HIV in Ontario by public health unit: tests & diagnoses 2021, and care cascade 2020



Ontario HIV Epidemiology and Surveillance Initiative

About OHESI

The Ontario HIV Epidemiology and Surveillance Initiative (OHESI) is a collaboration involving the HIV and Hepatitis C Programs Unit of the Ontario Ministry of Health (MOH), Public Health Ontario (PHO), the Public Health Agency of Canada (PHAC), and the Ontario HIV Treatment Network (OHTN) Applied Epidemiology Unit (AEU). The objectives of OHESI are to analyze, monitor and disseminate knowledge products on the epidemiology of HIV in Ontario. OHESI is a vital partnership that supports Ontario's ongoing ability to assess the impact of policy directions and program initiatives.

The success of the partnership would not be possible without the strategic, technical and resource contributions of all the partners. OHESI also receives ongoing advice from a community advisory committee (OHESI Champions Committee): people working in the community-based HIV service sector and HIV clinics whose input helps ensure that OHESI reports and other products support collective efforts and impact in neighborhoods, communities and organizations across the province.

Background

In 2013-2014, the OHTN set up the OHTN Applied Epidemiology Unit (AEU), under a funding agreement with the MOHLTC, to support ongoing production of epidemiological information to support Ontario's response to HIV.

In 2014-2015, the AEU initiated the Ontario HIV Epidemiology and Surveillance Initiative (OHESI) and continues to provide administrative and technical support for the partnership.

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Introduction

Timely, relevant HIV epidemiological data are critical for Ontario's 34 public health units (PHUs) to monitor their local HIV epidemic, and evaluate and plan health promotion and prevention programs. This report serves as an update to OHESI's <u>previous report</u> on HIV indicators broken down by the PHUs released in 2018. PHU-level data is not only important for the health units themselves, but also HIV/AIDS service organizations and other communitybased organizations whose catchment areas may be better represented by these smaller geographic boundaries.

Note that where the prior 2018 report included individuals previously diagnosed with HIV outside of Ontario in counts of diagnoses, this report describes <u>first-time HIV diagnoses</u>, which exclude individuals with previous evidence of HIV (i.e. previously diagnosed outside of Ontario and/or history of viral load tests in Ontario) in order to best reflect local HIV transmission and inform prevention.

This report has been developed in response to these needs and contains the most detailed HIV data published by PHU to date. These data include testing and diagnosis indicators (number/rate of tests and first-time HIV diagnoses, test positivity) and HIV care cascade indicators (number/percent of individuals living with diagnosed HIV who are in care, on antiretroviral treatment, and virally suppressed). Spanning the breadth of the HIV prevention, engagement and care cascade (see Figure i), these indicators can be used to identify priority areas to improve cascade engagement in each health unit. It is important to note that the data in this report come from the Public Health Ontario (PHO) Laboratory and not the Integrated Public Health Information System (iPHIS). While iPHIS is a rich data source and well known to PHUs, it is limited to information on HIV-positive diagnoses. In contrast, PHO Laboratory houses databases with information on all HIV diagnostic testing (both negative and positive) and viral load testing in Ontario. Use of PHO Laboratory data supports measurement of a broader range of indicators than is available through iPHIS.

Starting in 2020, the COVID-19 pandemic disrupted access to HIV testing and clinical care, impacting trends and making it difficult to assess the state of Ontario's epidemic. Decreases in numbers of first-time HIV diagnoses in Ontario during the COVID-19 pandemic are likely due to three major contributing factors: (1) missed diagnoses because of decreased testing; (2) a real decrease in HIV transmission; and (3) a decrease in immigration. This <u>OHESI blog post</u> discusses the impact of the COVID-19 pandemic on HIV testing and diagnosis in Ontario in more detail.

While measurements of both the HIV care cascade and the UNAIDS 90-90-90 targets (see <u>Box i</u>) are OHESI priorities, this report focuses only on the care cascade. Testing and diagnosis data in this report span a five-year period (2017 to 2021) while HIV care cascade indicators are limited only for the year 2020 (the year with the most recent data available when this report was written). This report excludes the approximately 150,000 HIV-negative prenatal tests conducted in Ontario each year (HIV-positive prenatal tests are included). The limitations of the surveillance data in this report are summarized in the <u>Background</u> and <u>Technical notes</u>.

OHESI aims to produce further updates of this report in the future. Questions about this report and HIV surveillance and epidemiology in Ontario can be directed to OHESI (<u>ohesi@ohtn.on.ca</u>), while technical and data questions related to this report can be directed towards PHO Laboratory Surveillance and Data Management (<u>lab.data@oahpp.ca</u>). Other OHESI HIV reports, including the larger reports on HIV tests and HIV diagnoses in Ontario in 2021, can be found <u>here</u>.

Summary

See the <u>Background</u> section below for information on interpreting these indicators. These data only include HIV and viral load tests from individuals living in Ontario with a known PHU and therefore may differ from the data reported in other OHESI testing and care cascade reports.

Overall

HIV tests and first-time HIV diagnoses¹

Between 2017 and 2021 in Ontario²:

- There were a cumulative total of 2,978,161 HIV tests and 3,090 first-time HIV diagnoses. The average annual rate of HIV tests was 41.1 tests per 1,000 people and the average annual rate of first-time HIV diagnoses was 4.3 diagnoses per 100,000 people. The average HIV test positivity during this period was 0.10%.
- The average rate of HIV tests per 1,000 people was similar for males (40.5) and females (39.4). In contrast, the average first-time HIV diagnosis rates and test positivities were four-times higher for males (6.8 per 100,000 and 0.17%) than females (1.8 per 100,000 and 0.04%).
- After several years of gradual increases, the annual HIV test rate decreased by 27% in 2020 (from 46.2 in 2019 to 33.7 tests per 1,000 people) before partially recovering in 2021 (40.8).
- The annual first-time HIV diagnosis rate decreased by 26% in 2020 (from 4.7 diagnoses per 100,000 people in 2019 to 3.4 per 100,000) before decreasing further in 2021 (3.3 per 100,000).

Care cascade (in care, on antiretroviral treatment, virally suppressed)

 As of the end of 2020, there were an estimated 19,956 people with diagnosed HIV living in a known PHU in the province, of whom 89.2% were in care, 86.8% were on antiretroviral treatment (ART) and 84.8% were virally suppressed.³

By PHU

HIV tests and first-time HIV diagnoses¹

- HIV test and first-time HIV diagnosis indicators (2017-2021) ranged widely by PHU as follows:
 - o cumulative number of tests 3,100 to 1,023,136
 - o average rate of tests per 1,000 people 14.0 to 69.6
 - o cumulative number of diagnoses 0 to 1,662
 - average rate of diagnoses per 100,000 people 0 to 11.3
 - \circ average test positivity 0% to 0.17%.
- There was a particularly uneven geographic distribution in the number of first-time HIV diagnoses across Ontario. Most PHUs reported small numbers of first-time HIV diagnoses, with 20 of the 34 PHUs having fewer than 25 cumulative first-time HIV diagnoses between 2017 and 2021.
- The cumulative numbers of HIV tests and first-time HIV diagnoses was much higher in Toronto than in other PHUs. This was expected given Toronto's large population size. When population

¹ A previous OHESI analysis estimated that, due to missing data on HIV test history, between 6.9% and 8.1% of first-time HIV diagnoses between 2011 and 2020 had an uncaptured previous HIV diagnosis.

² Excludes 21,682 tests and 28 diagnoses with an unknown PHU or known to be living out-of-province.

³ Excludes 34 diagnosed individuals with an unknown or out-of-province PHU. This explains why these numbers differ slightly to estimates presented in <u>OHESI's report on Ontario's care cascade</u>.

rates were calculated, there was less variation across PHUs, although Toronto still had the highest rates of HIV tests and first-time HIV diagnoses.

- Toronto and Thunder Bay District had the highest average rate of first-time HIV diagnoses per 100,000 people and test positivities. The first-time HIV diagnosis rate per 100,000 people was highest in Toronto while the HIV test positivity was slightly higher in Thunder Bay compared to Toronto. Following these two PHUs, Northwestern, Middlesex-London, and Hamilton had the highest first-time HIV diagnosis rates, and Windsor-Essex, Hamilton, and Northwestern had the highest test positivities.
- The first-time HIV diagnosis rate and HIV test positivity were highest in Toronto for males and in Thunder Bay for females.
- HIV test rates per 1,000 people were lowest in Haldimand-Norfolk, Grey Bruce, Huron-Perth, Timiskaming, Eastern, Chatham-Kent, Southwestern, Haliburton-Kawartha-Pine Ridge, Brant, and Porcupine. Many of the PHUs with lower HIV test rates also had smaller numbers of first-time HIV diagnoses.
- While HIV test rates were generally similar by sex in each PHU, the first-time HIV diagnosis rates were higher for males compared to females in all PHUs except Thunder Bay.
- Annual HIV test rates per 1,000 people decreased in 2020 compared to 2019 in all PHUs except Sudbury and Wellington-Dufferin-Guelph. Most PHUs saw a decrease in first-time HIV diagnoses in 2020 compared to 2019, and 7 of the 9 PHUs that saw increases had small (single-digit) counts of first-time HIV diagnoses. Toronto saw a continued decrease in first-time HIV diagnoses in 2021, whereas Hamilton, Middlesex-London, Peel, and York saw varying increases.

Care cascade (in care, on antiretroviral treatment, virally suppressed)

- Care cascade indicators (2020) ranged widely by PHU as follows (first quartile [Q1]; third quartile [Q3]):
 - o number of people living with diagnosed HIV 16 to 10,482 (Q1: 77; Q3: 399)
 - percent of diagnosed people who were in care 67.6% to 100%⁴ (Q1: 87.1%; Q3: 93.0%)
 - o percent of diagnosed people who were on ART 64.7% to 100%³ (Q1: 85.0%; Q3: 90.4%)
 - percent of diagnosed people who were virally suppressed 52.9% to 100%³ (Q1: 82.8%; Q3: 88.7%)
- There was a particularly uneven geographic distribution in the number of people living with diagnosed HIV across Ontario and relatively small numbers in some PHUs. For example, in 2020, 19 PHUs had fewer than 150 people living with diagnosed HIV and 12 PHUs had fewer than 100.
- The number of people living with diagnosed HIV at the end of 2020 was much higher in Toronto (10,482) than other PHUs. The next highest PHUs were Ottawa (2,032), Peel (1,109), Hamilton (752) and Middlesex-London (683).
- In 2020, the proportion of people living with diagnosed HIV who were virally suppressed was highest in Timiskaming (small denominator of 16 people diagnosed³), Huron-Perth, Chatham-Kent, Haliburton-Kawartha-Pine Ridge, Peterborough, and Hastings-Prince Edward. This proportion was lowest in Northwestern⁵ (small denominator of 34 people diagnosed), Thunder Bay, Algoma, Renfrew, North Bay-Parry Sound, Sudbury, Lambton, and Leeds-Grenville-Lanark.
- PHUs with the largest numbers of diagnosed people living with HIV (Toronto, Ottawa, Peel, Hamilton, Middlesex-London) generally ranked in the middle to lower end of HIV care cascade engagement.

⁴100% of relatively few (16) people diagnosed in Timiskaming PHU.

⁵ People living with HIV in the Northwestern PHU may receive HIV care in Manitoba and therefore appear as not in care in the Public Health Ontario Laboratory Cohort, decreasing the Cascade outcomes for this PHU in this report.

Background

What's in this report?

- To assist in planning local HIV services, this report presents indicators on testing and diagnosis (number/rates of tests and first-time HIV diagnoses, HIV test positivities) and the HIV care cascade (number/percent of people living with diagnosed HIV who are in care, on ART and virally suppressed) for each of the 34 public health units (PHUs) in Ontario. Due to the small number of first-time HIV diagnoses in some PHUs, HIV test and first-time HIV diagnosis data are aggregated over the past five years (2017-2021).
- Each indicator is situated across the HIV prevention, engagement and care cascade (<u>Figure i</u>) and is important for maintaining/improving the health of people living with HIV and preventing new HIV transmissions.
- The data in this report come from the Public Health Ontario (PHO) Laboratory, not the Integrated Public Health Information System (iPHIS). PHO Laboratory houses centralized provincial databases with linked diagnostic and viral load (VL) testing data. This allows for analysis of HIV testing and HIV care cascade indicators (in care, on ART, virally suppressed), which is not possible with iPHIS data.
- For the HIV care cascade, all individuals with an unknown PHU (13 individuals) or known to be living out-of-province (21 individuals) are excluded from this report. 21,682 tests and 28 first-time HIV diagnoses with an unknown PHU or known to be living out-of-province were also excluded.
- Other OHESI HIV reports can be found on the <u>www.OHESI.ca</u> website.

Why look at HIV tests and HIV test positivity?

- Testing and diagnosis are early steps in the HIV prevention, engagement and care cascade (Figure
 i) and critical in order for people living with HIV to know their status and be linked to care.
 Testing is also a gateway to prevention services for people who are HIV-negative. Testing and
 diagnosis are important for reaching the 1st UNAIDS 90-90-90 target (Box i).
- Numbers and rates of HIV tests can be useful for measuring the success of testing initiatives and interpreting data on first-time HIV diagnoses. For example, a higher rate of HIV tests could partly explain a higher number of first-time HIV diagnoses in a specific PHU.
- The rate of HIV tests refers to the number of HIV tests compared to the size of the overall population. This may not be reflective of HIV test rates in specific populations (e.g. men who have sex with men). Also, HIV test rates do not account for the same individual testing multiple times in a year. Importantly, the HIV test rate may not reflect the actual rates in urban versus rural areas where availability of testing may be very different. High testing in urban areas may mask low testing in rural areas.
- The HIV test positivity is the proportion of all HIV tests completed that are reactive/positive (among tests with no <u>Previous evidence of HIV</u>). Test positivity is influenced by the number and types of people getting tested. For example, a high test positivity in a specific PHU could be due to a higher rate of infection or more targeted testing of people at higher risk of HIV infection. A high test positivity combined with a low HIV test rate may indicate the need to increase HIV testing.

Why look at first-time HIV diagnoses?

• The rate of first-time HIV diagnoses refers to the number of first-time HIV diagnoses compared to the size of the overall population. First-time HIV diagnosis rates have similar limitations as HIV test rates, which are described in the above section.

- Information on first-time HIV diagnoses is useful to inform our understanding of HIV epidemiology in Ontario and how many people with a first-time HIV diagnosis will require linkage to HIV care.
- First-time HIV diagnoses include a diagnosis at any point in the spectrum of HIV illness from those diagnosed shortly after their infection to those who are infected with HIV for years before they are diagnosed. First-time HIV diagnoses are influenced by a number of factors including transmission patterns and changes in testing practices. This report excludes individuals with <u>Previous evidence of HIV</u>, which encompasses those diagnosed with HIV outside of Ontario if noted on the testing requisition by the ordering physician. It is possible that individuals who were diagnosed with HIV outside of Ontario but have a first HIV positive test in Ontario are included as part of our first-time HIV diagnosis data if previous test history information was not completed appropriately. A previous OHESI analysis estimated that, due to missing data on HIV test history, between 6.9% and 8.1% of first-time HIV diagnoses between 2011 and 2020 had an uncaptured previous HIV diagnosis.

Why look at engagement in the HIV care cascade (in care, antiretroviral treatment and viral suppression)?

- To maintain and improve health and reduce the risk of new HIV transmissions, it is important for people living with HIV to be diagnosed, in care, on ART and virally suppressed.
- Understanding engagement in these HIV care cascade steps can help measure the impact of HIV care and monitor progress toward meeting the 2nd and 3rd UNAIDS 90-90-90 targets (<u>Box i</u>).
- Identifying gaps can help the care system prioritize interventions and inform program/policy changes to improve engagement.
- Lower care cascade engagement in specific PHUs may be due to a combination of factors, including:
 - o gaps in HIV and related health services;
 - inadequate capacity of HIV and related health services (e.g. PHUs with high numbers of diagnosed people may not have enough service capacity to meet all their needs);
 - different HIV epidemics across jurisdictions (e.g. a PHU's epidemic may be concentrated among populations who are more likely to experience barriers to care, such as people who use injection drugs);
 - drug resistance (e.g. some PHUs may have higher rates of drug resistance, leading to treatment failure and less viral suppression); and/or
 - methodological issues (e.g. individuals who are living in Ontario but receive care outside the province are not considered to be in care, on ART or virally suppressed in this report. This particular issue is most relevant to PHUs that border Manitoba or Quebec).





Box i. UNAIDS 90-90-90 Targets to 2020⁶

- 1. 90% of all people living with HIV will know their HIV status.
- 2. 90% of all people diagnosed with HIV will receive ART.
- 3. 90% of all people receiving ART will have viral suppression.

If all three 90-90-90 targets are met, 81% of **all** people living with HIV would be on ART and 73% of **all** people living with HIV would be virally suppressed.

More recently, the UNAIDS Global AIDS Strategy 2021-2026 set more ambitious 95-95-95 targets, with a focus on reducing inequities among people living with HIV⁷.

Where do these data come from?

- Data in this report come from the Public Health Ontario (PHO) Laboratory, which performs centralized HIV diagnostic and VL testing for the province.
- When someone is tested for HIV or receives a VL test in Ontario, the health care provider conducting the test fills out a test requisition form that is sent to the PHO Laboratory. Both the diagnostic and VL test requisition forms collect information on the person tested, including sex and geographic location (which is used to determine PHU). The VL requisition also collects information on ART use.
- The Ontario HIV Laboratory Cohort is used to estimate the number of people with diagnosed HIV living in Ontario and their engagement in the HIV care cascade (used to measure the 'in care', 'on ART', and 'virally suppressed' HIV care indicators) since January 1, 2000.
 - This cohort was created by linking PHO Laboratory's HIV diagnostic and VL data together for the same individual.
 - Individuals are assigned to a PHU based on their residence at the time of VL testing or, if unknown/not listed, the address of the ordering provider
 - See the <u>Technical notes</u> for more information on how inclusion and exclusion criteria are defined for this cohort, as well as definitions for each HIV care cascade indicator.
 - The cohort contains information on almost 54,000 individuals diagnosed with HIV between January 1, 2000 and December 31, 2021.
- Prenatal tests with an HIV-negative result ARE NOT included in this report, as they are part of an HIV testing program that is offered to all pregnant people. Approximately 150,000 HIV-negative prenatal tests are conducted in Ontario each year. Prenatal tests with an HIV-positive result ARE included in this report for the calculation of test positivity, when they are a first-time HIV diagnosis.
- While HIV tests and first-time HIV diagnoses data are available up to the year 2021, the most recent HIV care cascade estimates from the Ontario HIV Laboratory Cohort were only available up to 2020.
- HIV tests and first-time HIV diagnoses are presented as numbers as well as rates (e.g. the number of tests per 1,000 people). While numbers of HIV tests and first-time HIV diagnoses are influenced by the size of the underlying population (e.g. greater population = greater numbers of tests/diagnoses), rates take population size into account and remove it as a possible explanatory factor for any observed differences between populations or PHUs.

 ⁶ UNAIDS. <u>'90-90-90' – An ambitious treatment target to help end the AIDS epidemic</u>
 ⁷ UNAIDS. <u>Global AIDS Strategy 2021-2026. End Inequalities. End AIDS.</u>

What are some of the strengths of these data?

- All HIV diagnostic and VL testing ordered by health care providers in Ontario is centrally
 performed by the PHO Laboratory with few exceptions that are not captured in this data set (e.g.
 tests conducted for purposes of blood/tissue/organ donation, life insurance eligibility, high risk
 women in labour with no history of HIV testing, and needlestick or other occupational
 exposures).
- Information on sex and geographic location (residence address, or if not reported, provider address) is reliably reported and missing for less than 3% of HIV tests and less than 1% of first-time HIV diagnoses.
- In the 2020 data used to measure the HIV care cascade, only 7% of VL tests were missing information on residence and were assigned to a PHU based on provider address.

What are some of the limitations of these data?

- HIV tests and first-time HIV diagnoses are assigned to a PHU based on an individual's residence at the time of the testing or, if unknown, the address of the ordering provider. Between 2017 and 2021, 16% of diagnostic tests and 29% of first-time HIV diagnoses were missing information on residence address and assigned based on the provider's address. The percentage of tests/diagnoses missing residence address is higher than the 7% of Ontario HIV Laboratory Cohort individuals who are missing this information (the VL test requisition is primarily used for the cohort).
- The number of first-time HIV diagnoses may be higher than the actual number of individuals who were diagnosed, as (1) individuals diagnosed through non-nominal testing (anonymous, coded) may also receive a nominal diagnostic test when entering care and be counted twice; and (2) positive HIV tests are categorized as first-time HIV diagnoses by default when previous test information is not completed.
- When estimating the number of people with diagnosed HIV living in Ontario it is not possible to determine the reasons for loss to follow-up (LTFU) such as an individual who has died, migrated out of Ontario, or has been lost to care. To account for LTFU, individuals diagnosed with HIV and have no VL test for greater than three years, and no VL test in later subsequent years, are removed from the cohort.
- Use of ART is documented by the ordering provider on the VL test requisition and missing from 21% of forms between 2016 and 2020. Those with missing data are assigned as being 'on ART' only if virally suppressed (<200 copies/mL) **and** there is no evidence of being a HIV-negative person.
- Due to small counts, data for transgender individuals are not presented separately. 'Unknown' sex includes transgender individuals.
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The figures in this section contain maps presenting various HIV indicators by PHU. Indicators include cumulative HIV tests and first-time HIV diagnoses data (2017-2021), as well as estimates of the number of people with diagnosed HIV living in Ontario and the proportion who were in care, on ART and virally suppressed in 2020. While trends over time are not presented in these maps, tables at the end of the report do contain annual data on HIV tests, first-time HIV diagnoses and HIV test positivities for 2017 to 2021.

Each map presents PHU-level data using different shades/colors. Each shade/colour represents a different range of values, as denoted by the map legend. Importantly, range cutoffs are based on the distribution of data (using a combination of natural breaks and quartile methods) and are therefore different for each map. The main section of the map shows central/southern Ontario, while the inset map (enclosed in a square box) shows northern Ontario. Each map is also accompanied by a brief, non-exhaustive description of the data. Asterisks (*) within specific PHUs in some maps indicates that estimates are based on small numbers and should be interpreted with caution.

A maps presenting PHU locations and population sizes can be found in **Figure 1.1**, and following is a table listing the PHU codes and their specific population sizes. See the <u>Technical notes</u> section for more information on data sources and indicators were calculated.

I. Public health unit population sizes

Figure 1.1 Location of the 34 public health units and public health units by average population size (number of people), Ontario, 2017-2021



ALG	Algoma District	KFL	Kingston-Frontenac and	PTC	Peterborough County-City
BRN	Brant County		Lennox and Addington	REN	Renfrew County and
CHK	Chatham-Kent	LAM	Lambton		District
DUR	Durham Regional	LGL	Leeds-Grenville and Lanark	SMD	Simcoe Muskoka District
EOH	Eastern Ontario		District	SUD	Sudbury and District
GBO	Grey Bruce	MSL	Middlesex-London	THB	Thunder Bay District
HAL	Halton Regional	NIA	Niagara Regional Area	TOR	City of Toronto
HAM	City of Hamilton	NPS	North Bay Parry Sound	TSK	Timiskaming
HDN	Haldimand-Norfolk		District	WAT	Waterloo
HKP	Haliburton-Kawartha-Pine	NWR	Northwestern	WDG	Wellington-Dufferin-
	Ridge District	OTT	City of Ottawa		Guelph
HPE	Hastings-Prince Edward	OXE	Southwestern	WEC	Windsor-Essex County
	Counties	PEL	Peel Regional	YRK	York Regional
HPH	Huron Perth	PQP	Porcupine		

Notes: Population estimates retrieved from Statistics Canada.

HIV in Ontario by public health unit: Tests & diagnoses 2021, and care cascade 2020

		Average
Cada	Dublic Health I Init	population
Code	Public Health Unit	(2017 to
		2021)
ALG	Algoma District	116,940
BRN	Brant County	151,635
СНК	Chatham-Kent	106,409
DUR	Durham Regional	699,949
EOH	Eastern Ontario	213,597
GBO	Grey Bruce	173,700
HAL	Halton Regional	597,081
HAM	City of Hamilton	574,141
HDN	Haldimand-Norfolk	118,454
НКР	Haliburton-Kawartha-Pine Ridge District	189,666
HPE	Hastings and Prince Edward Counties	170,748
HPH	Huron Perth	144,642
KFL	Kingston-Frontenac and Lennox and Addington	206,912
LAM	Lambton	131,735
LGL	Leeds-Grenville and Lanark District	177,922
MSL	Middlesex-London	500,786
NIA	Niagara Regional Area	476,496
NPS	North Bay Parry Sound District	129,411
NWR	Northwestern	81,370
OTT	City of Ottawa	1,022,991
OXE	Southwestern	215,598
PEL	Peel Regional	1,525,060
PQP	Porcupine	85,091
PTC	Peterborough County-City	146,725
REN	Renfrew County and District	108,109
SMD	Simcoe Muskoka District	593,655
SUD	Sudbury and District	204,270
ТНВ	Thunder Bay District	156,990
TOR	City of Toronto	2,941,790
TSK	Timiskaming	33,952
WAT	Waterloo	590,854
WDG	Wellington-Dufferin-Guelph	308,016
WEC	Windsor-Essex County	423,488
YRK	York Regional	1,180,922

Notes: Population estimates retrieved from Statistics Canada.

Number of HIV tests

<u>Overall</u>

- The cumulative number of HIV tests (2017-2021) in Ontario was 2,978,161. Sex was reported for 2,894,754 tests, of which 1,449,773 (50.1%) were among males and 1,444,981 (49.9%) were among females.⁸
 - Note: the approximately 150,000 HIV-negative prenatal tests conducted in Ontario each year as part of the HIV prenatal testing program were not included in this report.
- The annual number of HIV tests in Ontario increased from 569,811 in 2017 to 672,683 in 2019, then decreased to 500,517 in 2020 before increasing again to 610,493 in 2021.⁹

By PHU

- The cumulative number of tests (2017-2021) ranged from 3,100 in Timiskaming to 1,023,136 in Toronto.
- Following Toronto, the number of tests was highest in Peel (352,679), Ottawa (239,547), York (210,586), Middlesex-London (109,355), Hamilton (107,842), and Durham (103,451). There were fewer than 100,000 tests in each of the remaining 27 PHUs.
- The number of tests among males and females followed the same decending ordering as for overall (Toronto, Peel, Ottawa and York).
- Tests were generally split equally by sex in most PHUs, with the proportion that were female ranging from 43% in Kingston-Frontenac-Lennox-Addington to 56% in Eastern Ontario and Wellington-Dufferin-Guelph.
- The annual number of tests increased in nearly all PHUs between 2017 and 2019, decreased in 2020, and then increased again in 2021. Sudbury and Wellington-Dufferin-Guelph were the exceptions to this, where Sudbury increased between 2017 and 2019 but Wellington-Dufferin-Guelph decreased, both increased in 2020, and both decreased in 2021. The largest relative decreases in 2020 compared to 2019 were in Kingston-Frontenac-Lennox-Addington (37%), Peterborough (33%), and Toronto (31%).

The above data is presented in Figure 2.1, Figure 2.2, and Figure 2.3, and Table 1.1 and Table 1.2.

⁸ Excludes 21,682 tests with an unknown PHU or known to be living out-of-province. 83,407 tests had unknown sex. 'Unknown' sex includes transgender individuals.

⁹ Excludes 21,682 tests with an unknown PHU or known to be living out-of-province. 'Unknown' sex includes transgender individuals. Includes tests with unknown sex.





Snapshot

The cumulative number of HIV tests was highest in Toronto (1,023,136), followed by Peel (352,679), Ottawa (239,547) and York (210,586). Overall, the cumulative number of HIV tests in Ontario between 2017 and 2021 was 2,978,161.

Notes: Data provided by Public Health Ontario Laboratory. HIV-negative prenatal tests not included. Excludes individuals with an unknown PHU or known to be living out-of-province (0.7%). Tests assigned to a PHU based on an individual's address of residence or, if unknown, the address of the ordering provider. See **Table 1.1** for data.



Figure 2.2 Cumulative number of HIV tests by public health unit, males, Ontario, 2017 to 2021

Snapshot

The cumulative number of HIV tests among males was highest in Toronto (527,079), followed by Peel (169,091), Ottawa (116,856) and York (98,945). Overall, the cumulative number of HIV tests among males in Ontario between 2017 and 2021 was 1,449,773.

Notes: Data provided by Public Health Ontario Laboratory. HIV-negative prenatal tests not included. Excludes individuals with an unknown PHU or known to be living out-of-province (0.7%). Tests assigned to a PHU based on an individual's address of residence or, if unknown, the address of the ordering provider. See **Table 1.1** for data.



Figure 2.3 Cumulative number of HIV tests by public health unit, females, Ontario, 2017 to 2021

Snapshot

The cumulative number of HIV tests among females was highest in Toronto (473,444), followed by Peel (175,210), Ottawa (117,748) and York (106,719). Overall, the cumulative number of HIV tests among females in Ontario between 2017 and 2021 was 1,444,981.

Notes: Data provided by Public Health Ontario Laboratory. HIV-negative prenatal tests not included. Excludes individuals with an unknown PHU or known to be living out-of-province (0.7%). Tests assigned to a PHU based on an individual's address of residence or, if unknown, the address of the ordering provider. See **Table 1.1** for data.

Rate of HIV tests per 1,000 people

<u>Overall</u>

- The average HIV test rate per 1,000 people (2017-2021) in Ontario was 41.1 and similar for males (40.5) and females (39.4).¹⁰
- The annual rate of tests per 1,000 people in Ontario increased from 40.5 in 2017 to 46.2 in 2019, then decreased to 33.7 in 2020 before increasing again to 41.1 in 2021.¹⁰

By PHU

- The HIV test rate per 1,000 people was highest in Toronto (69.6) followed by Ottawa (46.9), Peel (46.2), Northwestern (45.3) and Kingston-Frontenac-Lennox-Addington (44.7). The HIV test rate per 1,000 people was lowest in Haldimand-Norfolk (14.0) followed by Grey Bruce (16.0), Huron-Perth (17.4), Timiskaming (18.3), Eastern (19.2), Chatham-Kent (19.3), and Southwestern (19.8).
- The rate of testing was generally similar for males and females in most PHUs. The HIV test rate per 1,000 males and per 1,000 females were highest in Toronto followed by Kingston-Frontenac-Lennox-Addington (males) and Northwestern (females).
- The average rate of tests per 1,000 people increased in nearly all PHUs between 2017 and 2019, decreased in 2020, and then increased again in 2021. Sudbury and Wellington-Dufferin-Guelph were the exceptions to this, where instead Wellington-Dufferin-Guelph decreased between 2017 and 2019, both increased in 2020, and both decreased in 2021. The largest relative decreases in 2020 compared to 2019 were in Kingston-Frontenac-Lennox-Addington (37%), Peterborough (34%), and Toronto (32%).

The above data is presented in Figure 2.4, Figure 2.5, and Figure 2.6, and Table 1.3 and Table 1.4.

¹⁰ Excludes 21,682 tests with an unknown PHU or known to be living out-of-province. 83,407 tests had unknown sex. 'Unknown' sex includes transgender individuals.

Figure 2.4 Average rate of HIV tests per 1,000 people by public health unit, Ontario, 2017 to 2021



Snapshot

The HIV test rate per 1,000 people was highest in Toronto (69.6), Ottawa (46.9), Peel (46.2), and Northwestern (45.3). The rates were lowest in Haldimand-Norfolk (14.0), Grey Bruce (16.0), Huron-Perth (17.4), Timiskaming (18.3), Eastern (19.2), Chatham-Kent (19.3), and Southwestern (19.8). Overall, the average HIV test rate in Ontario between 2017 and 2021 was 41.1 per 1,000 people.

Notes: Data provided by Public Health Ontario Laboratory. HIV-negative prenatal tests not included. Excludes individuals with an unknown PHU or known to be living out-of-province (0.7%). Population estimates retrieved from Statistics Canada. Tests assigned to a PHU based on an individual's address of residence or, if unknown, the address of the ordering provider. See **Table 1.3** for data.



Figure 2.5 Average rate of HIV tests per 1,000 people by public health unit, males, Ontario, 2017 to 2021

Snapshot

The HIV test rate per 1,000 males was highest in Toronto (73.7), Kingston-Frontenac-Lennox-Addington (51.1) and Ottawa (46.6). The rates were lowest in Haldimand-Norfolk (12.6), Grey Bruce (14.3), Huron-Perth (16.4), Eastern (16.5), Southwestern (17.4), Timiskaming (17.6) and Chatham-Kent (18.0). Overall, the average HIV test rate among males in Ontario between 2017 and 2021 was 40.5 per 1,000 people.

Notes: Data provided by Public Health Ontario Laboratory. HIV-negative prenatal tests not included. Excludes individuals with an unknown PHU or known to be living out-of-province (0.7%). Population estimates retrieved from Statistics Canada. Tests assigned to a PHU based on an individual's address of residence or, if unknown, the address of the ordering provider. See **Table 1.3** for data.



Figure 2.6 Average rate of HIV tests per 1,000 by public health unit, females, Ontario, 2017 to 2021

Snapshot

The HIV test rate per 1,000 females was highest in Toronto (62.7), Northwestern (49.5) Peel (45.8) and Ottawa (45.3). The rates were lowest in Haldimand-Norfolk (13.6), Grey Bruce (16.0), Huron-Perth (17.6), Timiskaming (18.5), Haliburton-Kawartha-Pine Ridge (18.8), and Chatham-Kent (19.4). Overall, the average HIV test rate among females in Ontario between 2017 and 2021 was 39.4 per 1,000 people.

Notes: Data provided by Public Health Ontario Laboratory. HIV-negative prenatal tests not included. Excludes individuals with an unknown PHU or known to be living out-of-province (0.7%). Population estimates retrieved from Statistics Canada. Tests assigned to a PHU based on an individual's address of residence or, if unknown, the address of the ordering provider. See **Table 1.3** for data.

3. First-time HIV diagnoses

Number of first-time HIV diagnoses¹¹

<u>Overall</u>

- The cumulative number of first-time HIV diagnoses (2017-2021) in Ontario was 3,070, of whom 2,424 (79.0%) were male and 646 (21.0%) were female.¹²
- The annual number of first-time HIV diagnoses in Ontario increased from 691 in 2017 to 729 in 2018, then decreased to 483 in 2021.¹³

By PHU

- The cumulative number of first-time HIV diagnoses (2017-2021) ranged from 0 in Timiskaming to 1,662 in Toronto.
- Following Toronto, the number of first-time HIV diagnoses was highest in Peel (247), Ottawa (192), Hamilton (129), Middlesex-London (121), and York (109). These six PHUs (including Toronto) accounted for 79% of all first-time HIV diagnoses between 2017 and 2021 in Ontario. There were 630 cumulative first-time HIV diagnoses in total in the remaining 28 PHUs, with fewer than 100 diagnoses in each and 20 PHUs each having fewer than 25 diagnoses.
- The number of first-time HIV diagnoses in males and females were highest in Toronto, followed by Peel and Ottawa (males), and Ottawa and Peel (females).
- Among PHUs with the highest cumulative number of first-time HIV diagnoses above, the proportions that were female were highest in Ottawa (37%), Hamilton (26%), and Peel (26%) and lowest in York (15%), Toronto (17%), and Middlesex-London (22%). Note that no first-time HIV diagnoses in females were reported in Haldimand-Norfolk, Huron-Perth, and Porcupine, and no first-time HIV diagnoses in males or females were reported in Timiskaming.
- Most PHUs saw a decrease in first-time HIV diagnoses in 2020 compared to 2019, and 7 of the 9 PHUs that saw increases had small (single-digit) counts of first-time HIV diagnoses.
- Among PHUs with the highest numbers of first-time HIV diagnoses, Toronto saw a continued decrease in first-time HIV diagnoses in 2021, whereas Hamilton, Middlesex-London, Peel, and York saw increases.
- See **Table 2.3** for numbers of people with previous evidence of HIV (PEH) by public health unit and year.
- See **Table 2.6** for breakdowns of first-time HIV diagnoses by HIV exposure category within each PHU.

The above data is presented in Figure 3.1, Figure 3.2, and Figure 3.3, and Table 2.1 and Table 2.2.

¹¹ A previous OHESI analysis estimated that, due to missing data on HIV test history, between 6.9% and 8.1% of first-time HIV diagnoses between 2011 and 2020 (between 5.0% and 5.9% among males and between 15.0% and 17.4% among females) had an uncaptured previous HIV diagnosis.

¹² Excludes 20 diagnoses with unknown sex and 28 diagnoses with an unknown PHU or known to be living out-of-province. 'Unknown' sex includes transgender individuals.

¹³ Excludes diagnoses with an unknown PHU or known to be living out-of-province. Includes diagnoses with unknown sex. 'Unknown' sex includes transgender individuals.

Figure 3.1 Cumulative number of first-time HIV diagnoses by public health unit, Ontario, 2017 to 2021



Snapshot

The cumulative number of first-time HIV diagnoses was highest in Toronto (1,662) followed by Peel (247), Ottawa (192), Hamilton (129) and Middlesex-London (121). Overall, the cumulative number of first-time HIV diagnoses in Ontario between 2017 and 2021 was 3,090.

Notes: Data provided by Public Health Ontario Laboratory. Excludes individuals with an unknown PHU or known to be living out-of-province (0.9%). First-time HIV diagnoses assigned to a PHU based on an individual's address of residence or, if unknown, the address of the ordering provider. A previous OHESI analysis estimated that, due to missing data on HIV test history, between 6.9% and 8.1% of first-time HIV diagnoses between 2011 and 2020 had an uncaptured previous HIV diagnosis. See **Table 2.1** for data.



Figure 3.2 Cumulative number of first-time HIV diagnoses by public health unit, males, Ontario, 2017 to 2021

Snapshot

The cumulative number of first-time HIV diagnoses among males was highest in Toronto (1,371) followed by Peel (181), Ottawa (120), Hamilton (95), Middlesex-London (94) and York (93). Overall, the cumulative number of first-time HIV diagnoses among males in Ontario between 2017 and 2021 was 2,424.

Notes: Data provided by Public Health Ontario Laboratory. Excludes individuals with an unknown PHU or known to be living out-of-province (0.8%). First-time HIV diagnoses assigned to a PHU based on an individual's address of residence or, if unknown, the address of the ordering provider. A previous OHESI analysis estimated that, due to missing data on HIV test history, between 5.0% and 5.9% of first-time HIV diagnoses among males between 2011 and 2020 had an uncaptured previous HIV diagnosis. See **Table 2.1** for data.





Snapshot

The cumulative number of first-time HIV diagnoses among females was highest in Toronto (280) followed by Ottawa (69), Peel (63), Hamilton (34), and Thunder Bay (30). Overall, the cumulative number of first-time HIV diagnoses among females in Ontario between 2017 and 2021 was 646.

Notes: Data provided by Public Health Ontario Laboratory. Excludes individuals with an unknown PHU or known to be living out-of-province (1.2%). First-time HIV diagnoses assigned to a PHU based on an individual's address of residence or, if unknown, the address of the ordering provider. A previous OHESI analysis estimated that, due to missing data on HIV test history, between 15.0% and 17.4% of first-time HIV diagnoses among females between 2011 and 2020 had an uncaptured previous HIV diagnosis. See **Table 2.1** for data.

Rate of first-time HIV diagnoses¹⁴ per 100,000 people

<u>Overall</u>

- The average rate of first-time HIV diagnoses per 100,000 people (2017-2021) in Ontario was 4.3.
- The average rate of first-time HIV diagnoses per 100,000 people (2017-2021) was nearly fourtimes higher for males (6.8) than for females (1.8).¹⁵
- The annual rate of first-time HIV diagnoses per 100,000 people in Ontario increased from 4.9 in 2017 to 5.1 in 2018, then decreased to 3.3 by 2021.¹⁶

By PHU

- The average rate of first-time HIV diagnoses per 100,000 people (2017-2021) ranged from 0 in Timiskaming to 11.3 in Toronto.
- Following Toronto, the average rate of first-time HIV diagnoses per 100,000 people (2017-2021) was highest in Thunder Bay (7.0), followed by Northwestern (5.2), Middlesex-London (4.9), Hamilton (4.5) and Windsor-Essex (4.2).
- The average rate of first-time HIV diagnoses per 100,000 males was highest in Toronto (19.2), followed by Middlesex-London (7.7), Windsor-Essex (7.5), Hamilton (6.7), Thunder Bay (6.4), and Northwestern (5.8).
- In contrast, the average rate of first-time HIV diagnoses per 100,000 females was highest in Thunder Bay (7.7), followed by Northwestern (4.5), Toronto (3.7), Ottawa (2.6), Hamilton (2.4), and Middlesex-London (2.2).
- The average first-time HIV diagnosis rate per 100,000 people (2017-2021) was lowest in Timiskaming (0.0), Porcupine (0.7), Haliburton-Kawartha-Pine Ridge (0.8), Lambton (0.9) and Renfrew (0.9).
- Most PHUs saw a decrease in the annual rate of first-time HIV diagnoses per 100,000 in 2020 compared to 2019, and 7 of the 9 PHUs that saw increases had small (single-digit) counts of first-time HIV diagnoses. Toronto and Windsor-Essex saw continued decreases in first-time HIV diagnosis rates in 2021, whereas Thunder Bay, Northwestern, Middlesex-London, and Hamilton saw varying increases.
- See **Table 2.3** for numbers of people with previous evidence of HIV (PEH) by public health unit and year.
- See **Table 2.6** for breakdowns of first-time HIV diagnoses by HIV exposure category within each PHU.

The above data is presented in Figure 3.4, Figure 3.5, and Figure 3.6, and Table 2.4 and Table 2.5.

¹⁴ A previous OHESI analysis estimated that, due to missing data on HIV test history, between 6.9% and 8.1% of first-time HIV diagnoses between 2011 and 2020 (between 5.0% and 5.9% among males and between 15.0% and 17.4% among females) had an uncaptured previous HIV diagnosis.

¹⁵ Excludes 28 diagnoses with an unknown PHU or known to be living out-of-province.

¹⁶ Excludes diagnoses with an unknown PHU or known to be living out-of-province. Includes diagnoses with unknown sex. 'Unknown' sex includes transgender individuals.

Figure 3.4 Average rate of first-time HIV diagnoses per 100,000 people by public health unit, Ontario, 2017 to 2021



Snapshot

The average rate of first-time HIV diagnoses per 100,000 people was highest in Toronto (11.3), followed by Thunder Bay (7.0), Northwestern (5.2), Middlesex-London (4.9) and Hamilton (4.5). The rate was lowest in Timiskaming (0.0; 0 first-time HIV diagnoses), Porcupine (0.7; 3 diagnoses), Haliburton-Kawartha-Pine Ridge (0.8; 8 diagnoses) and Renfrew (0.9; 5 diagnoses). Overall, the average rate of first-time HIV diagnoses per 100,000 people in Ontario between 2017 and 2021 was 4.3.

Notes: Data provided by Public Health Ontario Laboratory. *Indicates the first-time HIV diagnosis rate is based on fewer than 10 first-time HIV diagnoses and should therefore be interpreted with caution. Excludes individuals with an unknown PHU or known to be living out-of-province (0.9%). First-time HIV diagnoses assigned to a PHU based on an individual's address of residence or, if unknown, the address of the ordering provider. A previous OHESI analysis estimated that, due to missing data on HIV test history, between 6.9% and 8.1% of first-time HIV diagnoses between 2011 and 2020 had an uncaptured previous HIV diagnosis. See **Table 2.4** for data.





Snapshot

The average rate of first-time HIV diagnoses per 100,000 males was highest in Toronto (19.2), followed by Middlesex-London (7.7), Windsor-Essex (7.5), Hamilton (6.7) and Thunder Bay (6.4). The rate was lowest in Timiskaming (0.0; 0 first-time HIV diagnoses), Renfrew (1.1; 3 diagnoses), Lambton (1.2; 4 diagnoses), Haliburton-Kawartha-Pine Ridge (1.3; 6 diagnoses), Porcupine (1.4; 3 diagnoses) and Eastern (1.5; 8 diagnoses). Overall, the average rate of first-time HIV diagnoses per 100,000 males in Ontario between 2017 and 2021 was 6.8.

Notes: Data provided by Public Health Ontario Laboratory. *indicates the first-time HIV diagnosis rate is based on fewer than 5 first-time HIV diagnoses and should therefore be interpreted with caution. Excludes individuals with an unknown PHU or known to be living out-of-province (0.8%). First-time HIV diagnoses assigned to a PHU based on an individual's address of residence or, if unknown, the address of the ordering provider. A previous OHESI analysis estimated that, due to missing data on HIV test history, between 5.0% and 5.9% of first-time HIV diagnoses among males between 2011 and 2020 had an uncaptured previous HIV diagnosis. See **Table 2.4** for data.





Snapshot

The average rate of first-time HIV diagnoses per 100,000 females was highest in Thunder Bay (7.7), followed by Northwestern (4.5) and Toronto (3.7). Overall, the average rate of first-time HIV diagnoses per 100,000 females in Ontario between 2017 and 2021 was 1.8.

Notes: Data provided by Public Health Ontario Laboratory. *Indicates the first-time HIV diagnosis rate is based on fewer than 5 first-time HIV diagnoses and should therefore be interpreted with caution. Excludes individuals with an unknown PHU or known to be living out-of-province (1.7%). First-time HIV diagnoses assigned to a PHU based on an individual's address of residence or, if unknown, the address of the ordering provider. A previous OHESI analysis estimated that, due to missing data on HIV test history, between 15.0% and 17.4% of first-time HIV diagnoses among females between 2011 and 2020 had an uncaptured previous HIV diagnosis. See **Table 2.4** for data.

4. HIV test positivity

<u>Overall</u>

- The overall test positivity (2017-2021) in Ontario was 0.10%.
- The overall test positivity (2017-2021) was four-times higher for males (0.17%) than females (0.04%).¹⁷
- Between 2017 and 2021, the overall annual test positivity decreased from 0.12% to 0.08% (equivalent to a 33% relative decrease).¹⁷

By PHU

- The average HIV test positivity (2017-2021) ranged from 0% in Timiskaming to 0.17% in Thunder Bay.
- Following Thunder Bay, the average HIV test positivity was highest in Toronto (0.16%) followed by Windsor-Essex (0.13%), Hamilton (0.12%), Northwestern (0.11%), North Bay-Parry Sound (0.11%), and Middlesex-London (0.11%).
- The average HIV test positivity among males was highest in Toronto (0.26%), Windsor-Essex (0.25%), Southwestern (0.19%), and Hamilton (0.18%).
- In contrast, the average HIV test positivity among females was highest in Thunder Bay (0.17%), followed by Northwestern (0.09%), North Bay-Parry Sound (0.07%), and Hamilton (0.07%).
- The average HIV test positivity overall was lowest in Timiskaming (0.00%; 0 first-time HIV diagnoses), Porcupine (0.03%; 3 diagnoses), Sudbury (0.04%; 5 diagnoses), Simcoe-Muskoka (0.04%; 29 diagnoses), Haliburton-Kawartha-Pine Ridge (0.04%; 8 diagnoses), Algoma (0.04%; 8 diagnoses), Lambton (0.04%; 6 diagnoses), Renfrew (0.04%; 5 diagnoses), and Wellington-Dufferin-Guelph (0.04%; 20 diagnoses).
- Between 2017 and 2021, there were no consistent trends in the annual test positivity for any PHU.

The above data is presented in Figure 4.1, Figure 4.2, and Figure 4.3, and Table 3.1 and Table 3.2.

¹⁷ Excludes 21,682 tests and 28 diagnoses with an unknown PHU or known to be living out-of-province.



Figure 4.1 Average HIV test positivity by public health unit, Ontario, 2017 to 2021

Snapshot

The average HIV test positivity was highest in Thunder Bay (0.17%), followed by Toronto (0.16%), Windsor-Essex (0.13%), Hamilton (0.12%), Middlesex-London (0.11%), Northwestern (0.11%), and North Bay-Parry Sound (0.11%). The rate was lowest in Timiskaming (0.00%; 0 first-time HIV diagnoses), Porcupine (0.03%; 3 diagnoses), Haliburton-Kawartha-Pine Ridge (0.04%; 8 diagnoses), Lambton (0.04%; 6 diagnoses), Algoma (0.04%; 8 diagnoses), Renfrew (0.04%; 5 diagnoses), Simcoe-Muskoka (0.04%; 29 diagnoses); Sudbury (0.04%; 13 diagnoses), and Wellington-Dufferin-Guelph (0.04%; 20 diagnoses). Overall, the average HIV test positivity in Ontario between 2017 and 2021 was 0.10%.

Notes: Data provided by Public Health Ontario Laboratory. *Indicates the test positivity is based on fewer than 10 first-time HIV diagnoses and should therefore be interpreted with caution. HIV-negative prenatal tests not included. Test positivity refers to the percent of tests that were HIV-positive. Excludes individuals with an unknown PHU or known to be living out-of-province (0.7%). HIV tests and first-time HIV diagnoses assigned to a PHU based on an individual's address of residence or, if unknown, the address of the ordering provider. See **Table 3.1** for data.



Figure 4.2 Average HIV test positivity by public health unit, males, Ontario, 2017 to 2021

Snapshot

The average HIV test positivity among males was highest in Toronto (0.26%), and Windsor-Essex (0.25%), followed by Southwestern (0.19%). The test positivity was lowest in Timiskaming (0.00%; 0 first-time HIV diagnoses), Refrew (0.05%; 3 diagnoses), Sudbury (0.05%; 13 diagnoses), Haliburton-Kawartha-Pine Ridge (0.06%; 6 diagnoses), Lambton (0.06%; 4 diagnoses), Algoma (0.06%; 6 diagnoses), Wellington-Dufferin-Guelph (0.06%; 12 diagnoses), and Kingston-Frontenac-Lennox-Addington (0.06%; 16 diagnoses). Overall, the average HIV test positivity among males in Ontario between 2017 and 2021 was 0.17%.

Notes: Data provided by Public Health Ontario Laboratory. *Indicates the test positivity is based on fewer than 5 first-time HIV diagnoses and should therefore be interpreted with caution. Test positivity refers to the percent of tests that were HIV-positive. Excludes individuals with an unknown PHU or known to be living out-of-province (0.7%). HIV tests and first-time HIV diagnoses assigned to a PHU based on an individual's address of residence or, if unknown, the address of the ordering provider. See **Table 3.1** for data.



Figure 4.3 Average HIV test positivity by public health unit, females, Ontario, 2017 to 2021

Snapshot

The average HIV test positivity among females was highest in Thunder Bay (0.17%), followed by Northwestern (0.09%), Hamilton (0.07%), and North Bay-Parry Sound (0.07%). The test positivity was lowest in Haldiman-Norfolk (0.00%; 0 first-time HIV diagnoses), Huron-Perth (0.00%; 0 diagnoses), Porcupine (0.00%; 0 diagnoses), Timiskaming (0.00%; 0 diagnoses), Grey Bruce (0.01%; 1 first-time HIV diagnosis), Hastings-Prince Edward (0.01%; 1 first-time HIV diagnosis), Leeds-Grenville-Lanark (0.01%; 1 first-time HIV diagnosis) and Simcoe-Muskoka (0.01%; 5 diagnoses). Overall, the average HIV test positivity among females in Ontario between 2017 and 2021 was 0.04%.

Notes: Data provided by Public Health Ontario Laboratory. *Indicates the test positivity is based on fewer than 5 first-time HIV diagnoses and should therefore be interpreted with caution. HIV-negative prenatal tests not included. Test positivity refers to the percent of tests that were HIV-positive. Excludes individuals with an unknown PHU or known to be living out-of-province (0.8%). Tests assigned to a PHU based on an individual's address of residence or, if unknown, the address of the ordering provider. See **Table 3.1** for data.

5. HIV care cascade (diagnosed, in care, on ART and virally suppressed)

Number of people living with diagnosed HIV

<u>Overall</u>

• As of the end of 2020, there were an estimated 19,956 people living with diagnosed HIV in Ontario.¹⁸

By PHU

- The number of people living with diagnosed HIV in 2020 ranged from 16 in Timiskaming to 10,482 in Toronto.
- Following Toronto, the number of diagnosed people was highest in Ottawa (2,032), Peel (1,109) and Hamilton (752). These four PHUs (including Toronto) accounted for approximately 72% of all diagnosed people in 2020.
- Seven PHUs had between 100-150 people living with diagnosed HIV and 12 PHUs had fewer than 100.

The above data is presented in Figure 5.1 and Table 4.1.

In care

Individuals in the Ontario HIV Laboratory Cohort are considered to be 'in care' if they have at least one viral load test in a given year or the preceding year.

<u>Overall</u>

• In 2020, the percent of people with diagnosed HIV living in Ontario who were in care was 89.2%.¹⁸

By PHU

- Across PHUs, the percent of people living with diagnosed HIV who were in care in 2020 ranged from 67.6% to 100%.
- The percent who were in care was highest in Timiskaming (100% of 16 people), Grey Bruce (94.8% of 77 people) and Haldimand-Norfolk (94.5% of 55 people).
- This percent was lowest in Northwestern¹⁹ (67.6% of 34 people), Renfrew (78.4% of 51 people), Thunder Bay (82.0% of 139 people) and Algoma (82.7% of 81 people).
- Between 2016 and 2020, the largest increases in the percent who were in care were in Huron-Perth (84.6% to 93.5%), Hastings-Prince Edward (85.2% to 93.5%), and Timiskaming (92.9% to 100% [based on very small counts]), and the largest decreases were in Renfrew (89.4% to 78.4%), Algoma (93.4% to 82.7%), and North Bay-Parry Sound (94.8% to 85.7%).

The above data is presented in Figure 5.2 and Table 4.1.

On ART

Individuals in the Ontario HIV Laboratory Cohort are considered to be 'on antiretroviral treatment' if their provider documented that they were taking antiretroviral medications on their last viral load test requisition in a given year. If this information is missing, an individual is assumed to be 'on antiretroviral treatment' if they were virally suppressed on their last viral load test.

¹⁸ Excludes 34 people with an unknown PHU or known to be living out-of-province.

¹⁹ People living with HIV in the Northwestern PHU may receive HIV care in Manitoba and therefore appear as not in care in the Public Health Ontario Laboratory Cohort, decreasing the Cascade outcomes for this PHU in this report.
<u>Overall</u>

 In 2020, the percent of people with diagnosed HIV living in Ontario who were on ART was 86.8%.²⁰

<u>By PHU</u>

- Across PHUs, the percent of people living with diagnosed HIV who were on ART in 2020 ranged from 64.7% to 100%.
- The percent who were on ART was highest in Timiskaming (100% of 16 people), Huron-Perth (93.5% of 46 people), Chatham-Kent (93.4% of 61 people) and Hastings-Prince Edward (92.5% of 107 people).
- This percent was lowest in Northwestern²¹ (64.7% of 34 people), Thunder Bay (67.6% of 139 people), Renfrew (76.5% of 51 people), Algoma (80.2% of 81 people), Leeds-Grenville-Lanark (81.5% of 124 people), Sudbury (81.7% of 208 people), and North Bay-Parry Sound (81.8% of 77 people).
- Between 2016 and 2020, the largest increases in the percent who were on ART were in Northwestern (47.6% to 64.7% [based on small counts]), Huron-Perth (81.1% to 93.5%), Hastings-Prince Edward (82.0% to 92.5%), and Middlesex-London (78.5% to 86.5%), and the largest decreases were in North Bay-Parry Sound (91.4% to 81.8%), Renfrew (85.1% to 76.5%), and Algoma (88.5% to 80.2%).

The above data is presented in Figure 5.3 and Table 4.1.

Virally suppressed

Individuals in the Ontario HIV Laboratory Cohort are considered to be virally suppressed if their last viral test in a given year was less than 200 copies/ml.

<u>Overall</u>

 In 2020, the percent of people with diagnosed HIV living in Ontario who were virally suppressed was 84.8%.²⁰

<u>By PHU</u>

- Across PHUs, the percent of people living with diagnosed HIV who were virally suppressed in 2020 ranged from 52.9% to 100%.
- The percent who were virally suppressed was highest in Timiskaming (100% of 16 people), Huron-Perth (93.5% of 46 people), Chatham-Kent (93.4% of 61 people), Haliburton-Kawartha-Pine Ridge (92.2% of 129 people), and Peterborough (91.1% of 90 people).
- This percent was lowest in Northwestern²¹ (52.9% of 34 people), Thunder Bay (64.7% of 139 people), Renfrew (76.5% of 51 people), Algoma (76.5% of 81 people), North Bay-Parry Sound (77.9% of 77 people), and Sudbury (78.4% of 208 people).
- Between 2016 and 2020, the largest increases in the percent who were virally suppressed were in Huron-Perth (82.1% to 93.5%), Middlesex-London (73.6% to 84.9%), and Hastings-Prince Edward (79.5% to 90.7%), and the largest decreases were in North Bay-Parry Sound (91.4% to 77.9%) and Algoma (88.5% to 76.5%).

The above data is presented in Figure 5.4 and Table 4.1.

²⁰ Excludes 34 people with an unknown PHU or known to be living out-of-province.

²¹ People living with HIV in the Northwestern PHU may receive HIV care in Manitoba and therefore appear as not in care in the Public Health Ontario Laboratory Cohort, decreasing the Cascade outcomes for this PHU in this report.



Figure 5.1 Number of people with diagnosed HIV living in Ontario by public health unit, 2020

As of the end of 2020, the number of people living with diagnosed HIV was highest in Toronto (10,482), Ottawa (2.032), Peel (1,109) and Hamilton (752). Overall, the number of people living with diagnosed HIV in Ontario in 2020 was 19,956.

Notes: Data provided by Public Health Ontario Laboratory using the Ontario HIV Laboratory Cohort. Excludes diagnosed individuals with unknown public health unit or known to be living out of province (0.2%). Individuals assigned to a public health unit based on their address of residence or, if unknown, the address of the ordering provider. See **Table 4.1** for data.





Snapshot

In 2020, the percent of diagnosed people who were in care was highest in Timiskaming (100%; 16 diagnosed), followed by Grey Bruce (94.8%) and Haldimand-Norfolk (94.5%). The percent in care was lowest in Northwestern⁺ (67.6%), Renfrew (78.4%), Thunder Bay (82.0%), and Algoma (82.7%). Overall, the percent of people living with diagnosed HIV in Ontario who were in care in 2020 was 89.2%.

Notes: Data provided by Public Health Ontario Laboratory using the Ontario HIV Laboratory Cohort. *Indicates fewer than 25 first-time HIV diagnoses and therefore percentages should be interpreted with caution. In care defined as ≥ 1 VL test in 2020 or 2019. Excludes diagnosed individuals with unknown public health unit or known to be living out of province (0.2%). Individuals assigned to a public health unit based on their address of residence or, if unknown, the address of the ordering provider. See **Table 4.1** for data, including numerator and denominator used to calculate percentages. +People living with HIV in the Northwestern PHU may receive HIV care in Manitoba and therefore appear as not in care in the Public Health Ontario Laboratory Cohort, decreasing the Cascade outcomes for this PHU in this report.





Snapshot

In 2020, the percent of people living with diagnosed HIV who were on ART was highest in Timiskaming (100%; 16 diagnosed), followed by Huron-Perth (93.5%), Chatham-Kent (93.4%), Hastings-Prince Edward (92.5%), Peterborough (92.2%), Brant (92.2%), and Haliburton-Kawartha-Pine Ridge (92.2%). The percent on ART was lowest in Northwestern⁺ (64.7%), Thunder Bay (67.6%), Renfrew (76.5%). Overall, the percent of people living with diagnosed HIV in Ontario who were on ART in 2020 was 86.8%.

Notes: Data provided by Public Health Ontario Laboratory using the Ontario HIV Laboratory Cohort. *Indicates fewer than 25 first-time HIV diagnoses and therefore percentages should be interpreted with caution. ART status documented on VL test requisition by ordering provider. ART data missing on 21% of requisitions. On ART defined as being documented on ART by ordering provider, or ART status missing and virally suppressed on last VL test. Excludes diagnosed individuals with unknown public health unit or known to be living out of province (0.2%). Individuals assigned to a public health unit based on their address of residence or, if unknown, the address of the ordering provider. See **Table 4.1** for data, including numerator and denominator used to calculate percentages. +People living with HIV in the Northwestern PHU may receive HIV care in Manitoba and therefore appear as not in care in the Public Health Ontario Laboratory Cohort, decreasing the Cascade outcomes for this PHU in this report.

Figure 5.4 Percent of people with diagnosed HIV living in Ontario who were virally suppressed by public health unit, 2020



Snapshot

In 2020, the percent of people living with diagnosed HIV who were virally suppressed was highest in Timiskaming (100%; 16 diagnosed), followed by Huron-Perth (93.5%), Chatham-Kent (93.4%), Haliburton-Kawartha-Pine Ridge (92.2%), Peterborough (91.1%), and Hastings-Prince Edward (90.7%). The percent suppressed was lowest in Northwestern⁺ (52.9%), Thunder Bay (64.7%), Renfrew (76.5%), Algoma (76.5%), and North Bay-Parry Sound (77.9%). Overall, the percent of people living with diagnosed HIV in Ontario who were virally suppressed in 2020 was 84.8%.

Notes: Data provided by Public Health Ontario Laboratory using the Ontario HIV Laboratory Cohort. *Indicates fewer than 25 first-time HIV diagnoses and therefore percentages should be interpreted with caution. Virally suppressed defined as having less than 200 copies/ml on last VL test in 2020. Excludes diagnosed individuals with unknown public health unit or known to be living out of province (0.2%). Individuals assigned to a public health unit based on their address of residence or, if unknown, the address of the ordering provider. See **Table 4.1** for data, including numerator and denominator used to calculate percentages. +People living with HIV in the Northwestern PHU may receive HIV care in Manitoba and therefore appear as not in care in the Public Health Ontario Laboratory Cohort, decreasing the Cascade outcomes for this PHU in this report.

Definitions

Administrative lost to follow-up

An individual in the Ontario HIV Laboratory Cohort is considered to be a person with diagnosed HIV who is living in Ontario and has had an HIV viral load test in the past 3 years. Administrative lost to follow-up is defined as an individual with diagnosed HIV in Ontario who has had no HIV viral load test for more than 3 consecutive years and no viral load test in subsequent years. This is 3 years despite the 2-year LTFU criteria, because the last viral load test is "carried forward" into the subsequent year, and the lack of viral load test in the subsequent 2 years constitute the 2-year LTFU criteria. Individuals lost to follow-up may have died, migrated out of the province, or may still be living in Ontario but have not had a viral load test in more than three years. Individuals lost to follow-up are removed from the cohort. If an individual is removed from the cohort but goes on to have a viral load test in the future, they are reentered into the cohort.

Anonymous testing

An approach to diagnostic HIV testing where no identifying information on the individual getting tested is collected on the test requisition form (although a unique number is included on each requisition). Under the *Health Protection and Promotion Act*, designated anonymous testing sites are exempt from reporting identifying information on individuals testing HIV-positive to local public health authorities. Anonymous testing was introduced in Ontario in 1992 and expanded in 2006. There are currently 50 active anonymous testing site organizations in Ontario.

Coded testing

An approach to diagnostic HIV testing where a code assigned by a health care provider, instead of the name of the individual getting tested, is included on the test requisition form. Coded testing is no longer permitted in Ontario.

First-time HIV diagnoses

First-time HIV diagnoses are positive HIV tests with no previous evidence of HIV in Ontario. We look at this number to better understand which diagnoses may be due to local transmission in Ontario (or at least HIV acquisition among those living in Ontario) and, therefore, what populations might be at most risk and benefit most from prevention activities.

First-time HIV diagnoses exclude anyone with a previous positive diagnostic test as indicated on the LEP form (or the test requisition form since 2018), regardless of the location of the previous positive test (inside or outside of Ontario). In addition, Anyone with a history of viral load testing in Ontario more than 30 days before their first nominal confirmatory diagnostic test in Ontario, or anyone with a history of viral load testing in Ontario within 30 days (including same day) of their first nominal confirmatory diagnostic test with a viral load of <200 copies/mL (indicating prior treatment) are excluded. People who have evidence of a history of viral load testing before their first reported HIV positive test are counted as a positive HIV test in the first year which there is evidence of an HIV diagnoses (i.e. the year of their first viral load test).

Where HIV test history information is not reported, positive HIV tests are categorized as first-time HIV diagnoses. More information about first-time HIV diagnoses can be found <u>here</u>.

HIV care cascade

The HIV care cascade refers to the continuum of steps that people living with HIV progress through to achieve viral suppression. These steps generally include testing and diagnosis, linkage to and retention in HIV care, and initiation of and adherence to antiretroviral treatment (ART). Some cascades are more comprehensive and include non-linear components and/or prevention steps for people who are HIV-negative (e.g. see the <u>HIV prevention, engagement and care cascade</u>). In this report, the HIV care cascade specifically refers to the 'in care', 'on ART' and 'virally suppressed' indicators.

HIV datamart

An integrated data platform composed of Public Health Ontario Laboratory's diagnostic and viral load testing databases. Within the datamart, diagnostic and viral load test records are linked together for the same person (however, linkage is not possible for anonymous and coded HIV-positive diagnostic tests). The Ontario HIV Laboratory Cohort is derived from this datamart.

HIV exposure category

A category meant to represent an individual's most likely means of HIV transmission. An individual getting tested is assigned to an exposure category based on reported HIV risk factors collected on the test requisition. Exposure categories are mutually exclusive, which means an individual can only be assigned to one category. When more than one exposure category is applicable for a single individual, a hierarchy is used to assign them to a single category. This hierarchy is based on the level of HIV risk associated with different exposure categories. See <u>HIV exposure categories</u> for more information.

Integrated Public Health Information System (iPHIS)

iPHIS is an electronic, web-based system used by PHUs for case-management and reporting to the Ontario Ministry of Health and Long-term Care on diseases of public health significance, including HIV. It is the main source of data used by Public Health Ontario to produce surveillance reports for diseases of public health significance. iPHIS includes information elicited during public health follow up of cases. iPHIS data are not used in this report.

In care

Individuals in the Ontario HIV Laboratory Cohort are considered to be 'in care' if they have at least one viral load test in a given year or the preceding year.

Laboratory Enhancement Program (LEP)

When a person receives an HIV diagnosis in Ontario, an LEP form is sent to the health care provider who ordered the test to collect additional information on the person who tested HIV-positive. This includes information collected on the original test requisition (e.g. demographics), as well as additional information (e.g. more detailed risk factors). Since 2009, the LEP form has collected information on race/ethnicity and country of birth, both of which were not historically collected on the HIV test requisition form.

Nominal test

An approach to diagnostic HIV testing in which the name of the person being tested is collected on the test requisition form.

Non-nominal test

An approach to diagnostic HIV testing in which the name of the person being tested is NOT collected on the test requisition form. This includes anonymous and coded testing. Coded testing is no longer permitted in Ontario.

On antiretroviral treatment (ART)

Individuals in the Ontario HIV Laboratory Cohort are considered to be 'on antiretroviral treatment' if their provider documented that they were taking antiretroviral medications on their last viral load test requisition in a given year. If this information is missing, an individual is assumed to be 'on antiretroviral treatment' if they were virally suppressed on their last viral load test. Antiretroviral treatment information is missing from approximately 21% of viral load requisitions between 2016 and 2020.

Ontario HIV Laboratory Cohort

A population-based, retrospective cohort of people with diagnosed HIV living in Ontario. This cohort was created using Public Health Ontario Laboratory's HIV datamart. More information about the Ontario HIV Laboratory Cohort is provided below in the sections Estimation of <u>Estimation of people living with</u> <u>diagnosed HIV in Ontario</u> and <u>HIV care cascade (diagnosed person living with HIV, in care, on ART and virally suppressed)</u>

Previous evidence of HIV

People (unique individuals) with previous evidence of HIV are people who already knew their HIV status at the time of their first positive nominal (as opposed to anonymous testing) diagnostic test in Ontario. This previous evidence of HIV includes: (1) People new to care in Ontario but who were previously diagnosed elsewhere (i.e. another province or country) and retested in Ontario; and (2) People who have been in HIV care in Ontario* (i.e. have a history of viral load tests) but with no previous linkable HIV diagnostic test. These individuals may have originally been tested anonymously and then retested (sometimes many years later) – perhaps when they changed health care providers.

*Evidence of being in care includes anyone with a history of viral load testing in Ontario of 1) more than 30 days before a first diagnostic positive test or 2) within 30 days (including same day) with a viral load <200 copies/ml before a first diagnostic positive test.

Public health unit (PHU)

A health agency that provides health promotion and disease prevention programs in accordance with the Ontario Public Health Standards under the authority of the *Health Protection and Promotion Act*. There are 34 PHUs in Ontario and each has its own unique geographical boundary.

Rates of HIV tests / Rates of first-time HIV diagnoses

Refers to the number of HIV tests per 1,000 people (or number of first-time HIV diagnoses per 100,000 people) in Ontario. While the number of tests (or diagnoses) is influenced by the size of the underlying population (e.g. greater population = greater number of tests), rates take population size into account and remove it as a possible explanatory factor for any observed differences over time or between populations.

For HIV testing data in particular, this report uses the total number of HIV tests to calculate HIV test rates. It does NOT use the number of unique individuals tested. This means differences between PHUs may reflect both the number of times an individual gets tested in a year as well as the total number of unique people who get tested. The rates of first-time HIV diagnoses do reflect unique individuals.

Test positivity

The proportion of HIV diagnostic tests with a confirmed HIV-positive result (among tests with no <u>Previous evidence of HIV</u>). Test positivity can provide insight into which sub-populations have a higher risk of HIV. The number and types of people getting tested for HIV impact test positivity and their interpretation.

Test requisition forms

A form filled out by a health care provider for each HIV diagnostic and viral load test. The diagnostic test requisition collects information on the age, sex and HIV risk factors of the person getting tested. As of 2018, the HIV test requisition form also collects information on race/ethnicity and country of birth (information which has been collected on the Laboratory Enhancement Program form since 2009). The viral load test requisition collects information on age, sex, most recent CD4 count and use of antiretroviral medications.

Test type

There are three main HIV test types in Ontario as defined by the type of identifier collected on the test requisition form. HIV tests could have been conducted under a patient's name (nominal), a code assigned by a health care provider or a unique anonymous number. Coded and anonymous testing are both forms of non-nominal testing.

UNAIDS 90-90-90 targets

UNAIDS treatment targets to 2020 as described in <u>'90-90-90 - An ambitious treatment target to help end</u> <u>the AIDS epidemic</u>'. Each of these targets are a subset of the previous target: the first target is the percent of all people living with HIV who are diagnosed, the second target is the percent of people with diagnosed HIV who are on treatment and the third target is the percent of people on treatment who are virally suppressed. This is in contrast to the HIV care cascade estimates presented in this report, in which all indicators are presented as a percentage of people living with diagnosed HIV. This report does not specifically focus on the UNAIDS 90-90-90 targets.

Virally suppressed

Individuals in the Ontario HIV Laboratory Cohort are considered to be virally suppressed if their last viral test in a given year was less than 200 copies/ml.

Abbreviations

ART = antiretroviral treatment

iPHIS = integrated Public Health Information System

LEP = Laboratory Enhancement Program

LTFU = administratively lost to follow-up

OHESI = Ontario HIV Epidemiology and Surveillance Initiative

PHO = Public Health Ontario

PHU = Public Health Unit

VL = viral load

Technical notes

Data source: HIV datamart

Information in this report comes from the HIV Datamart housed at the Public Health Ontario (PHO) Laboratory. PHO Laboratory conducts the majority of HIV diagnostic and centralized viral load (VL) testing for Ontario, and maintains databases that contain information on the vast majority of such testing in the province. These databases were integrated to form the HIV Datamart. In the datamart, a person's diagnostic and VL test records are linked using patient identifiers. However, it is not possible to link nonnominal HIV-positive diagnostic tests (coded, anonymous) to VL tests, as no identifying information is available to facilitate linkage.

All information in the HIV Datamart is confidential, and only de-identified aggregate data is shared with OHESI partners for inclusion in this report.

The HIV diagnosis and VL databases used to create the datamart are described in further detail below:

HIV diagnostic testing database (1985-present)

The majority of HIV diagnostic testing ordered and collected by health care providers in Ontario is performed by PHO Laboratory. This includes tests ordered in Ontario as part of an immigration medical exam. Information on test results and forms completed as part of the testing process are compiled in databases at PHO. Tests conducted for purposes of blood/tissue/organ donation and life insurance eligibility, and for testing the source individual in the case of needlestick or other occupational exposures, are conducted outside of the PHO Laboratory system and are not included in this report. Prenatal tests with HIV-negative results are also not included in this report as they are part of an HIV testing program that is offered to all pregnant individuals as part of their prenatal care. Of note, HIV-positive prenatal tests ARE included in this report for calculation of test positivities where they are first-time HIV diagnoses, but the annual number of these tests is relatively low (5 to 9 per year between 2017 and 2021).

When someone gets an HIV test in Ontario, the health care provider conducting the test completes an HIV test requisition that collects information on the individual getting tested for HIV, including age, sex and HIV risk factors.

Viral load testing database (1996-present)

VL testing was implemented in 1996 and the database at PHO Laboratory contains records for all individuals who have had a VL test in Ontario. In addition to VL test results, the database contains information from the VL test requisition form (completed by the provider), including most recent CD4 count and whether the patient was on ART at the time of testing. Providers complete the information on ART on approximately 79% of VL test requisition forms. All VL tests in the database were conducted nominally. The analysis in this report is limited to VL tests conducted January I, 2000 or later. Although VL testing was implemented in Ontario in 1996 it took several years to be scaled up and become a routine part of HIV care. For this report, we only consider VL data from January I, 2000 onwards to be of sufficient quality to be a good indicator of engagement in HIV care.

Estimation of people living with diagnosed HIV in Ontario

The determination of people living with diagnosed HIV in Ontario, was created using the integrated HIV Datamart, with HIV diagnosis information form 1985 onwards, and VL information from 2000 onwards. Individuals are included as diagnosed in Ontario if they have at least one of the following:

I. At least one confirmed positive HIV diagnostic test (nominal or non-nominal) (i.e., reactive Western Blot, detection of HIV viral nucleic acid, p24 antigen confirmed by neutralization assay, Geenius [lateral flow]), **and/or**

2. At least one HIV VL test *above* 40 copies/mL, and/or

3. At least one HIV VL test *below* 40 copies/mL and no evidence of being a HIV-negative person*

*Individuals with record of a undetectable VL test (i.e. VL is below the 40 copies/mL threshold of detection [threshold at the time of testing]) **and** no linked nominal HIV-positive diagnostic test are included in the cohort unless they have evidence of being an HIV-negative person. Individuals with an undetectable VL test (and no previous VL test above the threshold of detection) **and** who have no confirmed HIV-positive diagnostic test **do not** enter the cohort if they have evidence of being HIV-negative defined as a record of a nominal HIV-negative diagnostic test less than or equal to 30 days before, on the same day as, or at any point after the date of their last undetectable VL test. These individuals are excluded from the cohort because they are likely HIV-negative people who received a VL test for a diagnostic purpose. In total, 2,257 individuals were excluded from the cohort for this reason.

As of the end of 2020, a total of 53,892 people in the HIV Datamart met at least one of the three above criteria. However, a fourth criterion is applied:

4. and have not been administratively lost to follow-up, described below.

To determine if an individual with diagnosed HIV is living in Ontario during a calendar year a number of loss to follow-up (LTFU) rules are applied:

- 1. For individuals with a confirmed diagnostic test that is <u>not</u> linked to a viral load test, they are assumed to live in Ontario if their diagnostic test was non-nominal and within the last 2 calendar years or if the unlinked diagnostic test was nominal and within the last 7 calendar years. If they do not meet these criteria they are removed from the cohort.
- 2. For individuals with a confirmed diagnostic test that is linked to a VL test, they are removed from the cohort if they have no record of a VL test for more than 3 consecutive calendar years, and no VL test at a later date (referred to as administratively LTFU). This is 3 years despite the 2-year LTFU criteria, because the last VL test is "carried forward" into the subsequent calendar year, and the lack of VL test in the next 2 calendar years constitute the 2-year LTFU criteria. These individuals are removed from the cohort to account for potential death, migration out of Ontario, or loss to care. If an LTFU individual has a subsequent VL test in later years, they re-enter the cohort and are counted as being a diagnosed person living in Ontario during the years in which they were in a gap in care. The 2-year LTFU criteria was selected given that this would include most individuals who are in a known gap in care (i.e. individuals with no VL test in one or more consecutive years, but a VL test in later years). Between 2000 and 2020, the median duration of known gaps in care was 1.4 years.

After application of the LTFU criteria, there were 19,990 diagnosed people living with HIV in the cohort at the end of 2020, of which 19,956 could have a PHU identified.

For more information on the laboratory cohort and its limitations, see technical notes of the <u>HIV cascade</u> <u>in Ontario OHESI report</u>.

HIV indicators

HIV testing

All HIV tests performed by PHO Laboratory contribute to the test data in this report, with one exception. Prenatal tests with an HIV-negative result are not included, as they are part of an HIV testing program that is offered to all pregnant individuals. Since these individuals were not necessarily at-risk of HIV infection and did not specifically seek out HIV testing, their inclusion may bias testing indicators. Approximately 150,000 HIV-negative prenatal tests are conducted in Ontario each year.

This report includes information on the number of HIV tests, it does NOT include information on the number of unique individuals tested. This means that annual test numbers may include the same individual more than once.

First-time HIV diagnoses

First-time HIV diagnoses exclude anyone with a previous positive diagnostic test as indicated on the LEP form (or the test requisition form since 2018), regardless of the location of the previous positive test (inside or outside of Ontario). First-time HIV diagnoses uses linked viral load testing history in Ontario as evidence of being in care for HIV so excludes: 1) anyone with a history of viral load testing in Ontario of more than 30 days before to their first nominal confirmatory diagnostic test in Ontario, or 2) anyone with a history of viral load testing in Ontario within 30 days (including same day) of their first nominal confirmatory diagnostic test with a viral load of <200 copies/mL indicating prior treatment. People who have evidence of a history of viral load testing before their first reported HIV positive test are counted as a positive HIV test in the first year which there is evidence of an HIV diagnoses.

It is not possible to exclude all individuals with a previous HIV-positive result from the first-time HIV diagnoses numbers. Many individuals who test HIV-positive through coded or anonymous testing also test HIV-positive a second time through nominal testing (e.g. confirming an HIV-positive test is standard practice for some healthcare providers when an HIV-positive person first presents to care). Since these two tests cannot be linked together, both are reported as a first-time HIV diagnosis. However, the LEP questionnaire collects information on previous HIV-positive testing history which is also used to exclude duplicates, minimizing double counting of individuals. Where HIV test history information is not reported on the LEP, first-time positive HIV tests are categorized as first-time HIV diagnoses.

The potential for double-counting may be higher in PHUs with more anonymous testing. The percent of first-time HIV diagnoses (2017-2021) identified through anonymous testing was about 13% for Ontario overall and ranged by PHU as follows: Leeds-Grenville-Lanark (29% of 14 first-time HIV diagnoses); Toronto (21% of 1,662 diagnoses); Haldimand-Norfolk (17% of 6 diagnoses); Hastings-Prince Edward (10% of 10 diagnoses); Windsor-Essex (9% of 88 diagnoses); Ottawa (7% of 192 diagnoses); Niagara, Peel, Middlesex-London, Hamilton, Durham (each <5%); and all others (0%).

Of note, in OHESI's previous PHU report, individuals diagnosed with HIV for the first time outside of Ontario, but who subsequently moved to the province and tested again, were included as a "new diagnosis", however these individuals are not included in the counts of first-time HIV diagnoses in this report (when this information is reported).

While prenatal HIV-negative tests are excluded from this report, first-time HIV diagnoses include prenatal HIV-positive tests. Between 2017 and 2021, the annual number of HIV-positive prenatal tests ranged from 5 to 9. Over the past five years, the test positivity for prenatal testing was 0.005%, which is much lower than the overall diagnostic test positivity of 0.04% among females. However, the inclusion of HIV-positive prenatal tests in smaller PHUs, along with the exclusion of HIV-negative prenatal tests from the denominator in these regions, may result in inflated female test positivities.

HIV test positivity

The HIV test positivity refers to the proportion of tests that are HIV-positive. The number of tests and first-time HIV diagnoses (see above for definitions) are used to calculate these rates.

Rates of HIV tests and first-time HIV diagnoses

Rates of HIV tests and first-time HIV diagnoses are calculated by dividing the number of HIV tests and first-time HIV diagnoses, respectively, by population estimates. Population estimates were accessed on December 15, 2022 and can be found from <u>Statistics Canada</u>.

HIV care cascade (diagnosed person living with HIV, in care, on ART and virally suppressed)

The Ontario HIV Laboratory Cohort is used to estimate the number of people with diagnosed HIV living in Ontario and the percent who are in care, on ART and virally suppressed. Indicator definitions and their limitations are summarized in the table below.

Indicator	Definition	Limitations
Person with diagnosed HIV living in Ontario	Nominal or non-nominal HIV-positive diagnostic test and/or HIV viral load test*, and not administratively LTFU after two years for viral load tests and unlinked non-nominal diagnoses or after seven years for unlinked nominal diagnoses	Some LTFU individuals may still be living in the province – leading to an underestimate of the number of diagnosed people.
In care	At least one VL test in two calendar years ⁺	Individuals without a VL test in a given year and the year prior are assumed to be not 'in care' in that year.
On ART	Documented on ART or VL less than 200 copies/mL on last VL test	Use of ART documented by ordering provider on VL test requisitions and missing 21% of the time. Individuals without a VL test in a given year are assumed to be not 'on ART' in that year.
Virally suppressed	VL less than 200 copies/mL on last VL test	Individuals without a VL test in a given year are assumed to be not 'virally suppressed' in that year.

*Individuals with no nominal HIV-positive diagnostic test and all undetectable VL tests were not included if they had evidence of being HIV-negative (i.e. record of a nominal HIV-negative diagnostic test after, on the same day as, or within 30 days before their last undetectable VL test).

⁺Values in the previous calendar year forwarded to the next calendar year if no VL test in the next calendar year.

The percent of VL requisitions with missing ART data (2016-2020) was highest in Middlesex-London (30.9%), followed by Wellington-Dufferin-Guelph, Grey Bruce, Lambton, and Southwestern (27-29%). ART data was missing for less than 25% of VL requisitions for the remaining PHUs.

iPHIS vs. PHO Laboratory data

For first-time HIV diagnoses, OHESI uses laboratory data on HIV-positive diagnostic tests from PHO Laboratory along with information documented by ordering providers on test requisition forms.

OHESI **does not** use information from the integrated Public Health Information System (iPHIS). iPHIS is an electronic, web-based system used by PHUs for case-management and reporting to the Ontario Ministry of Health (MOH) on diseases of public health significance, including HIV. It is the main source of data used by PHO to produce reportable disease surveillance reports. iPHIS includes information elicited during public health follow up of HIV cases. The number of HIV diagnoses in iPHIS does not correspond to the number of first-time HIV diagnoses in PHO Laboratory HIV surveillance. Potential sources of discrepancy include:

- Additional exclusion within iPHIS of repeated HIV-positive tests based on information elicited during PHU follow-up, whereas this may not be possible in PHO Laboratory data due to lack of identifying information to link tests (e.g. when an HIV-positive individual initially tests anonymously and then nominally).
- iPHIS does not include HIV diagnoses that arise from testing non-Ontario residents (e.g., Quebec residents testing in Ontario are included in provincial totals in PHO Laboratory HIV surveillance).
- iPHIS includes diagnoses who have moved to Ontario, been reported to the local PHU as an HIV case, but who have not received a HIV diagnostic laboratory test in Ontario.
- iPHIS may include more complete information on an individual's address (obtained during public health follow up) than laboratory data (which is solely based on what is documented on the test requisition and LEP forms), and this may influence the PHU to which an HIV case is assigned.
- Data entry errors within iPHIS that result in cases being misclassified and not captured in final counts.
- Cases may be assigned to different dates in PHO Laboratory and iPHIS data (e.g., date of confirmed diagnosis vs. date of report to PHU). Therefore, case counts based on calendar year may differ.

Public health units

Maps with public health unit locations and population sizes can be found in Figures 1.1.

Individuals who receive an HIV diagnostic test are assigned to a PHU based on the residence listed on their test requisition, or, if not listed/unknown, the address of the ordering provider. About 16% of tests in the province (2017-2021) were missing information on address of residence and assigned based on provider address. The percent missing residence address was highest in Middlesex-London (35.6%) and Hamilton (34.1%), followed by Niagara, Sudbury, Leeds-Grenville-Lanark, Chatham-Kent and Windsor-Essex (21 to 28%). Missing address information was <20% for all other PHUs.

First-time HIV diagnoses are assigned to a PHU based the residence listed on their test requisition, or, if not listed/unknown, the address of the ordering provider. About 29% of first-time HIV diagnoses in the province (2017-2021) were missing information on address of residence and assigned based on provider address. The percent missing residence address was highest in Hamilton (65.3%), followed by Middlesex-London, Sudbury, Leeds-Grenville-Lanark, York, and Toronto (30 to 38%). Missing address information was <30% for all other PHUs.

For individuals who travelled outside their PHU in order to test for HIV (for example, to an urban center where testing is more available), missing residence data would mean that these HIV tests and first-time HIV diagnoses would be attributed to the PHU where testing was ordered. This would lower HIV test / first-time HIV diagnosis rates for the PHU where the individual lives, and increase rates for the PHU where the individual lives, and increase rates for the PHU where the individual tested.

Individuals in the Ontario HIV Laboratory Cohort are assigned based on the individual's residence listed on their VL test requisition or, if unknown, the address of the ordering provider. In 2020, residence address was missing for approximately 7% of individuals. For individuals with no record of a VL test, address listed on the HIV diagnosis test requisition is used to assign a PHU or, if unknown, the address of the ordering provider. The percent of individuals missing residence address was highest in Ottawa (19.5%), Wellington-Dufferin-Guelph (12.8%), Middlesex-London (12.4%), and Northwestern (10.7%), followed by Windsor-Essex, Hamilton, Thunder Bay, Sudbury, Toronto, Kingston-Frontenac-Lennox-Addington, North Bay-Parry Sound, and Peel (5 to 10%).

PHO's "Easy Maps" tool was used to create the map figures in this report, though they have been edited.

HIV exposure categories

An attempt is made to assign each HIV test to an exposure category based on what reported HIV risk factor information is collected on the requisition form. The HIV exposure category is meant to represent an individual's most likely means of HIV acquisition. The HIV exposure categories are mutually exclusive. When more than one risk factor is reported for a single individual, a hierarchy is used to assign an HIV test to a single HIV exposure category. This hierarchy is as follows:

- 1. Mother-to-child transmission (MTC): Being a child of an HIV-positive mother or aged less than 18 months
- 2. Male-to-male sexual contact + injection drug use (IDU): Being male and indicating sex with men and injection drug use
- 3. Male-to-male sexual contact: Being male and indicating sex with men
- 4. Injection drug use (IDU): Indicating injection drug use
- 5. HIV-endemic
 - a. HIV-endemic + heterosexual contact: (Country of birth is HIV-endemic or "Born in an HIV-endemic country" indicated as HIV risk factor) + indication of heterosexual contact (defined as being male or female and indicating sex with a person of the opposite sex/gender)
 - b. HIV-endemic, no heterosexual contact: (Country of birth is HIV-endemic or "Born in an HIV-endemic country" indicated as HIV risk factor) + no indication of heterosexual contact as in 5a
- 6. Heterosexual contact partner with identified risk (PIR): Being male or female and indicating sex with a person of the opposite sex/gender who is either HIV-positive, uses injection drugs, born in an HIV-endemic country, or is a bisexual male.
- 7. Heterosexual contact, no identified risk: Being male or female and indicating sex with a person of the opposite sex/gender who has no identified risk.
- 8. Clotting factor (pre-1986): Indicating clotting factor pre-1986
- 9. Transfusion (pre-1986): Indicating a blood transfusion pre-1986
- 10. No identified risk (NIR): Indicating "none" or "other" or "needlestick injury" as a risk factor
- 11. Unknown/missing: No risk factors indicated (form not completed)

In this report, some of the above categories are combined to form broader categories (see **Figure ii** below):

- Heterosexual contact, identified risk: combines tests assigned to "HIV-endemic + heterosexual contact" (category #5a above) and "Heterosexual contact partner with identified risk (PIR)" (category #6)
- Other: combines tests assigned to "Mother-to-child transmission (MTC)" (category #1), "Clotting factor (pre-1986)" (category #8), and transfusion categories (category #9).
- No risk reported/unknown: combines tests assigned to "HIV-endemic, no heterosexual contact" (category #5b) and "No identified risk" (category #10), or where the form is not completed (category #11).

Figure ii. Original hierarchical HIV exposure categories (in descending order) and how they were recategorized for this report.



HIV-endemic areas (category #5) are classified by the Public Health Agency of Canada as countries where the prevalence of HIV among adults (15-49 years old) is 1.0% or greater and one of the following criteria is met: at least 50% are attributed to heterosexual transmission; a male to female ratio of 2:1 or less among prevalent infections; or HIV prevalence greater than or equal to 2% among women receiving prenatal care. A list of these countries can be found <u>here</u>.

HIV risk factor data used to determine an individual's exposure category is missing for 27.7% of first-time HIV diagnoses between 2017 and 2021 (average of 24.2% among the 24 PHU's with at least 10 first-time HIV diagnoses included in **Table 2.6**).

It is unknown whether individuals with certain HIV risk factors, and hence exposure categories, are more likely to be missing information, which could introduce bias into the exposure category breakdowns. Also, provider practices for filling out the requisition forms may vary, leading to further bias. For example, some providers may ask people getting tested about their risk factors, while others may make assumptions or not ask.

Limitations

Limitations are summarized in the <u>Background</u> and above sections of the Technical notes.

Data tables

I. HIV testing

Table I.I Cumulative number of HIV tests by public health unit and sex, Ontario, 2017 to 2021

	Total	Males	Females	Female (%)		Total	Males	Females	Female (%)
Algoma	18,048	8,712	9,089	50.4%	Northwestern	18,434	7,953	9,952	54.0%
Brant	15,947	7,082	7,870	49.4%	Ottawa	239,547	116,856	117,748	49.2%
Chatham-Kent	10,282	4,732	5,219	50.8%	Peel	352,679	169,091	175,210	49.7%
Durham	103,451	46,708	53,157	51.4%	Peterborough	19,183	8,696	9,182	47.9%
Eastern Ontario	20,536	8,727	11,180	54.4%	Porcupine	8,919	4,075	4,806	53.9%
Grey Bruce	13,878	6,164	6,991	50.4%	Renfrew	11,586	5,63 I	5,625	48.5%
Haldimand-Norfolk	8,259	3,766	3,980	48.2%	Simcoe Muskoka	74,252	34,666	36,266	48.8%
Haliburton, Kawartha, Pine Ridge	19,838	10,233	8,936	45.0%	Southwestern	21,365	9,327	11,259	52.7%
Halton	91,576	41,954	46,161	50.4%	Sudbury	36,135	16,522	18,876	52.2%
Hamilton	107,842	51,242	50,628	46.9%	Thunder Bay	32,657	15,230	16,903	51.8%
Hastings Prince Edward	18,522	9,199	8,960	48.4%	Timiskaming	3,100	1,499	1,568	50.6%
Huron Perth	12,584	5,893	6,382	50.7%	Toronto	1,023,136	527,079	473,444	46.3%
Kingston, Frontenac, Lennox & Addington	46,144	26,154	19,522	42.3%	Waterloo	98,202	46,012	46,999	47.9%
Lambton	14,891	6,83 I	7,693	51.7%	Wellington- Dufferin-Guelph	46,943	19,603	24,940	53.1%
Leeds, Grenville and Lanark	20,357	9,697	10,070	49.5%	Windsor-Essex	69,117	32,556	35,760	51.7%
Middlesex-London	109,355	52,602	53,715	49.1%	York	210,586	98,945	106,719	50.7%
Niagara	63,602	28,532	31,201	49 .1%					
North Bay Parry Sound	17,208	7,804	8,970	52.1%	Ontario	2,978,161	1,449,773	1,444,981	48.5%

Notes: Data provided by Public Health Ontario Laboratory. HIV-negative prenatal tests not included. Individuals living out of province or with an unknown public health unit were excluded. 'Total' includes unknown sex.

	2017	2018	2019	2020	2021
Algoma	3,607	3,910	3,829	2,967	3,735
Brant	2,882	3,132	3,575	2,809	3,549
Chatham-Kent	1,990	2,081	2,278	I,787	2,146
Durham	19,531	21,879	23,546	17,784	20,711
Eastern Ontario	3,870	4,359	4,633	3,598	4,076
Grey Bruce	2,83 I	2,895	3,140	2,370	2,642
Haldimand-Norfolk	1,717	I,768	1,743	I,348	1,683
Haliburton, Kawartha, Pine Ridge	3,582	4,139	4,601	3,535	3,981
Halton	18,923	18,519	19,956	15,736	18,442
Hamilton	21,667	22,193	23,926	17,741	22,315
Hastings Prince Edward	3,500	3,849	4,115	3,177	3,881
Huron Perth	2,334	2,534	2,667	2,277	2,772
Kingston, Frontenac, Lennox & Addington	9,779	9,573	11,538	7,287	7,967
Lambton	2,930	3,173	3,409	2,401	2,978
Leeds, Grenville and Lanark	3,805	4,473	4,637	3,495	3,947
Middlesex-London	20,642	25,307	23,604	18,243	21,559
Niagara	11,763	13,370	13,956	10,513	14,000
North Bay Parry Sound	3,346	3,614	3,733	3,189	3,326
Northwestern	3,427	3,659	4,293	3,392	3,663
Ottawa	45,864	53,436	54,501	39,067	46,679
Peel	61,173	69,416	75,298	59,377	87,415
Peterborough	3,537	3,827	4,875	3,245	3,699
Porcupine	1,600	1,792	I,889	I,500	2,138
Renfrew	2,216	2,585	2,616	1,913	2,256
Simcoe Muskoka	13,712	16,360	17,007	12,433	14,740
Southwestern	3,748	4,819	4,640	3,801	4,357
Sudbury	6,750	7,322	7,561	7,848	6,654
Thunder Bay	5,874	6,266	7,755	5,978	6,784
Timiskaming	485	581	739	647	648
Toronto	200,507	222,453	237,354	164,014	198,808
Waterloo	18,851	19,860	21,230	16,555	21,706
Wellington-Dufferin-Guelph	9,648	9,121	9,215	10,901	8,058
Windsor-Essex	13,503	14,993	15,197	11,548	13,876
York	40,120	45,715	49,627	34,729	40,395
Ontario	569,714	632,973	672,683	497,205	605,586

Table 1.2 Annual number of HIV tests by public health unit and year, Ontario, 2017 to 2021

Notes: Data provided by Public Health Ontario Laboratory. HIV-negative prenatal tests not included. Individuals living out of province or with an unknown public health unit were excluded.

	Total	Males	Females		Total	Males	Females
Algoma	30.9	30.2	30.7	Northwestern	45.3	38.7	49.5
Brant	21.0	18.8	20.6	Ottawa	46.9	46.6	45.3
Chatham-Kent	19.3	18.0	19.4	Peel	46.2	44.4	45.8
Durham	29.6	27.1	30.0	Peterborough	26. I	24.3	24.4
Eastern Ontario	19.2	16.5	20.8	Porcupine	21.0	19.1	22.7
Grey Bruce	16.0	14.3	16.0	Renfrew	21.4	20.7	21.0
Haldimand-Norfolk	14.0	12.6	13.6	Simcoe Muskoka	25.0	23.4	24.4
Haliburton, Kawartha, Pine Ridge	20.9	21.6	18.8	Southwestern	19.8	17.4	20.8
Halton	30.7	28.7	30.4	Sudbury	35.4	32.5	36.8
Hamilton	37.6	36. I	34.9	Thunder Bay	41.6	38.7	43.2
Hastings Prince Edward	21.7	21.7	20.8	Timiskaming	18.3	17.6	18.5
Huron Perth	17.4	16.4	17.6	Toronto	69.6	73.7	62.7
Kingston, Frontenac, Lennox & Addington	44.7	51.1	37.4	Waterloo	33.3	31.1	31.9
Lambton	22.6	21.0	23.1	Wellington-Dufferin-Guelph	30.5	25.7	32.2
Leeds, Grenville and Lanark	22.9	22.2	22.3	Windsor-Essex	32.7	30.7	33.9
Middlesex-London	43.7	42.7	42.3	York	35.7	34. I	35.6
Niagara	26.7	24.3	25.8				
North Bay Parry Sound	26.6	24.3	27.5	Ontario	41.1	40.5	39.4

Table 1.3 Average rate of HIV tests per 1,000 by public health unit and sex, Ontario, 2017 to 2021

Notes: Data provided by Public Health Ontario Laboratory. HIV-negative prenatal tests not included. Individuals living out of province or with an unknown public health unit were excluded. 'Total' includes unknown sex.

Table 1.4 Annual rate of HIV tests per 1,000 population by public health unit an	d year, Ontario, 2017 to
2021	-

	2017	2018	2019	2020	2021
Algoma	31.0	33.6	32.7	25.2	31.9
Brant	19.6	21.0	23.6	18.3	22.7
Chatham-Kent	18.9	19.7	21.5	16.7	19.9
Durham	28.9	31.9	33.7	24.9	28.5
Eastern Ontario	18.5	20.7	21.7	16.6	18.7
Grey Bruce	16.8	16.9	18.1	13.4	14.8
Haldimand-Norfolk	15.1	15.1	14.7	11.2	13.8
Haliburton, Kawartha, Pine Ridge	19.2	22.0	24.3	18.5	20.6
Halton	33.0	31.7	33.4	25.7	29.8
Hamilton	38.7	39.2	41.7	30.4	38.0
Hastings Prince Edward	21.0	22.8	24.I	18.4	22.3
Huron Perth	16.6	17.7	18.4	15.5	18.7
Kingston, Frontenac, Lennox & Addington	48.4	46.6	55.5	34.8	38.0
Lambton	22.6	24.2	25.8	18.1	22.5
Leeds, Grenville and Lanark	21.9	25.4	26.0	19.4	21.7
Middlesex-London	42.8	51.3	47.0	35.7	41.9
Niagara	25.3	28.3	29.2	21.8	28.9
North Bay Parry Sound	26.1	28.0	28.9	24.6	25.4
Northwestern	42.3	45.0	52.8	41.6	44.9
Ottawa	46.6	53.2	53.2	37.3	44.3
Peel	41.8	46.4	49.I	38.0	55.6
Peterborough	24.6	26. I	33.1	21.9	25.0
Porcupine	18.7	21.0	22.2	17.6	25.4
Renfrew	20.7	24.I	24.2	17.6	20.6
Simcoe Muskoka	24.1	28.1	28.6	20.5	23.9
Southwestern	18.0	22.7	21.5	17.3	19.5
Sudbury	33.4	35.9	37.0	38.2	32.4
Thunder Bay	37.5	39.9	49.2	38.0	43.5
Timiskaming	14.3	17.2	21.8	19.0	19.0
Toronto	70.0	76.2	80.I	54.8	66.8
Waterloo	33.4	34.3	35.8	27.3	35.5
Wellington-Dufferin-Guelph	32.3	30.0	29.9	34.9	25.4
Windsor-Essex	32.5	35.6	35.7	27.0	32.6
York	34.9	39.4	42.0	28.9	33.4
Ontario	40.5	44.2	46.2	33.7	40.8

Notes: Data provided by Public Health Ontario Laboratory. HIV-negative prenatal tests not included. Individuals living out of province or with an unknown public health unit were excluded.

2. First-time HIV diagnoses (and people with previous evidence of HIV [PEH])

	Total	Males	Females	Female (%)		Total	Males	Females	Female (%)
Algoma	8	6	2	25.0%	Northwestern	21	12	9	42.9%
Brant	8	6	2	25.0%	Ottawa	192	120	69	35.9%
Chatham-Kent	7	6	I	14.3%	Peel	247	181	63	25.5%
Durham	65	48	16	24.6%	Peterborough	13	11	2	15.4%
Eastern Ontario	14	8	6	42.9%	Porcupine	3	3	0	0.0%
Grey Bruce	11	10	I	9.1%	Renfrew	5	3	2	40.0%
Haldimand-Norfolk	6	6	0	0.0%	Simcoe Muskoka	29	24	5	17.2%
Haliburton, Kawartha, Pine Ridge	8	6	2	25.0%	Southwestern	21	17	4	19.0%
Halton	50	39	10	20.0%	Sudbury	13	8	5	38.5%
Hamilton	129	95	34	26.4%	Thunder Bay	55	25	30	54.5%
Hastings Prince Edward	10	9	I	10.0%	Timiskaming	0	0	0	NA
Huron Perth	7	7	0	0.0%	Toronto	1,662	1,371	280	16.8%
Kingston, Frontenac, Lennox & Addington	21	16	5	23.8%	Waterloo	53	42	10	18.9%
Lambton	6	4	2	33.3%	Wellington-Dufferin- Guelph	20	12	8	40.0%
Leeds, Grenville and Lanark	14	13	I	7.1%	Windsor-Essex	88	79	9	10.2%
Middlesex-London	121	94	27	22.3%	York	109	93	16	14.7%
Niagara	55	37	18	32.7%					
North Bay Parry Sound	19	13	6	31.6%	Ontario	3,090	2,424	646	20.9%

Table 2.1 Cumulative number of first-time HIV diagnoses by public health unit and sex, Ontario, 2017 to 2021

Notes: Data provided by Public Health Ontario Laboratory. Individuals living out of province or with an unknown public health unit were excluded. 'Total' includes unknown sex. A previous OHESI analysis estimated that, due to missing data on HIV test history, between 6.9% and 8.1% of first-time HIV diagnoses between 2011 and 2020 (between 5.0% and 5.9% among males and between 15.0% and 17.4% among females) had an uncaptured previous HIV diagnosis.

Table 2.2 Annual number of first-time HIV	diagnoses by public health	unit and year, Ontario, 2017 to
2021		

	2017	2018	2019	2020	2021
Algoma	2	6	0	0	0
Brant	4	0	I	3	0
Chatham-Kent	I	2	4	0	0
Durham	13	16	15	9	12
Eastern Ontario	2	l	5	4	2
Grey Bruce	0	4	5	I	I
Haldimand-Norfolk		3	I	I	0
Haliburton, Kawartha, Pine Ridge	I	3	2	0	2
Halton	7	11	12	12	8
Hamilton	30	27	22	18	32
Hastings Prince Edward	2	2	0	4	2
Huron Perth	2	I	0	4	0
Kingston, Frontenac, Lennox & Addington	2	9	4	4	2
Lambton	0	2		2	
Leeds, Grenville and Lanark	2	5	3		3
Middlesex-London	35	34	26	6	20
Niagara	7	11	8	6	23
North Bay Parry Sound		2	5	7	4
Northwestern	4	2	4	3	8
Ottawa	51	43	34	37	27
Peel	51	64	51	37	44
Peterborough	2	2	2	4	3
Porcupine	0	2	<u> </u>	0	0
Renfrew	2			0	
Simcoe Muskoka	5	8	6	2	8
Southwestern	7	3	2	5	4
Sudbury	2	3	2	2	4
Thunder Bay	5	10	16	12	12
Timiskaming	0	0	0	0	0
Toronto	381	398	394	278	211
Waterloo	12	7	12	11	
Wellington-Dufferin-Guelph	3	4	6	2	5
Windsor-Essex	27	20	13	15	13
York	27	23	21	18	20
Ontario	691	729	679	508	483

Notes: Data provided by Public Health Ontario Laboratory. Individuals living out of province or with an unknown public health unit were excluded. A previous OHESI analysis estimated that, due to missing data on HIV test history, between 6.9% and 8.1% of first-time HIV diagnoses between 2011 and 2020 had an uncaptured previous HIV diagnosis.

	2017	2018	2019	2020	2021	Total
Algoma	0	0	0	0	0	0
Brant	I	0	0	0	I	2
Chatham-Kent	0	I	0	0	0	I
Durham	3	4	9	4	2	22
Eastern Ontario	0	2	0	0	0	2
Grey Bruce	0	0	0	I	0	I
Haldimand-Norfolk	0	0	0	0	0	0
Haliburton, Kawartha, Pine Ridge	Ι	0	0	I	0	2
Halton	6	4	2	3	I	16
Hamilton	5	6	8	6	5	30
Hastings Prince Edward	0		0	I	0	2
Huron Perth	0	0	0	0	0	0
Kingston, Frontenac, Lennox & Addington	I	0	I	0	0	2
Lambton			0	0	0	2
Leeds, Grenville and Lanark	2	0	I	0	I	4
Middlesex-London	5	4	9	6	5	29
Niagara	2			4	I	9
North Bay Parry Sound	I	I		0	0	3
Northwestern	0	0	2	0	0	2
Ottawa	23	35	22	16	12	108
Peel	10	14	23	14	8	69
Peterborough	0	0	0	0	0	0
Porcupine	0	0	0	2	0	2
Renfrew	I		0	0	0	2
Simcoe Muskoka	I		I	3	2	8
Southwestern	0	I	2	0	I	4
Sudbury	3	3	6	I	2	15
Thunder Bay	I	0	I	0	I	3
Timiskaming	0	0	0	0	0	0
Toronto	80	112	140	95	48	475
Waterloo	3	3	3	5	5	19
Wellington-Dufferin-Guelph	0	0	2	0	0	2
Windsor-Essex	6	7	3	4	2	22
York	4	4		4	7	30
Ontario	160	206	248	170	104	888

Table 2.3 Annual number of positive HIV tests from people with previous evidence of HIV (PEH) by public health unit and year, Ontario, 2017 to 2021

Notes: Data provided by Public Health Ontario Laboratory. Individuals living out of province or with an unknown public health unit were excluded. People with previous evidence of HIV (PEH) are people (unique individuals) who already knew their HIV status at the time of their first positive nominal (as opposed to anonymous testing) diagnostic test in Ontario. This includes: (1) People new to care in Ontario but who were previously diagnosed elsewhere (i.e. another province or country) and retested in Ontario, and (2) People who have been in HIV care in Ontario (i.e. have a history of viral load tests) but with no previous linkable HIV diagnostic test. These individuals may have originally been tested anonymously and then retested (sometimes many years later) – perhaps when they changed health care providers. People who have evidence of a history of viral load testing before their first reported HIV positive test are counted as a positive HIV test in the first year where there is evidence of an HIV diagnosis (i.e. the year of their first viral load test). Viral load testing as evidence of being in care includes anyone with a history of viral load testing in Ontario of (1) more than 30 days before a first diagnostic positive test; or (2) within 30 days (including same day) with a viral load <200 copies/ml before a first diagnostic positive test. A previous OHESI analysis estimated that, due to missing data on HIV test history, between 6.9% and 8.1% of first-time HIV diagnoses between 2011 and 2020 had an uncaptured previous HIV diagnosis.

	Total	Males	Females		Total	Males	Females
Algoma	I.4	2.1	0.7	Northwestern	5.2	5.8	4.5
Brant	1.1	۱.6	0.5	Ottawa	3.8	4.8	2.6
Chatham-Kent	1.3	2.3	0.4	Peel	3.3	4.8	1.7
Durham	1.9	2.8	0.9	Peterborough	1.8	3.1	0.5
Eastern Ontario	1.3	1.5	1.1	Porcupine	0.7	I.4	0.0
Grey Bruce	1.3	2.3	0.2	Renfrew	0.9	1.1	0.8
Haldimand-Norfolk	1.0	2.0	0.0	Simcoe Muskoka	1.0	1.6	0.3
Haliburton, Kawartha, Pine Ridge	0.8	1.3	0.4	Southwestern	2.0	3.2	0.7
Halton	1.7	2.7	0.7	Sudbury	1.3	1.6	1.0
Hamilton	4.5	6.7	2.4	Thunder Bay	7.0	6.4	7.7
Hastings Prince Edward	1.2	2.1	0.2	Timiskaming	0.0	0.0	.00
Huron Perth	1.0	1.9	0.0	Toronto	11.3	19.2	3.7
Kingston, Frontenac, Lennox & Addington	2.0	3.1	1.0	Waterloo	1.8	2.8	0.7
Lambton	0.9	1.2	0.6	Wellington-Dufferin-Guelph	1.3	1.6	1.0
Leeds, Grenville and Lanark	1.6	3.0	0.2	Windsor-Essex	4.2	7.5	0.9
Middlesex-London	4.9	7.7	2.2	York	1.9	3.2	0.5
Niagara	2.3	3.1	1.5				
North Bay Parry Sound	2.9	4.0	1.8	Ontario	4.3	6.8	1.8

Table 2.4 Average rate of first-time HIV diagnoses per 100,000 by public health unit and sex Ontario, 2017 to 2021

Notes: Data provided by Public Health Ontario Laboratory. Individuals living out of province or with an unknown public health unit were excluded. 'Total' includes unknown sex. A previous OHESI analysis estimated that, due to missing data on HIV test history, between 6.9% and 8.1% of first-time HIV diagnoses between 2011 and 2020 (between 5.0% and 5.9% among males and between 15.0% and 17.4% among females) had an uncaptured previous HIV diagnosis.

	2017	2018	2019	2020	2021
Algoma	1.7	5.2	0.0	0.0	0.0
Brant	2.7	0.0	0.7	2.0	0.0
Chatham-Kent	1.0	1.9	3.8	0.0	0.0
Durham	1.9	2.3	2.1	1.3	1.6
Eastern Ontario	1.0	0.5	2.3	1.9	0.9
Grey Bruce	0.0	2.3	2.9	0.6	0.6
Haldimand-Norfolk	0.9	2.6	0.8	0.8	0.0
Haliburton, Kawartha, Pine Ridge	0.5	1.6	1.1	0.0	1.0
Halton	1.2	1.9	2.0	2.0	1.3
Hamilton	5.4	4.8	3.8	3.1	5.4
Hastings Prince Edward	1.2	1.2	0.0	2.3	1.1
Huron Perth	I.4	0.7	0.0	2.7	0.0
Kingston, Frontenac, Lennox & Addington	1.0	4.4	1.9	1.9	1.0
Lambton	0.0	1.5	0.8	1.5	0.8
Leeds, Grenville and Lanark	1.1	2.8	1.7	0.6	1.7
Middlesex-London	7.3	6.9	5.2	1.2	3.9
Niagara	1.5	2.3	1.7	1.2	4.7
North Bay Parry Sound	0.8	1.6	3.9	5.4	3.1
Northwestern	4.9	2.5	4.9	3.7	9.8
Ottawa	5.2	4.3	3.3	3.5	2.6
Peel	3.5	4.3	3.3	2.4	2.8
Peterborough	1.4	1.4	1.4	2.7	2.0
Porcupine	0.0	2.3	1.2	0.0	0.0
Renfrew	1.9	0.9	0.9	0.0	0.9
Simcoe Muskoka	0.9	1.4	1.0	0.3	1.3
Southwestern	3.4	1.4	0.9	2.3	1.8
Sudbury	1.0	1.5	1.0	1.0	1.9
Thunder Bay	3.2	6.4	10.2	7.6	7.7
Timiskaming	0.0	0.0	0.0	0.0	0.0
Toronto	13.3	13.6	13.3	9.3	7.1
Waterloo	2.1	1.2	2.0	1.8	1.8
Wellington-Dufferin-Guelph	1.0	1.3	1.9	0.6	1.6
Windsor-Essex	6.5	4.7	3.1	3.5	3.0
York	2.3	2.0	1.8	1.5	1.7
Ontario	4.9	5.1	4.7	3.4	3.3

Table 2.5 Annual rate of first-time HIV diagnoses per 100,000 population by public health unit and year,

 Ontario, 2017 to 2021

Notes: Data provided by Public Health Ontario Laboratory. Individuals living out of province or with an unknown public health unit were excluded. A previous OHESI analysis estimated that, due to missing data on HIV test history, between 6.9% and 8.1% of first-time HIV diagnoses between 2011 and 2020 had an uncaptured previous HIV diagnosis.

	Male-to-male sexual contact + IDU	Male-to-male sexual contact	Injection drug use (IDU)	Heterosexual contact, identified risk	Heterosexual contact, no identified risk	Other	Total first-time HIV diagnoses (incl. where exposure category not reported)
Durham	6.5%	52.2%	8.7%	17.4%	15.2%	0.0%	65
Eastern Ontario	0.0%	25.0%	0.0%	25.0%	50.0%	0.0%	14
Grey Bruce	0.0%	50.0%	25.0%	0.0%	25.0%	0.0%	11
Halton	7.7%	30.8%	7.7%	33.3%	20.5%	0.0%	50
Hamilton	2.4%	45.9%	17.6%	22.4%	11.8%	0.0%	129
Hastings Prince	0.0%	62.5%	0.0%	12.5%	25.0%	0.0%	10
Edward							
Kingston, Frontenac, Lennox & Addington	7.1%	57.1%	14.3%	7.1%	14.3%	0.0%	21
Leeds, Grenville and Lanark	8.3%	66.7%	16.7%	8.3%	0.0%	0.0%	14
Middlesex-London	5.1%	31.6%	52.0%	6.1%	4.1%	1.0%	121
Niagara	7.7%	41.0%	10.3%	25.6%	15.4%	0.0%	55
North Bay Parry	5.6%	33.3%	38.9%	5.6%	16.7%	0.0%	19
Sound							
Northwestern	5.0%	20.0%	65.0%	0.0%	10.0%	0.0%	21
Ottawa	4.5%	39.6%	11.7%	31.5%	10.8%	1.8%	192
Peel	3.1%	40.0%	I. 9 %	31.9%	22.5%	0.6%	247
Peterborough	18.2%	54.5%	0.0%	9 .1%	18.2%	0.0%	13
Simcoe Muskoka	5.3%	36.8%	15.8%	21.1%	21.1%	0.0%	29
Southwestern	12.5%	56.3%	18.8%	6.3%	6.3%	0.0%	21
Sudbury	0.0%	27.3%	27.3%	27.3%	18.2%	0.0%	13
Thunder Bay	2.4%	21.4%	59.5%	4.8%	11.9%	0.0%	55
Toronto	3.0%	71.2%	2.8%	13.5%	9.3%	0.2%	I,662
Waterloo	2.1%	61.7%	6.4%	17.0%	12.8%	0.0%	53
Wellington-Dufferin- Guelph	7.7%	61.5%	0.0%	15.4%	7.7%	7.7%	20
Windsor-Essex	7.8%	67 5%	0.0%	13.0%	11.7%	0.0%	88
York	5 9%	56 5%	0.0%	16.5%	21.2%	0.0%	109
	3.770	30.370	0.070	10.076	21.2/0	0.070	
Ontario	3.9%	59.1%	8.7%	16.0%	11.9%	0.3%	3,090

Table 2.6 Proportion of first-time HIV diagnoses by HIV exposure category (where known/reported), Ontario, 2017 to 2021

HIV in Ontario by public health unit: Tests & diagnoses 2021, and care cascade 2020

Notes: Data provided by Public Health Ontario Laboratory. Proportions calculated among where an HIV exposure category was known/reported, while the total counts on the right include all first-time HIV diagnoses in the PHU. Individuals living out of province or with an unknown public health unit were excluded. The "Heterosexual contact, identified risk" category includes diagnoses where sex with a person of the opposite sex/gender is reported and either the individual's country of birth is reported as an HIV-endemic country, or the individual's sex partner is reported to be at least one of: HIV-positive; user of injection drugs; born in an HIV-endemic country; a bisexual male. See **HIV exposure categories** for more information. A previous OHESI analysis estimated that, due to missing data on HIV test history, between 6.9% and 8.1% of first-time HIV diagnoses between 2011 and 2020 had an uncaptured previous HIV diagnosis. The following PHU's had total counts of first-time HIV diagnoses of less than 10 and were therefore excluded from the above table:

- Algoma
- Brant
- Chatham-Kent
- Haldimand-Norfolk
- Haliburton, Kawartha, Pine Ridge
- Huron-Perth
- Lambton
- Porcupine
- Renfrew
- Timiskaming

3. **HIV** test positivity

	Total	Males	Females		Total	Males	Females
Algoma	0.04%	0.06%	0.02%	Northwestern	0.11%	0.15%	0.09%
Brant	0.05%	0.09%	0.03%	Ottawa	0.08%	0.10%	0.06%
Chatham-Kent	0.06%	0.12%	0.02%	Peel	0.07%	0.11%	0.04%
Durham	0.06%	0.10%	0.03%	Peterborough	0.07%	0.13%	0.02%
Eastern Ontario	0.07%	0.10%	0.05%	Porcupine	0.03%	0.07%	0.00%
Grey Bruce	0.08%	0.15%	0.01%	Renfrew	0.04%	0.05%	0.04%
Haldimand-Norfolk	0.07%	0.16%	0.00%	Simcoe Muskoka	0.04%	0.07%	0.01%
Haliburton, Kawartha, Pine Ridge	0.04%	0.06%	0.02%	Southwestern	0.10%	0.19%	0.04%
Halton	0.06%	0.09%	0.02%	Sudbury	0.04%	0.05%	0.03%
Hamilton	0.12%	0.18%	0.07%	Thunder Bay	0.17%	0.16%	0.17%
Hastings Prince Edward	0.06%	0.10%	0.01%	Timiskaming	0.00%	0.00%	0.00%
Huron Perth	0.06%	0.13%	0.00%	Toronto	0.16%	0.26%	0.06%
Kingston, Frontenac, Lennox & Addington	0.05%	0.06%	0.02%	Waterloo	0.05%	0.09%	0.02%
Lambton	0.04%	0.06%	0.03%	Wellington-Dufferin-Guelph	0.04%	0.06%	0.04%
Leeds, Grenville and Lanark	0.07%	0.13%	0.01%	Windsor-Essex	0.13%	0.25%	0.02%
Middlesex-London	0.11%	0.17%	0.05%	York	0.05%	0.10%	0.02%
Niagara	0.08%	0.13%	0.06%				
North Bay Parry Sound	0.11%	0.17%	0.07%	Ontario	0.10%	0.17%	0.04%

Table 3.1 Average HIV test positivity by public health unit and sex, Ontario, 2017 to 2021

Notes: Data provided by Public Health Ontario Laboratory. HIV-negative prenatal tests not included. Testers living out of province or with an unknown public health unit were excluded. 'Total' includes unknown sex.

	2017	2018	2019	2020	2021
Algoma	0.06%	0.15%	0.00%	0.00%	0.00%
Brant	0.14%	0.00%	0.03%	0.11%	0.00%
Chatham-Kent	0.05%	0.10%	0.18%	0.00%	0.00%
Durham	0.07%	0.07%	0.06%	0.05%	0.06%
Eastern Ontario	0.05%	0.02%	0.11%	0.11%	0.05%
Grey Bruce	0.00%	0.14%	0.16%	0.04%	0.04%
Haldimand-Norfolk	0.06%	0.17%	0.06%	0.07%	0.00%
Haliburton, Kawartha, Pine Ridge	0.03%	0.07%	0.04%	0.00%	0.05%
Halton	0.04%	0.06%	0.06%	0.08%	0.04%
Hamilton	0.14%	0.12%	0.09%	0.10%	0.14%
Hastings Prince Edward	0.06%	0.05%	0.00%	0.13%	0.05%
Huron Perth	0.09%	0.04%	0.00%	0.18%	0.00%
Kingston, Frontenac, Lennox & Addington	0.02%	0.09%	0.03%	0.05%	0.03%
Lambton	0.00%	0.06%	0.03%	0.08%	0.03%
Leeds, Grenville and Lanark	0.05%	0.11%	0.06%	0.03%	0.08%
Middlesex-London	0.17%	0.13%	0.11%	0.03%	0.09%
Niagara	0.06%	0.08%	0.06%	0.06%	0.16%
North Bay Parry Sound	0.03%	0.06%	0.13%	0.22%	0.12%
Northwestern	0.12%	0.05%	0.09%	0.09%	0.22%
Ottawa	0.11%	0.08%	0.06%	0.09%	0.06%
Peel	0.08%	0.09%	0.07%	0.06%	0.05%
Peterborough	0.06%	0.05%	0.04%	0.12%	0.08%
Porcupine	0.00%	0.11%	0.05%	0.00%	0.00%
Renfrew	0.09%	0.04%	0.04%	0.00%	0.04%
Simcoe Muskoka	0.04%	0.05%	0.04%	0.02%	0.05%
Southwestern	0.19%	0.06%	0.04%	0.13%	0.09%
Sudbury	0.03%	0.04%	0.03%	0.03%	0.06%
Thunder Bay	0.09%	0.16%	0.21%	0.20%	0.18%
Timiskaming	0.00%	0.00%	0.00%	0.00%	0.00%
Toronto	0.19%	0.18%	0.17%	0.17%	0.11%
Waterloo	0.06%	0.04%	0.06%	0.07%	0.05%
Wellington-Dufferin-Guelph	0.03%	0.04%	0.07%	0.02%	0.06%
Windsor-Essex	0.20%	0.13%	0.09%	0.13%	0.09%
York	0.07%	0.05%	0.04%	0.05%	0.05%
Ontario	0.12%	0.11%	0.10%	0.10%	0.08%

Table 3.2 Annual HIV test positivity by public health unit and year, Ontario, 2017 to 2021

Notes: Data provided by Public Health Ontario Laboratory. Individuals living out of province or with an unknown public health unit were excluded.

4. HIV care cascade (diagnosed, in care, on ART and virally suppressed)

		Diagnosed	In	care	On	ART	Virally su	uppressed
Public Health Unit	Year	Number	Number	Percent of diagnosed	Number	Percent of diagnosed	Number	Percent of diagnosed
Algoma	2016	61	57	93.4%	54	88.5%	54	88.5%
	2017	68	60	88.2%	59	86.8%	58	85.3%
	2018	78	65	83.3%	61	78.2%	56	71.8%
	2019	76	67	88.2%	63	82.9%	61	80.3%
	2020	81	67	82.7%	65	80.2%	62	76.5%
Brant	2016	77	72	93.5%	69	89.6%	67	87.0%
	2017	87	84	96.6%	80	92.0%	78	89.7%
	2018	87	80	92.0%	77	88.5%	77	88.5%
	2019	95	87	91.6%	85	89.5%	84	88.4%
	2020	102	95	93.1%	94	92.2%	91	89.2%
Chatham-Kent	2016	46	45	97.8%	43	93.5%	42	91.3%
	2017	47	45	95.7%	43	91.5%	43	91.5%
	2018	52	50	96.2%	50	96.2%	49	9 4.2%
	2019	63	59	93.7%	58	9 2.1%	57	90.5%
	2020	61	57	93.4%	57	93.4%	57	93.4%
Durham	2016	386	358	92.7%	334	86.5%	325	84.2%
	2017	414	388	93.7%	371	89.6%	361	87.2%
	2018	45 I	420	93.1%	411	91.1%	399	88.5%
	2019	490	451	92.0%	443	90.4%	437	89.2%
	2020	506	460	90.9%	452	89.3%	449	88.7%
Eastern	2016	122	108	88.5%	103	84.4%	100	82.0%
	2017	122	106	86.9%	103	84.4%	100	82.0%
	2018	124	107	86.3%	104	83.9%	102	82.3%
	2019	124	110	88.7%	108	87.1%	106	85.5%
	2020	139	123	88.5%	121	87.1%	119	85.6%

 Table 4.1 Number and percent of people living with diagnosed HIV by care cascade step and public health unit, 2016 to 2020

		Diagnosed	In	care	On	ART	Virally suppressed		
Public Health Unit	Year	Number	Number	Percent of diagnosed	Number	Percent of diagnosed	Number	Percent of diagnosed	
Grey Bruce	2016	60	59	98.3%	55	91.7%	54	90.0%	
	2017	64	60	93.8%	56	87.5%	54	84.4%	
	2018	68	61	89.7%	60	88.2%	57	83.8%	
	2019	72	68	94.4%	63	87.5%	62	86.1%	
	2020	77	73	94.8%	70	90.9%	68	88.3%	
Haldimand-Norfolk	2016	41	37	90.2%	36	87.8%	34	82.9%	
	2017	51	46	90.2%	46	90.2%	41	80.4%	
	2018	54	49	90.7%	49	90.7%	47	87.0%	
	2019	54	51	94.4%	50	92.6%	50	92.6%	
	2020	55	52	94 .5%	47	85.5%	47	85.5%	
Haliburton, Kawartha,	2016	107	100	93.5%	99	92.5%	96	89.7%	
Pine Ridge	2017	117	112	95.7%	110	94.0%	108	92.3%	
	2018	116	112	96.6%	108	93.1%	107	92.2%	
	2019	130	124	95.4%	122	93.8%	122	93.8%	
	2020	129	120	93.0%	119	92.2%	119	92.2%	
Halton	2016	264	247	93.6%	229	86.7%	224	84.8%	
	2017	267	247	9 2.5%	231	86.5%	224	83. 9 %	
	2018	285	241	84.6%	229	80.4%	221	77.5%	
	2019	294	246	83.7%	241	82.0%	238	81.0%	
	2020	292	253	86.6%	249	85.3%	245	83. 9 %	
Hamilton	2016	661	594	89.9 %	560	84.7%	543	82.1%	
	2017	699	639	91.4%	607	86.8%	587	84.0%	
	2018	732	653	89.2%	630	86.1%	612	83.6%	
	2019	749	669	89.3%	643	85.8%	623	83.2%	
	2020	752	679	90.3%	659	87.6%	642	85.4%	
Hastings Prince Edward	2016	122	104	85.2%	100	82.0%	97	79.5%	
	2017	115	96	83.5%	93	80.9%	91	79.1%	
	2018	117	102	87.2%	100	85.5%	99	84.6%	
	2019	105	97	92.4%	97	92.4%	95	90.5%	
	2020	107	100	93.5%	99	92.5%	97	90.7%	

		Diagnosed	In	care	On	On ART		ıppressed
Public Health Unit	Year	Number	Number	Percent of diagnosed	Number	Percent of diagnosed	Number	Percent of diagnosed
Huron Perth	2016	39	33	84.6%	32	82.1%	32	82.1%
	2017	43	37	86.0%	36	83.7%	36	83.7%
	2018	48	46	95.8%	45	93.8%	44	91.7%
	2019	49	45	91.8%	44	89.8%	44	89.8%
	2020	46	43	93.5%	43	93.5%	43	93.5%
Kingston, Frontenac,	2016	187	171	91.4%	158	84.5%	154	82.4%
Lennox & Addington	2017	182	166	91.2%	156	85.7%	150	82.4%
	2018	188	171	91.0%	167	88.8%	162	86.2%
	2019	202	179	88.6%	174	86.1%	167	82.7%
	2020	207	187	90.3%	181	87.4%	174	84.1%
Lambton	2016	47	44	93.6%	40	85.1%	39	83.0%
	2017	50	48	96.0%	45	90.0%	41	82.0%
	2018	53	44	83.0%	42	79.2%	39	73.6%
	2019	53	43	81.1%	41	77.4%	40	75.5%
	2020	54	47	87.0%	45	83.3%	43	79.6%
Leeds, Grenville and	2016	103	88	85.4%	87	84.5%	86	83.5%
Lanark	2017	108	92	85.2%	85	78.7%	85	78.7%
	2018	114	102	89.5%	95	83.3%	93	81.6%
	2019	117	101	86.3%	98	83.8%	94	80.3%
	2020	124	105	84.7%	101	81.5%	99	79.8%
Middlesex-London	2016	587	516	87.9%	461	78.5%	432	73.6%
	2017	619	556	89.8%	516	83.4%	482	77. 9 %
	2018	635	582	91.7%	549	86.5%	515	81.1%
	2019	678	623	91.9%	584	86.1%	552	81.4%
	2020	683	632	9 2.5%	591	86.5%	580	84.9%
Niagara	2016	314	287	91.4%	277	88.2%	264	84.1%
	2017	339	308	90.9%	295	87.0%	287	84.7%
	2018	349	311	89.1%	306	87.7%	302	86.5%
	2019	355	321	90.4%	315	88.7%	307	86.5%
	2020	367	341	92.9%	332	90.5%	325	88.6%

		Diagnosed	In care		On	ART	Virally suppressed		
Public Health Unit	Year	Number	Number	Percent of diagnosed	Number	Percent of diagnosed	Number	Percent of diagnosed	
North Bay Parry Sound	2016	58	55	94.8%	53	91.4%	53	91.4%	
	2017	60	52	86.7%	52	86.7%	51	85.0%	
	2018	65	53	81.5%	50	76.9%	50	76. 9 %	
	2019	68	55	80.9%	54	79.4%	51	75.0%	
	2020	77	66	85.7%	63	81.8%	60	77.9%	
Northwestern	2016	21	13	61.9%	10	47.6%	10	47.6%	
	2017	26	12	46.2%	7	26.9%	7	26. 9 %	
	2018	25	15	60.0%	14	56.0%	13	52.0%	
	2019	29	18	62.1%	17	58.6%	15	51.7%	
	2020	34	23	67.6%	22	64.7%	18	52. 9 %	
Ottawa	2016	1,917	I,665	86.9%	I,594	83.2%	1,535	80.1%	
	2017	I,944	1,717	88.3%	I,634	84.1%	1,583	81.4%	
	2018	I,990	I,753	88.1%	I,685	84.7%	I,640	82.4%	
	2019	2,031	I,777	87.5%	I,724	84.9%	1,676	82.5%	
	2020	2,032	I,775	87.4%	1,727	85.0%	1,681	82.7%	
Peel	2016	911	809	88.8%	758	83.2%	730	80.1%	
	2017	974	868	89.1%	817	83.9%	785	80.6%	
	2018	1,025	922	90.0%	871	85.0%	843	82.2%	
	2019	I,086	971	89.4%	930	85.6%	906	83.4%	
	2020	1,109	973	87.7%	943	85.0%	920	83.0%	
Peterborough	2016	72	66	91.7%	63	87.5%	60	83.3%	
	2017	80	73	91.3%	68	85.0%	67	83.8%	
	2018	81	73	9 0.1%	72	88.9%	72	88.9%	
	2019	88	83	94.3%	83	94.3%	82	93.2%	
	2020	90	84	93.3%	83	92.2%	82	91.1%	
Porcupine	2016	24	22	91.7%	20	83.3%	20	83.3%	
	2017	25	20	80.0%	20	80.0%	20	80.0%	
	2018	27	20	74.1%	20	74.1%	20	74.1%	
	2019	26	23	88.5%	23	88.5%	23	88.5%	
	2020	24	22	91.7%	21	87.5%	21	87.5%	

		Diagnosed	In	care	On	On ART		ıppressed
Public Health Unit	Year	Number	Number	Percent of diagnosed	Number	Percent of diagnosed	Number	Percent of diagnosed
Renfrew	2016	47	42	89.4%	40	85.1%	39	83.0%
	2017	52	46	88.5%	43	82.7%	40	76.9%
	2018	58	47	81.0%	44	75.9%	43	74.1%
	2019	57	47	82.5%	46	80.7%	46	80.7%
	2020	51	40	78.4%	39	76.5%	39	76.5%
Simcoe Muskoka	2016	263	232	88.2%	218	82. 9 %	212	80.6%
	2017	254	222	87.4%	210	82.7%	203	79.9%
	2018	264	231	87.5%	220	83.3%	214	81.1%
	2019	270	237	87.8%	225	83.3%	217	80.4%
	2020	287	253	88.2%	245	85.4%	239	83.3%
Southwestern	2016	74	67	90.5%	64	86.5%	58	78.4%
	2017	82	75	91.5%	72	87.8%	69	84.1%
	2018	92	83	90.2%	76	82.6%	73	79.3%
	2019	97	88	90.7%	84	86.6%	82	84.5%
	2020	105	95	90.5%	91	86.7%	90	85.7%
Sudbury	2016	196	172	87.8%	159	81.1%	143	73.0%
	2017	186	163	87.6%	153	82.3%	144	77.4%
	2018	188	166	88.3%	156	83.0%	144	76.6%
	2019	210	183	87.1%	173	82.4%	167	79.5%
	2020	208	177	85.1%	170	81.7%	163	78.4%
Thunder Bay	2016	107	89	83.2%	78	72. 9 %	74	69.2%
	2017	112	90	80.4%	81	72.3%	78	69.6%
	2018	115	96	83.5%	85	73.9%	80	69.6%
	2019	124	103	83.1%	84	67.7%	77	62.1%
	2020	139	114	82.0%	94	67.6%	90	64.7%
Timiskaming	2016	14	13	92.9%	13	92.9%	13	92.9%
	2017	14	13	92.9%	13	92.9%	12	85.7%
	2018	16	15	93.8%	15	93.8%	15	93.8%
	2019	15	15	100.0%	15	100.0%	15	100.0%
	2020	16	16	100.0%	16	100.0%	16	100.0%
		Diagnosed	In care		On ART		Virally suppressed	
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Public Health Unit	Year	Number	Number	Percent of diagnosed	Number	Percent of diagnosed	Number	Percent of diagnosed
Toronto	2016	9,670	8,435	87.2%	7,954	82.3%	7,730	79.9%
	2017	9,890	8,701	88.0%	8,289	83.8%	8,065	81.5%
	2018	10,160	8,924	87.8%	8,564	84.3%	8,359	82.3%
	2019	10,443	9,247	88.5%	8,943	85.6%	8,725	83.5%
	2020	10,482	9,363	89.3%	9,140	87.2%	8,939	85.3%
Waterloo	2016	314	283	90.1%	262	83.4%	255	81.2%
	2017	319	287	90.0%	271	85.0%	260	81.5%
	2018	335	302	90.1%	292	87.2%	285	85.1%
	2019	362	332	91.7%	314	86.7%	309	85.4%
	2020	410	365	89.0%	354	86.3%	345	84.1%
Wellington-Dufferin-	2016	185	164	88.6%	156	84.3%	154	83.2%
Guelph	2017	200	172	86.0%	165	82.5%	160	80.0%
	2018	200	177	88.5%	171	85.5%	168	84.0%
	2019	191	177	9 2.7%	170	89.0%	166	86.9 %
	2020	179	161	89.9%	158	88.3%	156	87.2%
Windsor-Essex	2016	377	345	91.5%	331	87.8%	320	84.9%
	2017	409	379	92.7%	365	89.2%	349	85.3%
	2018	430	395	91.9%	382	88.8%	372	86.5%
	2019	437	401	91.8%	393	89.9%	382	87.4%
	2020	461	423	91.8%	415	90.0%	410	88.9%
York	2016	357	328	91.9%	299	83.8%	289	81.0%
	2017	385	347	90.1%	326	84.7%	315	81.8%
	2018	415	375	90.4%	356	85.8%	345	83.1%
	2019	441	403	91.4%	386	87.5%	370	83.9%
	2020	470	419	89.1%	409	87.0%	402	85.5%
Ontario	2016	17,831	15720	88.2%	14,809	83.1%	14,338	80.4%
	2017	18,404	16327	88.7%	15,518	84.3%	15,034	81.7%
	2018	19,037	16843	88.5%	16,156	84.9%	15,717	82.6%
	2019	19,681	17501	88.9%	16,893	85.8%	16,448	83.6%
	2020	19,956	17803	89.2%	17,315	86.8%	16,931	84.8%

Notes: Data provided by Public Health Ontario Laboratory using the Ontario HIV Laboratory Cohort. The number 'virally suppressed' can exceed the number 'on ART' due to the inclusion individuals who were virally suppressed but documented as not 'on ART'. Individuals living out of province or with an unknown public health unit were excluded.