Ontario Health Teams Central Evaluation

Quantitative Evaluation

OHT Attributable Populations: Diabetes Improvement Indicators at Baseline 2019/20 to 2021/2022

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HSPN Health System Performance Network

About Us

The Health System Performance Network (HSPN) is a collaborative network of investigators, visiting scholars, post-doctoral fellows, graduate students and research staff working with health system leaders, and policymakers to improve the management and performance of our health system. Building on Ontario's established record of performance measurement created by the 1998 ground-breaking Hospital Report Research Collaborative, the HSPN was established in 2009 and has built a track record in performance measurement, research, evaluation and improvement in Ontario with expertise in multiple domains of health system performance including perspectives of patients, providers, population health, and cost. The HSPN receives funding from the Ontario Ministry of Health.

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About This Report

This report is part of the Health System Performance Network (HSPN) central evaluation of Ontario Health Teams (OHTs). The purpose of the HSPN evaluation is to understand how OHTs are developing and implementing change to drive improvements in patient, provider and health system outcomes. This report is largely based on administrative data following the government's introduction of the OHT initiative, selection and approval of OHTs, and OHT implementation of new models of care. The data presented in this report provides the opportunity to compare diabetes indicators across OHTs over the past three fiscal years (2019/20, 2020/21, 2021/22), demonstrating how diabetes care was affected during the COVID-19 pandemic in Ontario. This data can also serve as motivation for OHTs to improve access to diabetes care and patient outcomes within their attributable population.

Table of Contents

List of Tables

List of Figures

OHT Key

OHT No.	OHT Name (Fiscal Year 2021/22)	Number of patients with diabetes (18 +)	Prevalence of diabetes in adult population (%)
Cohort 1			
01	Huron Perth and Area OHT	13,579	11.47
02	Central West OHT	110,527	15.72
03	East Toronto Health Partners OHT	42,108	13.93
04	Northumberland OHT	5,718	12.99
05	Middlesex London OHT	49,922	12.07
06	Mississauga OHT	106,444	14.31
08	Hills of Headwaters Collaborative OHT	6,648	10.17
09	North York Toronto Health Partners	51,648	12.18
10	All Nations Health Partners OHT	3,003	13.52
11	Ottawa OHT	52,431	10.81
12	Chatham-Kent OHT	11,950	14.82
13	Eastern York Region and North Durham OHT	35,837	13.93
14	Niagara OHT	41,515	13.38
15	Muskoka and Area OHT	6,509	12.22
16	North Toronto OHT	15,020	9.35
17	Cambridge North Dumfries OHT	16,198	13.56
18	Peterborough OHT	18,194	13.27
19	Nipissing Wellness OHT	11,720	14.66
20	Durham OHT	48,475	12.75
21	Guelph Wellington OHT	18,142	10.27
22	Greater Hamilton Health Network	65,583	13.16
23	Algoma OHT	11,194	13.68
24	Burlington OHT	19,323	10.40
25	Southlake Community OHT	31,912	11.56
26	Couchiching OHT	7,758	14.19
27	North Western Toronto OHT	54,271	16.12
28	Western York Region OHT	39,079	13.19
29	Archipel OHT	20,946	13.37
30	Connected Care Halton OHT	35,228	11.09
Cohort 2			
31	West Toronto OHT	21,064	11.00
33	Frontenac, Lennox & Addington OHT	22,693	12.79
34	Lanark, Leeds and Grenville OHT	13,694	13.33
35	Downtown East Toronto OHT	11,720	9.64
36	South Georgian Bay OHT	6,527	12.62
37	Oxford and Area OHT	10,508	13.21
38	Mid-West Toronto OHT	60,143	11.94
40	Brantford Brant Norfolk OHT	21,960	13.80
41	Sarnia Lambton OHT	12,474	13.17
42	Kitchener, Waterloo, Wilmot, Woolwich, and Wellesley (KW4) OHT	33,918	10.72
43	Rainy River District OHT	2,210	13.24
44	Scarborough OHT	116,450	16.80
45	Kawartha Lakes OHT	6,290	14.41
Cohort 3			
07	Barrie and Area OHT	16,627	10.68
32	North Simcoe OHT	5,887	13.73
39	Windsor Essex OHT	46,637	13.58
46	Hastings Prince Edward OHT	17,688	14.05
47	Ottawa West Four Rivers OHT	28,543	10.79
48	Great River OHT	16,439	15.41
49	Grey-Bruce OHT	13,710	12.45
50	Elgin OHT	7,406	13.32
51	Ottawa Valley OHT	8,507	13.98

Executive Summary

Ontario Health Teams (OHTs) were introduced in 2019 by the Ontario Ministry of Health (MOH) as a new way of integrating care delivery. They were developed to enable patients, families, and cross-sectoral groups of providers and organizations to work together to create a coordinated continuum of care that is better connected to patients in their local communities. At maturity, OHTs will be clinically and fiscally accountable for a defined population.

To date, 57 OHTs have been approved by the MOH, grouped into four separate cohorts. This report will focus on the 51 OHTs that comprise the first three cohorts.

The objective of this work is to report on indicators related to diabetes care captured in the routinely collected health administrative data sources held at ICES. This report focuses on system level indicators that reflect patient access to care and health outcomes for individuals who access the health care system for diabetes-related care. We contrast these indicators across measures of material deprivation and rurality.

Results in Brief

This report presents data on diabetes-related indicators across 51 OHTs in Ontario (of a total of 57) between 2019/20 to 2021/22. The highest level of variability in indicator results across these OHTs was found for hospitalizations for long-term diabetes-related complications where there was a 4-fold difference in the risk-adjusted rate across the OHTs (ranging from 130 events to 619 events per 10,000 population, and corresponding coefficient of variation (CV=35.9). Other indicators where high variability was observed include proportion of patients up-to-date with HbA1c screening (CV=12) and proportion of patients with uncontrolled hyperglycemia (HbA1c ≥7; CV=11).

There was very little relationship between material deprivation and diabetes screening and a moderate degree of correlation between material deprivation and hospitalizations for long-term diabetes-related complications (correlation=0.33) and proportion of patients with uncontrolled hyperglycemia (correlation 0.28).

There was a moderate correlation between the proportion of the attributable population residing in rural areas of Ontario with the proportion of patients up-to-date with retinal screening (correlation=0.52) and proportion of patients with HbA1c ≥7 (0.58), and a weak to moderate correlation between rurality and hospitalizations for long-term diabetes related complications (0.30).

Within OHTs, proportion of patients with HbA1c ≥7 showed minimal differences in outcomes between residents in the highest and lowest quintiles of material deprivation across the OHTs (i.e., relative difference (Q5/Q1) near 1). For other indicators, some inequities were evident. However, the direction and magnitude of association varied considerably by OHT.

Conclusion

This report provides an overview of baseline performance for select indicators across 51 OHTs for diabetes-related care. These baseline findings illustrate where there are opportunities for OHTs to focus their implementation activities to improve access and outcomes for patients in need of diabetes-related care.

Abbreviations

DAD	Discharge Abstract Database
MOH	Ministry of Health
NACRS	National Ambulatory Care Reporting System
ODB	Ontario Drug Benefit claims database
ODD	Ontario Diabetes Database
OHIP	Ontario Health Insurance Plan (claims database)
OHTAM	Ontario Health Teams Attribution Models database
OLIS	Ontario Laboratories Information System
ONMARG	Ontario Marginalization database
RPDB	Registered Persons Database

Background

Ontario Health Teams (OHTs) were introduced in 2019 by the Ontario Ministry of Health (MOH) as a new way of integrating care delivery. They were developed to enable patients, families, and health care providers work together to create a coordinated continuum of care that is better connected to patients in their local communities. OHTs involve a cross-sectoral group of providers and organizations, and at maturity will be clinically and fiscally accountable for a defined population[1]. Diabetes poses a significant burden upon the healthcare system of Ontario, with a patient population of over 1.5 million and a total annual system cost of over 3 billion dollars[2]. In addition, diabetes outcomes can be improved by providing patients with better access to care at the population level[3].

Objectives

The objective of this work is to report on indicators specific to care for patients with Type 1 or Type 2 diabetes across OHTs using routinely collected health administrative data sources held at ICES. This report, will also shed light on changes in diabetes indicators across OHTs during the COVID-19 pandemic. We sought to describe variation cross-sectionally between OHTs and over time, to identify where opportunities and challenges exist to improve care for people with diabetes. Monitoring and evaluation of these indicators facilitates evidence-based decision making and care improvements for Ontarians.

Methods

Data Sources

In January 2021, a database of Ontarians linked to an OHT was shared with ICES by the MOH. This database, the OHT Attribution Models database (OHTAM), links Ontarians to a single usual provider of primary care, and then assigns that provider's patients to a hospital and a larger network (i.e., an OHT) based on historical health care utilization patterns. Specialists are linked to networks based on hospital where they provided the most services. Nearly all Ontarians are assigned to a network using this methodology, which closely resembles the Ontario physician networks developed at ICES [3]. Importantly, the networks are based on health care utilization and physician-hospital referral patterns, and not where individuals live in Ontario. Administrative data were used to attribute individuals to OHTs and create the dataset, which we herein refer to as the *OHT attributable population.* The OHT key defining the 51 OHTs included in this report can be found on **page 6**.

This report provides data on Ontarians included in the Ontario Diabetes Database (ODD). Patients are included in this database if they meet at least one of the following criteria during a period of two years; 1) two physician service claims related to diabetes or 2) one hospital admission related to pre-existing or newly onset diabetes. It is important to note that this database is unable to distinguish between persons with Type 1 or Type 2 diabetes.

Health administrative datasets used in this work included the Registered Persons Database (RPDB), the Canadian Institute for Health Information's Discharge Abstract Database (DAD), the National Ambulatory Care Reporting System (NACRS), the ODD, the Ontario Health Insurance Plan (OHIP) claims database, the Ontario Laboratories Information System (OLIS), the Ontario Marginalization (ONMARG) database, the Ontario Drug Benefit claims database (ODB) and the 2016 Canadian Census (Census). Detailed information on these data is available elsewhere (see: https://datadictionary.ices.on.ca/Applications/DataDictionary/Default.aspx). These datasets were linked using unique encoded identifiers and analyzed at ICES, an independent, non-profit research institute funded by an annual grant from the MOH. As a prescribed entity under Ontario's privacy legislation, ICES is authorized to collect and use healthcare data for the purposes of health system analysis, evaluation and decision support. Secure access to these data is governed by policies and procedures that are approved by the Information and Privacy Commissioner of Ontario. The use of these data in this project was authorized under section 45 of Ontario's Personal Health Information Protection Act, which does not require review by a Research Ethics Board.

Selection of Indicators

A total of five indicators were selected for this report. Indicator selection was based on alignment with previously published primary care reports released by Ontario Health (Indicators 1 through 3). Indicators 4 and 5 provide outcome measures. Also, an important criterion for selection included that the indicator could be measured in administrative databases for all OHTs. In addition, we also desired a parsimonious number of indicators.

Table 1. Diabetes indicators examined in this report

	Indicator	Definition
1	Proportion of patients with diabetes up-to-date with glycated hemoglobin (HbA1C) tests	Proportion of diabetic patients aged 40 years and older who have had two or more glycated hemoglobin (HbA1C) tests within the past 12 months (percentage)[4]
2	Proportion of patients with diabetes who are up-to-date with a retinal examination	Proportion of diabetic patients aged 40 years and older who have had at least one retinal exam with an ophthalmologist or optometrist in the past 24 months (percentage)[5]
3	Statins dispensed to prevent vascular Complications from Diabetes	Proportion of patients with diabetes aged 65 and older who have been dispensed a statin within the past 12 months (percentage)[6]
4	Proportion of patients with HbA1c ≥7	Proportion of patients with diabetes who have HbA1c values higher than or equal to 7 (percentage). Adjusted for age and sex[4, 7]
5	Hospitalization for long-term diabetes-related complication	Proportion of diabetic patients aged 18 and older with long-term diabetes-related hospitalization in the past 12 months. Adjusted for age and sex[8]

Reporting of Indicators

All diabetes indicators are calculated on the full attributable population aged 18 to 105 years, unless otherwise stated. We report at the OHT level, only for OHTs that have been approved as of February 2022. These 51 OHTs account for approximately 95% of the Ontario attributable population. Full information of the calculation of each selected indicator – including data sources used, derivation of numerators and denominators, and other details – can be found in the accompanying Appendix.

We report each measure annually (from 2019/20 to 2021/22) at the OHT-level. Model-based risk adjustment methods have been used for the selected indicators related to patient outcomes. Risk adjustment is a statistical method that accounts for differences in the distribution of individual-level characteristics (and other risk factors) between different providers so that providers that care for older, more complex patients are not unfairly penalized (relative to providers that care for younger, healthier populations). Model based risk adjustment is ideal as it (1) allows for a consistent approach across all indicators, whether the indicator is a risk (proportion) or rate (events over time), (2) is flexible in that different regression models can be applied to best fit the data, and (3) allows for control for multiple confounding factors.

To quantify the degree of variability of results at the OHT-level in each reporting period (here, years), we calculated the coefficient of variation (CV), the ratio of the standard deviation to the mean. The higher the CV value, the greater the level of dispersion around the mean and possibly represents a measure where some OHTs are performing much better than others. We also described the percent change in risk adjusted estimates in 2021/22 relative to prior reporting periods. We used the ONMARG database to derive

the material deprivation quintile for the attributable population using and individual's postal code. Material deprivation includes aspects of income, education, family structure and housing quality. These data are collected from the Canadian census and are at the neighbourhood level (Dissemination Area). Material deprivation measures the ability or inability to access and attain basic needs. The concept is closely connected to poverty. For each target population, we calculated the proportion of each OHTs attributable population living in each quintile of material deprivation. We ranked OHTs according to the ratio of their population residing in the most vs least deprived areas of Ontario (i.e., proportion of population in quintile 5 vs quintile 1).

Kendall's rank correlation statistic (T) was used to quantify associations between this material deprivation rank and risk adjusted indicator performance. The rank correlation coefficient varies between +1 and -1. Values between ±0.00 and 0.10 suggest a negligible association; values between ±0.10 and 0.39 suggest a weak association; values between ±0.40 and 0.69 suggest a moderate association; values between ±0.70 and 0.89 suggest a strong association; and values between ±0.90-1.00 suggest a very strong association. Correlations between the OHT ranks of risk adjusted performance versus rank of rurality (i.e., proportion of each OHTs attributable population residing in a rural vs urban community) was also calculated. Here, urban versus rural was based on residing in a community of 10,000 persons or more. We report our results through an equity lens rather than something to adjust away through risk-adjustment. We seek to provide insight into how factors related to socioeconomic status can affect access to care for diabetes patients. Highlighting such inequities in care can prompt efforts to ensure that patients living with diabetes are able to access the care they need, regardless of their socioeconomic status.

Understanding and interpreting the scatterplots

Each panel represents OHT-level estimates calculated separately for each reporting period. Indicators have been risk-adjusted by sex and age. OHTs were ordered from left to right according to their level of performance, from most to least desirable respectively, based on the most recent year of data (2021/22).

The ordering of OHTs is consistent from panel to panel, so for example, the leftmost point in each panel always represents the same OHT, but in different reporting periods. Comparing each point to the dotted line shows the OHT performance relative to the total OHT attributable population in a reporting period.

Each dot is colour-coded according to the OHT's ratio of the attributable population in most (Q5) vs least (Q1) deprived areas, so that correlations can be seen visually. Dark blue dots represent OHTs with a high proportion of their attributable population in the most deprived neighbourhoods as compared to the proportion of the attributed population in the least deprived neighbourhoods; light green represent OHTs where there is a higher proportion in the least as compared to the most deprived neighborhoods.

In the event that access to care for diabetes patients across OHTs is inequitably affected by material deprivation, we may observe clustering of the dark blue dots on the right side of the panel. This would suggest that OHTs with higher levels of material deprivation have less favorable outcomes for that particular indicator compared to OHTs with lower levels of material deprivation.

Key Findings

Proportion of patients up-to-date with glycated hemoglobin (HbA1C) tests

Low percentages of patients that are up-to-date with HbA1c screening may indicate poor monitoring of glucose control/ diabetes management

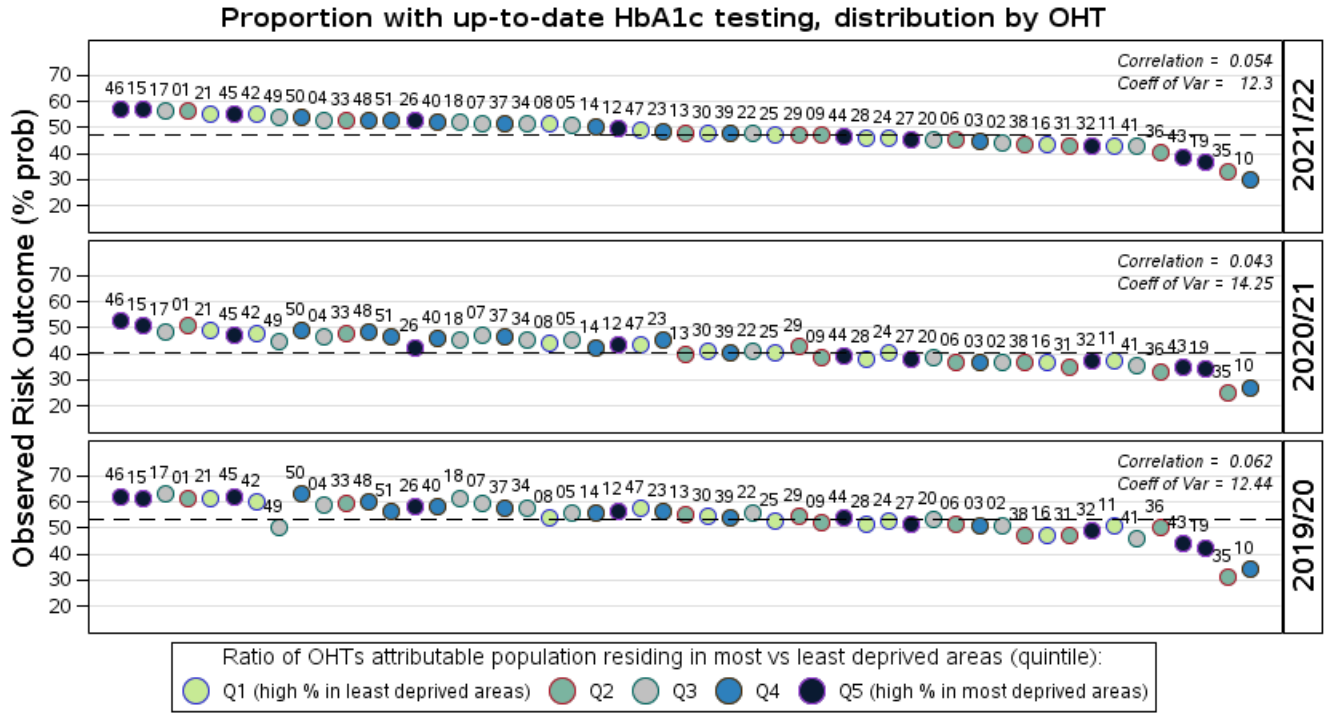
• In 2021/22, the percentage of patients up-to-date with HbA1c screening in the attributable population was 47.3%. While this is higher than the previous reporting period (40.5% in 2020/21), it is still less than it was in FY 2019/20 prior to the onset of the COVID-19 pandemic in Ontario (53.4% in 2019/20).

• The range in OHT-level risk-adjusted estimates was from 30.3% to 56.7%. The CV was 12.09, indicative of high variability across all 51 OHTs.

• The largest percent improvement (from 2020/21 to 2021/22) was a 10% improvement (in OHT 26).

• Percentage of patients that were up-to-date with HbA1c screening showed weak (positive) correlation with the concentration of the attributable population residing in the most (vs least) deprived areas ($T_{2021/22}$=0.05) and with the concentration of the attributable population residing in rural (vs urban) areas ($T_{2021/22}$=0.27, figure not shown)

Figure 1. Percentage of patients up-to-date with HbA1c screening by OHT, 2019/20 to 2021/22



Note: Dashed lines reflect total population (crude) average in given year

Proportion of patients up-to-date with Retinal Screening

Regular retinal examinations to screen for retinopathy allow timely treatment and reduces the likelihood that retinopathy will proceed to blindness

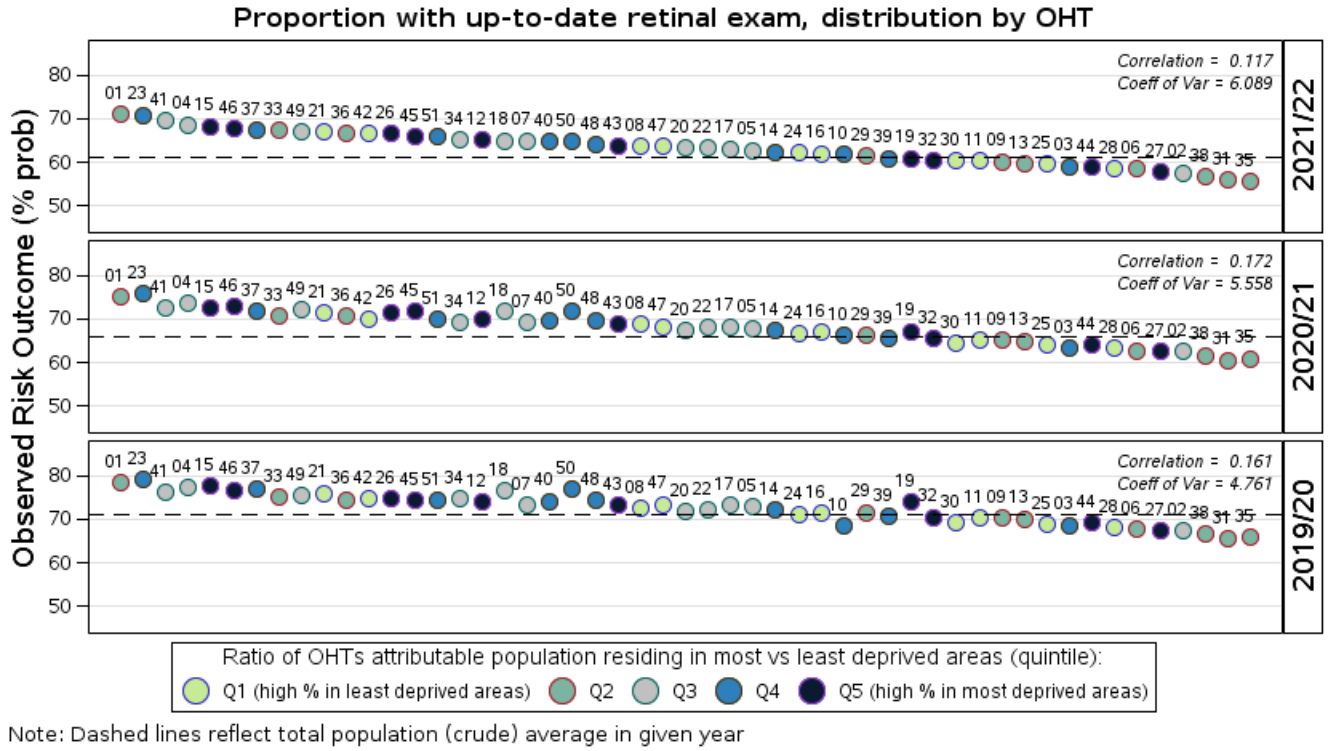
• In 2021/22, 61.3% of patients were up-to-date with retinal screening, which was lower than prior reporting periods (66% in 2020/21 and 70.9% in 2019/20).

• The range in OHT-level risk-adjusted estimates was from 55.6% to 71.1%. Coefficient of Variation was 5.52, indicative of high variability across all 51 OHTs.

• There was a decline in proportion of patients up-to-date with retinal examinations across all OHTs from (from 2020/21 to 2021/22), similar to what was observed in the previous fiscal year (2019/20 to 2020/21). However, it is important to note that this indicator looks at the proportion of patients who have received a retinal examination within the past *twenty-four months*. This means that a continued drop in the proportion of patients up-to-date with retinal examinations in 2021/22 is a result of lower rates ***across both 2020/21 and 2021/22***. This decrease in the proportion of patients up-to-date on retinal screening may be indicative of the impact of the COVID-19 pandemic on access to care for diabetes patients.

• Proportion of patients up-to-date with retinal screening showed weak (positive) correlation with the concentration of the attributable population residing in the most (vs least) deprived areas ($T_{2021/22}$=0.09) and moderate (positive) correlation with the concentration of the attributable population residing in rural (vs urban) areas ($T_{2021/22}$=0.52, figure not shown)

Figure 2. Proportion of patients up-to-date with retinal screening by OHT, 2019/20 to 2021/22



Statins Dispensed to Prevent Vascular Complications from Diabetes

Receiving statins can help to prevent microvascular and macrovascular complications among older patients with diabetes

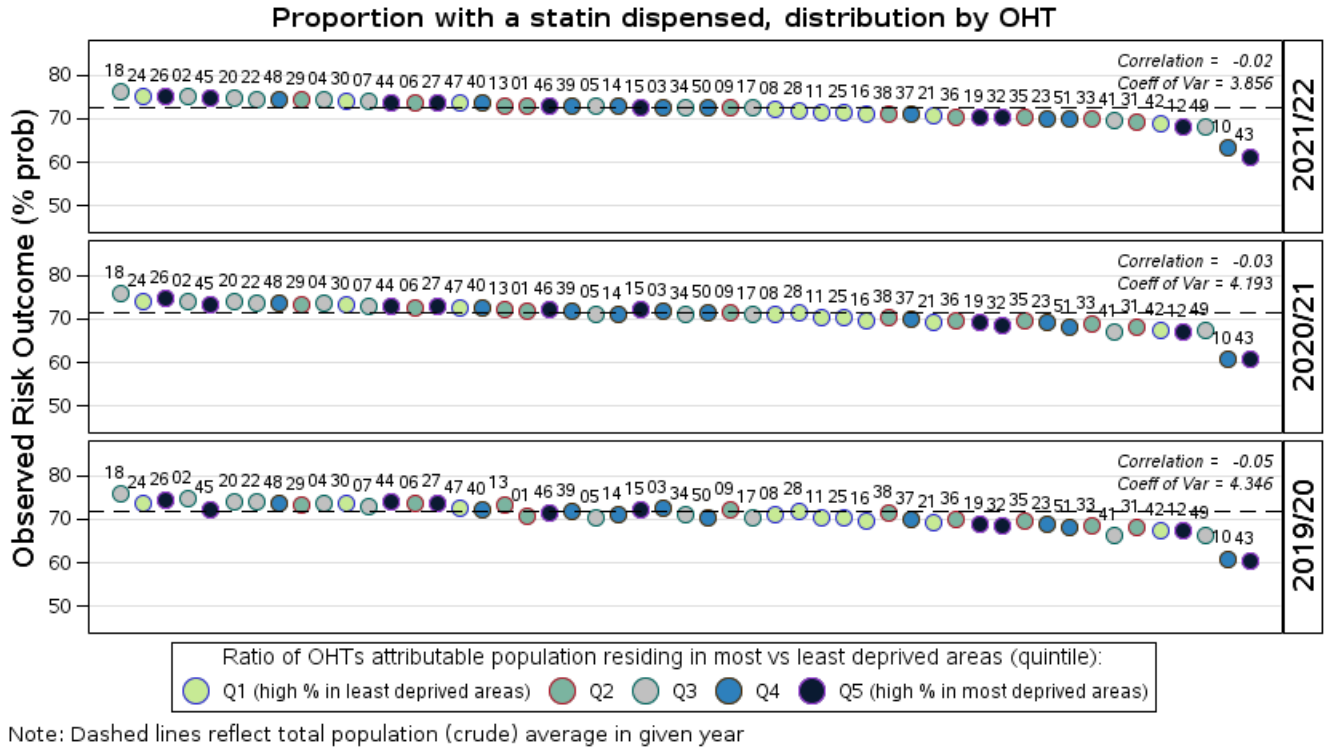
• In 2021/22, 72.7% of older patients with diabetes (65+) had statins dispensed, which was marginally higher than prior reporting periods (71.6% in 2020/21 and 71.8% in 2019/20). These rates indicate that the ability of patients with diabetes to receive statins medications did not change significantly in the period prior-to and during the COVID-19 pandemic in Ontario.

• The range in OHT-level risk-adjusted estimates was from 60.9% to 76.12%. The CV was 4, indicative of high variability across all 51 OHTs.

• Marginal improvement was witnessed across all OHTs in 2021/22 compared to 2020/21. Changes in 2020/21 compared to 2019/20 were also small, ranging from -1.3% (OHT 13) to 1.2% (OHT 01).

• Proportion of patients with diabetes that had statins dispensed in the previous year showed weak (negative) correlation with the concentration of the attributable population residing in the most (vs least) deprived areas ($T_{2021/22}$=-0.01) and weak (negative) correlation with the concentration of the attributable population residing in rural (vs urban) areas ($T_{2021/22}$=-0.13, figure not shown).

Figure 3. Proportion of patients with a statin dispensed, by OHT, 2019/20 to 2021/22



Hospitalizations for Long-term Diabetes-related Complications (Risk-adjusted for age and sex)

High rates of hospitalizations for long-term diabetes related complications (retinopathy, nephropathy, amputations etc.) may be an indication that people do not have access to the community-based services or support they need.

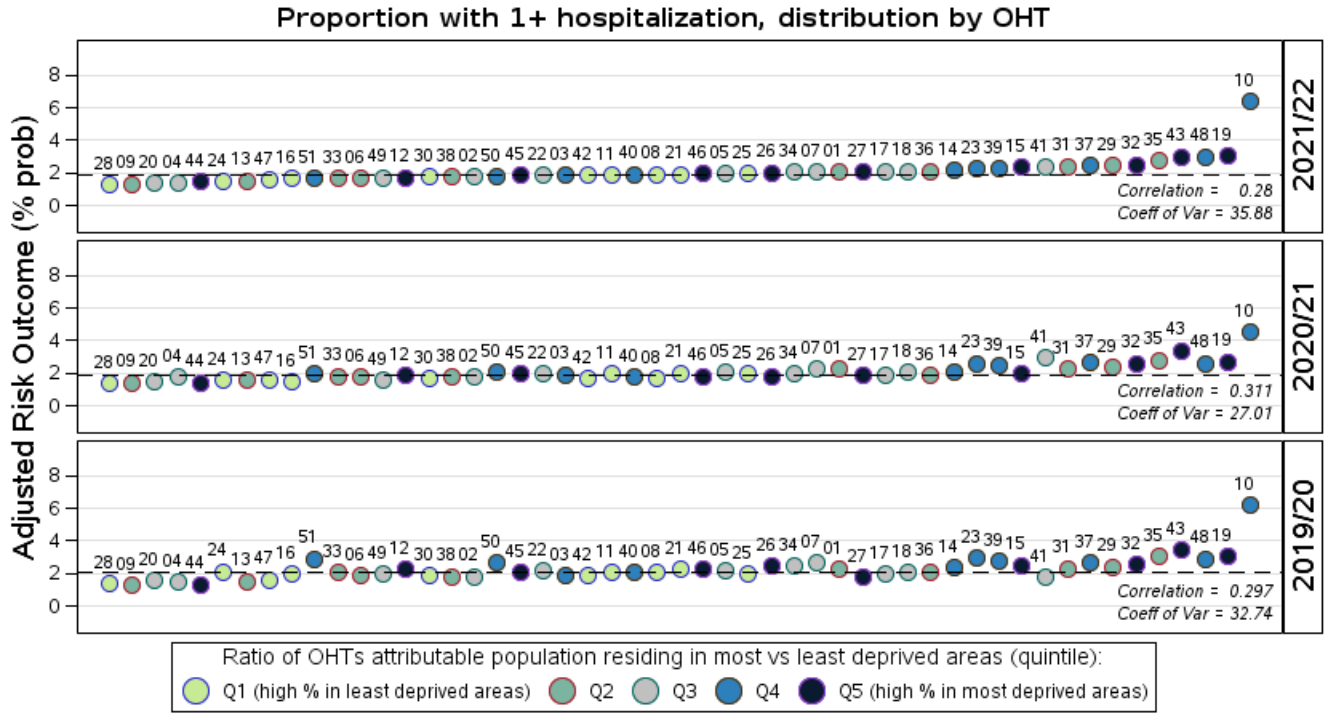
• In 2021/22, 1.91% of patients with diabetes (18+) were hospitalized for a long-term diabetes related complication. This was marginally lower compared to prior reporting periods (1.92% in 2020/21 and 2.04% in 2019/20)

• The range in OHT-level risk-adjusted estimates was from 1.3% to 3.10%, a difference of over two-fold, with one outlier (OHT 10). The CV was 36, indicative of high variability across all 51 OHTs.

• There was little change in hospitalizations for long-term diabetes complications across OHTs from 2019/20 to 2020/21 and also from 2020/21 to 2021/22 (changes ranging from -0.4% to +1.9%).

• Percentage of patients up-to-date with retinal screening showed weak to moderate (positive) correlation with the concentration of the attributable population residing in the most (vs least) deprived areas ($T_{2021/22}$=0.28) and weak to moderate (positive) correlation with the concentration of the attributable population residing in rural (vs urban) areas ($T_{2021/22}$=0.3, figure not shown)

Figure 4. Hospitalizations for long-term diabetes related complications



Note: Dashed lines reflect total population (crude) average in given year

Patients with diabetes that is not well controlled (HbA1c ≥7) (Risk-adjusted for age and sex)

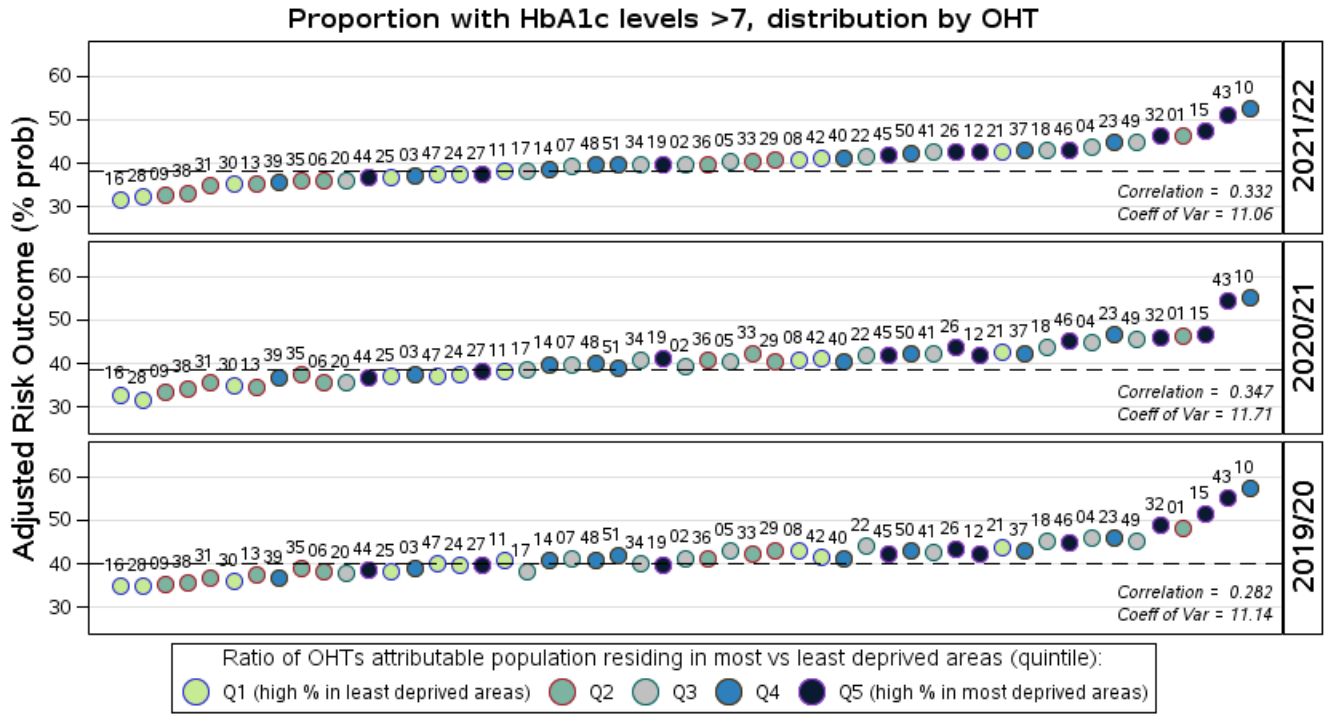
Patients with HbA1c levels higher than 7 are at greater risk of long-term diabetes related complications

• In 2021/22, the proportion of patients with HbA1c >7 was 38.3% which was marginally lower than prior reporting periods (38.6% in 2020/21 and 40.1% in 2019/20)

• The range in OHT-level risk-adjusted estimates was from 32.1% to 57.5%. The CV was 11, indicative of high variability across all 51 OHTs.

• Proportion of patients with uncontrolled diabetes (HbA1c ≥7) showed weak to moderate correlation (positive) with the concentration of the attributable population residing in the most (vs least) deprived areas ($T_{2021/22}$=0.33). However, correlation with concentration of the attributable population residing in rural (vs urban) areas was moderate (positive) ($T_{2021/22}$=0.58, figure not shown).

Figure 5. Proportion of patients with uncontrolled diabetes (HbA1c ≥7) by OHT, 2019/20 to 2021/22



Note: Dashed lines reflect total population (crude) average in given year

Limitations

There are limitations of this work requiring comment. Firstly, it is important to note that the OHTs in question were not required to focus on these diabetes-related indicators as part of their initial target populations. Secondly, this report presents a number of quantified indicators specific to diabetes care that are measurable with routinely collected health administrative data in Ontario. Other indicators specific to the quadruple aim framework and relevant to integrated care for this target population were not quantified and are not reported here. Some OHTs may have indicators specific to their local populations that are considered more sensitive to change. Individual-level socioeconomic status is not captured in health administrative data, and area-based measures (including ONMARG material deprivation index) are subject to ecological fallacy.

Lastly, we report on correlations between ratio of the proportion of the population in the highest over the lowest quintile of the deprivation index across OHTs and indicator results should only be interpreted as general associations.

Conclusions

In 2021/22, 47% of the OHT attributable population with diabetes were up-to-date on their HbA1c screening (2 or more HbA1c tests within the past 12 months). Over 60% of the population were up-to-date on their retinal examinations (having received one retinal exam within the past 24 months), and 72% of patients with diabetes over the age of 65 had being dispensed statins within the past 12 months. Approximately 2% of patients with diabetes were hospitalized for a complication related to the long-term control of diabetes. Almost 40% of patients had an HbA1c result that was greater than or equal to 7, indicative of diabetes that is not being well-controlled. Variation across the OHTs was most notable for hospitalization for long-term diabetes related complications which ranged from 13 to 62 per 1000 population.

OHT indicator performance was weakly correlated with the concentration of the attributable population in the most vs least deprived areas. However, proportion of patients who were up-to-date on their retinal examinations and was moderately negatively correlated with rurality (i.e., patients in a OHTs with a higher proportion of urban patients were more likely to be up-to-date on retinal examinations) and proportion of patients with HbA1c≥7 was moderately associated with rurality (i.e., OHTs with a higher proportion of rural residents had a greater proportion of patients with diabetes that was not well-controlled).

Within OHTs, some inequities by material deprivation were evident for the prevalence of diabetes, as well as the proportion of patients hospitalized for a long-term diabetes related complication, however, the magnitude of association varied considerably. For example, **within** each OHT, there was up to a 2-fold difference between the indicator rate for those residing in the most deprived area (Q5) vs those residing in the least deprived area (Q1) for patients hospitalized for a long-term diabetes related complication in the past year. Additional data on differences **within** OHTs will be provided to OHTs through **Addendum Reports** with detailed OHT specific data.

These baseline findings illustrate where there are opportunities for OHTs to focus their implementation activities to improve patient experience and outcomes specific to diabetes care. The approaches OHTs implement will likely vary depending on geography, other demographics, and community resources available. Nonetheless lessons should be shared where improvements are being observed.

Overall, there is little evidence of inequity in accessing diabetes management services across OHTs. This is indicated by the fact that the proportion of patients accessing services related to diabetes management was similar ***across*** OHTs. Similarly, ***within individual OHTs*** the proportion of patients

accessing care related to diabetes management was comparable among subgroups residing in regions of *higher* vs *lower* material deprivation, as assessed using the ONMarg index.

However, the data also suggests that populations with higher levels of material deprivation have worse outcomes (i.e., higher hospitalization rates, higher proportion of patients with diabetes not well controlled). This suggests that efforts are required for improving diabetes outcomes that extend beyond diabetes management, and improving the health of diabetes patients at the population level will need coordination beyond health care providers.

Finally, it is important to note that there is limited evidence regarding the effectiveness of measures such as the ONMarg index in measuring inequities in access to care among First Nations community members. For example, these indices may fail to capture inequities experienced by individuals that need to leave home in order to seek diabetes-related care in urban/rural health centres.

References

1. Ontario Ministry of Health. Ontario Health Teams: Guidance for Health Care Providers and Organizations Queen's Printer of Ontario2019 [Available from: http://health.gov.on.ca/en/pro/programs/connectedcare/oht/docs/guidance_doc_en.pdf.

2. Bilandzic A, Rosella L. The cost of diabetes in Canada over 10 years: applying attributable health care costs to a diabetes incidence prediction model. Health Promot Chronic Dis Prev Can. 2017;37(2):49-53.

3. Schmittdiel JA, Gopalan A, Lin MW, Banerjee S, Chau CV, Adams AS. Population Health Management for Diabetes: Health Care System-Level Approaches for Improving Quality and Addressing Disparities. Curr Diab Rep. 2017;17(5):31.

4. Ontario Health. Percentage of patients with diabetes up-to-date with glycated hemoglobin (HbA1C) tests: Queen's Printer for Ontario, 2023; 2016 [Available from: http://indicatorlibrary.hqontario.ca/Indicator/Summary/Percentage-diabetes-glycated-hemoglobin-HbA1C-tests/EN.

5. Ontario Health. Percentage of patients with diabetes up-to-date with a retinal examination: Queen's Printer for Ontario; 2016 [Available from: http://indicatorlibrary.hqontario.ca/Indicator/Summary/Percentage-patients-diabetes-retinal-examination/EN.

6. Ontario Health. Percentage of patients with diabetes up-to-date with a Statin prescription: Queen's Printer for Ontario; 2016 [Available from: http://indicatorlibrary.hqontario.ca/Indicator/Summary/Percentage-patients-diabetes-up-to-date-Statin-prescription/EN.

7. Diabetes Canada Clinical Practice Guidelines Expert Committee. Targets for Glycemic Control: Diabetes Canada; [Available from: https://www.diabetes.ca/health-care-providers/clinical-practice-guidelines/chapter-8#panel-tab_FullText.

8. Petrosyan Y, Bai YQ, Koné Pefoyo AJ, Gruneir A, Thavorn K, Maxwell CJ, et al. The Relationship between Diabetes Care Quality and Diabetes-Related Hospitalizations and the Modifying Role of Comorbidity. Can J Diabetes. 2017;41(1):17-25.

Appendix: Indicator Technical Specifications

Proportion of patients up-to-date with HbA1c screening	
Rationale	Provides information on proportion of patients that are regularly monitoring diabetes control
Indicator Reference	http://indicatorlibrary.hqontario.ca/Indicator/Detailed/Gycated-hemoglobin-HbA1c-testing/EN (Publish datetime: 04/03/2019 10:12:00)
Data Sources	ODD, RPDB, OHIP
Numerator (a subset of the denominator)	Number of diabetic patients aged 40 years and older who have had two or more glycated hemoglobin (HbA1c) tests within the past 12 months. HbA1c tests defined by OHIP fee code (**L093**)
Denominator	Total number of diabetic patients aged 40 years and older X 100
Exclusions	n/a
Standardizations	n/a
Notes and Limitations	HbA1c measures only include OHIP fee for service hemoglobin A1c tests conducted in community labs. Lab tests for A1c conducted in hospitals are not individually submitted and therefore not available.
Interpretation	A higher value (%) is desirable for this indicator

Proportion of patients up-to-date with retinal examinations	
Rationale	Allows timely treatment of diabetes eye complications through early detection
Indicator Reference	http://indicatorlibrary.hqontario.ca/Indicator/Summary/Percentage-patients-diabetes-retinal-examination/EN
Data Sources	ODD, OHIP, RPDB, ODB, DAD
Numerator (a subset of the denominator)	Number of diabetic patients aged 40 years and older who have had at least one retinal exam with an ophthalmologist or optometrist in the past 24 months. Retinal examinations defined using the following fee codes: **A111**, **A112**, **A115**: as long as the treating physician specialty is family medicine, general medicine, or ophthalmologist **A233**, **A234**, **A235**, **A236**, **A238**, **A239**, **A240**, **K065**, **K066**: as long as the specialist is an ophthalmologist **C233**, **C234**, **C235**, **C236**: as long as the specialist is an ophthalmologist **V401**, **V405**, **V406**, **V408**, **V409**, **V450**, **V451**: as long as the specialist is an optometrist **V402**, **V407** and diagnosis code (ICD-9) 250 or 362: as long as the specialist is an optometrist **A114** and diagnostic code (ICD-9) 250 or 362 as long as the treating physician specialty is family medicine, general medicine, or ophthalmologist
Denominator	Total number of diabetic patients aged 40 years and older
Exclusions	n/a
Standardizations	n/a
Notes and Limitations	Only includes retinal eye exams where a fee-for-service claim was submitted. Exams that were paid out-of-pocket by the patient are not included.
Interpretation	A higher value (%) is desirable for this indicator

Statins Dispensed to Prevent Vascular Complications from Diabetes	
Rationale	Prevents vascular complications among older diabetes patients
Indicator Reference	http://indicatorlibrary.hqontario.ca/Indicator/Summary/Percentage-patients-diabetes-up-to-date-Statin-prescription/EN
Data Sources	DAD, ODD, ODB, OHIP, RPDB
Numerator (a subset of the denominator)	Number of diabetic patients aged 66 years and older as of the end of the observation year who were dispensed statins within the past 12 months
Denominator	Total number of diabetic patients aged 65 years and older
Exclusions	n/a
Standardizations	n/a
Notes and Limitations	Only able to capture prescribed medication data for patients age 65 and older from ODB
Interpretation	A higher value (%) is desirable for this indicator

Patients with diabetes that is not well controlled (HbA1c ≥7)	
Rationale	Provides information on long-term glycemic status and reliably predicts risk for diabetes-related complications
Indicator Reference	Green M. et al. CMAJ (2020) 192: E937-45 Can J Diabetes 37 (2013) S302eS303
Data Sources	OLIS, ODD, RPDB
Numerator (a subset of the denominator)	Number of diabetic patients aged 40 years and older in the poor controlled (HbA1c ≥7, HbA1c <8.5) and uncontrolled (HbA1c ≥8.5) category of results for glycated hemoglobin (HbA1c) tests within the past 12 months. HbA1c tests identified using OHIP code (**L093**)
Denominator	Total number of diabetic patients aged 40 years and older
Exclusions	n/a
Standardizations	Risk adjusted for age and sex
Notes and Limitations	It is important to note that while this categorization for HbA1c level (HbA1c <7, 7-8.5, >8.5) used as a marker of good control, poor control and uncontrolled diabetes respectively, individual targets for patients may differ based on patient characteristics and condition.
Interpretation	A lower value (%) is desirable for this indicator

Hospitalizations for long-term diabetes related complications	
Rationale	Indicative of long-term poor management of disease resulting in blindness, kidney failure, loss of nerve function, amputation, etc.
Indicator Reference	Petrosyan et al (2017). The Relationship between Diabetes Care Quality and Diabetes-Related Hospitalizations and the Modifying Role of Comorbidity. Can J Diabetes 41 (2017) 17–25
Data Sources	DAD, ODD, RPDB
Numerator (a subset of the denominator)	Number of diabetes patients (18+) that had a long-term diabetes-related hospitalization in the past year X 100 Relevant ICD-10 codes: **E10.2, E10.3, E10.4, E10.5, E10.6, E10.7, E11.2, E11.3, E13.4, E11.5, E11.6, E11.7, E13.2, E13.3, E13.4, E13.5, E13.6, E13.7, E14.2, E14.3, E14.4, E14.5, E14.6, E14.7**
Denominator	Total number of diabetic patients aged 18 years and older
Exclusions	n/a
Standardizations	Risk adjusted for age and sex
Notes and Limitations	Hospitalizations for complications that arise as a result of long-term poor diabetes control, i.e., micro- or macrovascular complications, including ophthalmic, renal, neurologic or circulatory complications, or multiple complications Hospitalizations for acute hypoglycemia or hyperglycemia/ketoacidosis are not included
Interpretation	A lower value (%) is desirable for this indicator