92.8	86.6	86.6	77.5
Haliburton, Kawartha, Pine Ridge District Health Unit	95.2	93.9	94.0	95.0	95.0	94.6
Halton Region Public Health	93.4	95.3	95.3	94.7	94.9	93.5
Hastings Prince Edward Public Health	97.1	95.9	95.9	96.4	96.4	94.0
Huron Perth Public Health	89.7	89.8	90.0	93.3	93.3	92.4
Kingston, Frontenac and Lennox & Addington Public Health	97.7	97.6	97.6	97.0	97.1	95.7
Lambton Public Health	96.7	97.0	97.0	96.5	96.5	96.1

<b>Public Health Unit</b>	<b>2018-19 UTD (%)</b>	<b>2019-20 UTD (%)</b>	<b>2019-20 UTD (%) with catch-up</b>	<b>2020-21 UTD (%)</b>	<b>2020-21 UTD (%) with catch-up</b>	<b>2021-22 UTD (%)</b>
Leeds, Grenville & Lanark District Health Unit	88.3	90.5	90.5	88.7	88.7	85.7
Middlesex-London Health Unit	93.4	93.4	93.5	93.2	93.3	84.8
Niagara Region Public Health	95.9	96.1	96.1	95.5	95.5	93.0
North Bay Parry Sound District Health Unit	96.3	97.1	97.4	96.0	96.2	94.4
Northwestern Health Unit	80.4	94.2	94.2	96.8	96.8	94.4
Ottawa Public Health	96.2	96.3	96.3	95.8	95.8	93.1
Peel Public Health	95.1	94.8	94.8	94.9	95.1	93.6
Peterborough Public Health	95.5	96.2	96.2	93.5	93.5	93.6
Porcupine Health Unit	97.5	97.4	97.4	97.7	97.7	96.5
Public Health Sudbury & Districts	96.7	96.4	96.4	96.6	96.6	95.3
Region of Waterloo Public Health and Emergency Services	95.6	94.7	94.7	94.5	94.5	90.5
Renfrew County and District Health Unit	98.3	97.0	97.0	95.6	96.0	94.7
Simcoe Muskoka District Health Unit	94.2	94.5	94.6	87.8	87.8	92.4
Southwestern Public Health	91.2	91.6	91.6	91.3	91.3	91.1
Thunder Bay District Health Unit	95.7	94.6	94.7	95.7	95.7	91.4
Timiskaming Health Unit	97.0	96.3	96.3	94.8	94.8	95.5

Public Health Unit	2018-19 UTD (%)	2019-20 UTD (%)	2019-20 UTD (%) with catch-up	2020-21 UTD (%)	2020-21 UTD (%) with catch-up	2021-22 UTD (%)
Toronto Public Health	93.6	94.2	94.2	96.5	96.5	91.9
Wellington-Dufferin-Guelph Public Health	95.2	95.1	95.1	95.7	95.9	92.9
Windsor-Essex County Health Unit	95.4	89.6	89.7	81.9	81.9	85.1
York Region Public Health	90.6	89.1	89.2	89.0	89.2	77.4
Ontario	93.9	93.9	93.9	93.8	93.9	90.6

**Notes:**

- UTD reflects up-to-date coverage for immunizations received as of August 31<sup>st</sup> of the relevant school year; catch-up reflects immunizations received as of August 31, 2022.
- 2018-19 coverage estimates are included for comparison; they are from previous annual reports and have not been re-calculated.

# Technical Notes

## Data Sources

Data for this report were obtained from the Digital Health Immunization Repository (DHIR) – Ontario’s the provincial immunization repository. Data were extracted on September 1, 2022 for all data.

## Methods

- Please see the Technical Annex from the 2018-19 school year report for a detailed description of the DHIR and methods used for the assessment of student immunization, including details on cohort creation and up-to-date (UTD) coverage assessment by age and antigen, as well as a description of the limitations. The methodologies have not changed from previous years, with the exception of the updates described below made to assess UTD coverage with catch-up and with respect to hepatitis B coverage assessment.
- For the 2019-20 school year:
  - Students were included in the analysis if they had an education record that met the following criteria:
    - Effective From: On or after September 1, 2019 or missing, AND
    - Effective To: On or before August 31, 2020
  - Immunizations with administration dates on or before August 31, 2020 were included in the UTD coverage estimates.
  - Immunizations with administration dates on or before August 31, 2021 were included the UTD coverage estimates with one year of catch-up.
  - Immunizations with administration dates on or before August 31, 2022 were included the UTD coverage estimates with two years of catch-up.
- For the 2020-21 school year:
  - Students were included in the analysis if they had an education record that met the following criteria:
    - Effective From: On or after September 1, 2020 or missing, AND
    - Effective To: On or before August 31, 2021
  - Immunizations with administration dates on or before August 31, 2021 were included in the UTD coverage estimates.
  - Immunizations with administration dates on or before August 31, 2022 were included the UTD coverage estimates with one year of catch-up.



- For the 2021-22 school year:
  - Students were included in the analysis if they had an education record that met the following criteria:
    - Effective From: On or after September 1, 2021 or missing, AND
    - Effective To: On or before August 31, 2022
  - Immunizations with administration dates on or before August 31, 2022 were included in the UTD coverage estimates.
- Coverage was assessed at both 12 and 17 years of age for each respective school year, allowing coverage assessment for school programs with extended eligibility. These cohorts were then followed for one or two years to assess the impact of program catch-up (please see above for cut-off dates used for immunization administration dates).
- The following updates were made to hepatitis B up-to-date coverage assessment, which is available on page 27 of the Technical Annex from the 2018-19 school year report:
  - New vaccines were added to the relevant vaccines: HAHB-pediatric, HAHB-unspecified, HB-pediatric, Hib-HB
  - If multiple vaccines were administered on the same day, the following hierarchy was used to keep only one record: DTaP-HB-IPV-Hib > DTaP-HB-IPV or DPT-HB-Hib > DPT-HB or DTwP-HB > Hib-HB > HAHB-pediatric > HAHB > HAHB-unspecified > HB-dialysis > HBpediatric > HB > HB-unspecified
  - Immunization medical exemption records to assess evidence of immunity for hepatitis B were reviewed and updated to reflect changes that have been made to the DHIR data.
  - For the valid dose definitions, the new vaccines have been incorporated such as:
    - HAHB-pediatric and HAHB-unspecified were treated the same as HAHB
    - HB-pediatric was treated the same as HB
    - Hib-HB was treated the same as DTwP-HB

## References

1. Ontario Agency for Health Protection and Promotion (Public Health Ontario). Immunization coverage report for school-based programs in Ontario: 2019-20 and 2020-21 school years [Internet]. Toronto, ON: Queen's Printer for Ontario; 2021 [cited 2022 Dec 29]. Available from: [https://www.publichealthontario.ca/-/media/Documents/I/2021/immunization-coverage-2019-2021.pdf?sc\\_lang=en](https://www.publichealthontario.ca/-/media/Documents/I/2021/immunization-coverage-2019-2021.pdf?sc_lang=en)
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## Public Health Ontario

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