Ontario Health Teams
Phase 2 Evaluation

OHT Priority Populations: Mental Health & Addictions Improvement Indicators at Baseline 2017/18 to 2019/20

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HSPN Health System Performance Network

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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 second phase of the Health System Performance Network (HSPN) central evaluation of Ontario Health Teams (OHTs). The first phase focused on analyses of OHT applications and included surveys and key informant interviews at the time of application to become OHTs. The second phase includes reporting across all OHTs using population-based administrative data. The purpose of the HSPN evaluation is to understand how OHTs are developing and implanting change to drive improvements in patient, provider and health system outcomes.

This report is largely based on data prior to the government's introduction of the OHT initiative, selection and approval, and, prior to OHT implementation of new models of care and therefore considered a baseline of OHT performance. Baseline information on health system indicator trends provides a useful frame of reference for OHT implementation activities and comparators for local measurement.

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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 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. However, in the first year OHTs were asked to identify a priority population to begin implementing new integrated care pathways. Individuals with mental illness were among the top three priority populations selected by OHTs.

The objective of this work is to report on indicators related to MHA care captured in the routinely collected health administrative data sources held at ICES. The HSPN and MOH have adopted the Quadruple Aim Framework inclusive of patient experience, provider experience, health outcomes, and cost. This report focuses on system level indicators that reflect patient experience, health outcomes and system efficiencies for individuals who access the health care system for MHA-related care. We contrast these indicators across measures of material deprivation and rurality.

Results in Brief

The highest levels of variability in indicator results across the 42 OHTs were found for ED visits for deliberate self-harm where there was an 8-fold difference in the risk-adjusted rate across the OHTs (range from 8.8 events to 88.9 events per 10,000 population, and corresponding coefficient of variation, or CV = 65). Other indicators where high variability was observed include frequent ED visits (CV = 23), outpatient physician visits within 7 days following a MHA hospitalization (CV=22) and first contact in the ED (CV = 22).

OHT performance showed weak to moderate correlation with the concentration of the attributable population residing in the most (vs least) deprived areas of Ontario for outpatient physician visits within 7 days following a MHA hospitalization (correlation = -0.37), ED visits for MHA (0.38), and hospitalizations for MHA (0.36). Performance was also moderately correlated with the concentration of the attributable population residing in rural areas of Ontario for outpatient physician visits within 7 days following a MHA hospitalization (correlation = -0.51), ED visits for deliberate self-harm (0.54), ED visits for MHA (0.40), and hospitalizations for MHA (0.40).

Within OHTs, outpatient physician visits within 7 days following MHA hospitalization and first contact in the ED 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 across 42 candidate OHTs across select indicators for MHA-related care. These baseline findings illustrate where there are opportunities for OHTs to focus their implementation activities to improve outcomes and experience for patients in need of MHA-related care.

Abbreviations

DAD = Discharge Abstract Database; MHA = Mental health and addictions; NACRS = National Ambulatory Care Reporting System database; OHIP = Ontario Health Insurance Plan claims database; OHTAM = Ontario Health Teams attribution database; OMHRS = Ontario Mental Health Reporting System database; ONMARG = Ontario Marginalization database; RPDB = Registered Persons Database; SDS = Dame Day Surgery 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]. In the first year of activity, OHTs were asked to identify a priority population they would begin to implement their new integrated care pathways and mental health and addictions (MHA) was among the top three priority populations selected by OHTs [2].

Objectives

The objective of this work is to report on indicators specific to MHA care across OHT attributable populations using routinely collected health administrative data sources held at ICES. We sought to describe variation in these indicators, cross-sectionally and over time, to identify where opportunities and challenges exist to better integrate care. 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 from 2017 were used to attribute individuals to OHTs and create the dataset, which we herein refer to as the *OHT attributable population.* Each OHT in the dataset was anonymized for reporting.

Health administrative datasets used in this work included the Registered Persons Database (RPDB), Canadian Institute for Health Information's Discharge Abstract Database (DAD), National Ambulatory Care Reporting System (NACRS), Ontario Mental Health Reporting System (OMHRS), Ontario Health Insurance Plan claim database (OHIP), Ontario Marginalization (ONMARG) database, and the 2006 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 jurisdictional scan of Ontario mental health system reports and the OHT applications identified 32 indicators for consideration. This was followed by a modified Delphi approach among the team to select six indicators to report at the OHT attributable population level as measures of patient/population outcomes of integrated MHA care. An important criterion for selection included the indicator could be measured in administrative databases for all OHTs. In addition, we also desired a parsimonious number of indicators. We had our indicator selection validated by the province's Mental Health and Addictions Centre of Excellence, and they endorsed five. In addition, it was recommended we include three descriptive indicators of MHA health service use to provide context to the five improvement indicators.

Exhibit 1: MHA indicators examined in this report

Indicator	Definition	Quadruple Aim
Repeat emergency visits for MHA (within 30 days)	Proportion of unscheduled emergency department visits for care for MH conditions with a second unscheduled emergency department visit for MH or substance abuse within 30 days	Patient Experience (Health Service Use)
7-day follow-up with a physician after hospitalization for MHA	Proportion of MHA-related hospital discharges where the patient was seen by a primary care provider, psychiatrist and/or pediatrician within 7 days	Patient Experience (Timely)
First contact in the emergency department for MHA	Proportion of incident unscheduled emergency department visits for MHA-care where the patient had no prior MHA-related contact (hospitalization, emergency department or physician visit)	Patient Experience (Timely) Cost/Efficiency
Frequent (4+) emergency department visits for help with MHA	Proportion of individuals with an unscheduled emergency department visit that had 4 or more emergency department visits within a 365-day period	Patient Experience / Cost/Efficiency (Health Service Use)
Rate of emergency department visits for deliberate self-harm	Number of emergency department visits for deliberate self harm (includes nonfatal self-poisoning or -injury) per 10,000 population 10 years of age and older	Patient Experience Health Outcome
Contextual Indicators		
Rate of emergency department visits for MHA	Number of emergency department visits for MHA-related care per 1,000 population	-
Rate of MHA-related hospitalizations	Number of hospitalizations for MHA-related care per 1,000 population	-
Rate of MHA-related outpatient physician visits	Number of outpatient physician visits (to psychiatrists, pediatrician or primary care provider) for MHA-related care per 100 population	-

Reporting of Indicators

All MHA indicators are calculated on the full attributable population aged 0 to 105 years, unless otherwise stated. We report at the OHT level, only for OHTs that have submitted a full application to the MOH and approved. These 42 OHTs account for approximately 85% 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 2017/18 to 2019/20) at the OHT-level using model-based risk adjusted methods. 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. In this report, all estimates are risk adjusted for age and sex.

To quantify the degree of variability of risk adjusted 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 minimum and maximum percent change in risk adjusted estimates in 2019/20 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.

Understanding and interpreting the scatterplots:

Each panel represents OHT-level risk adjusted estimates calculated separately for each reporting period. 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 (2019/20). 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.

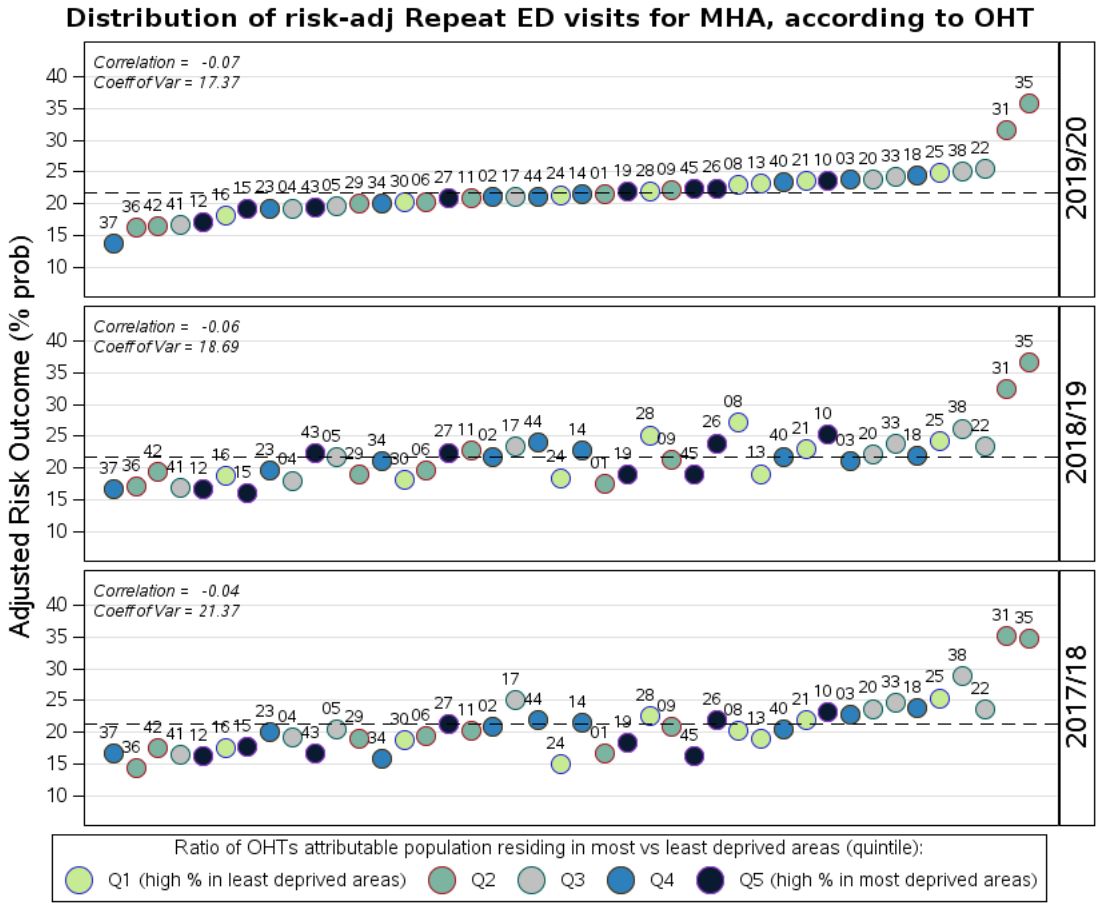
Key Findings

Repeat Emergency Visits for Mental Health (within 30 days)

Repeat unscheduled emergency department visits for MHA may indicate inadequate transitions from hospital to community care

- In 2019/20, repeat ED visits for MHA (within 30 days) in the attributable population was 21.7%, which was similar to prior reporting periods (21.7% in 2018/19 and 21.3% in 2017/18)
- The range in OHT-level risk-adjusted estimates was from 13.7% to 35.8%. The CV was 17.4, indicative of moderate variability across all 42 OHTs.
- The largest percent improvement (from 2018/19 to 2019/20) in the outcome was a 17% improvement (reduction in OHT 37), though others worsened (higher %) each reporting year (by as much as 21% from the prior year, for OHT 13)
- Repeat unscheduled ED visits showed weak (negative) correlation with the concentration of the attributable population residing in the most (vs least) deprived areas ($T_{2019/20}$=-0.07) and with the concentration of the attributable population residing in rural (vs urban) areas ($T_{2019/20}$=-0.14, figure not shown)

Exhibit 2: Repeat emergency visits for mental health (within 30 days) by OHT, 2017/18 to 2019/20



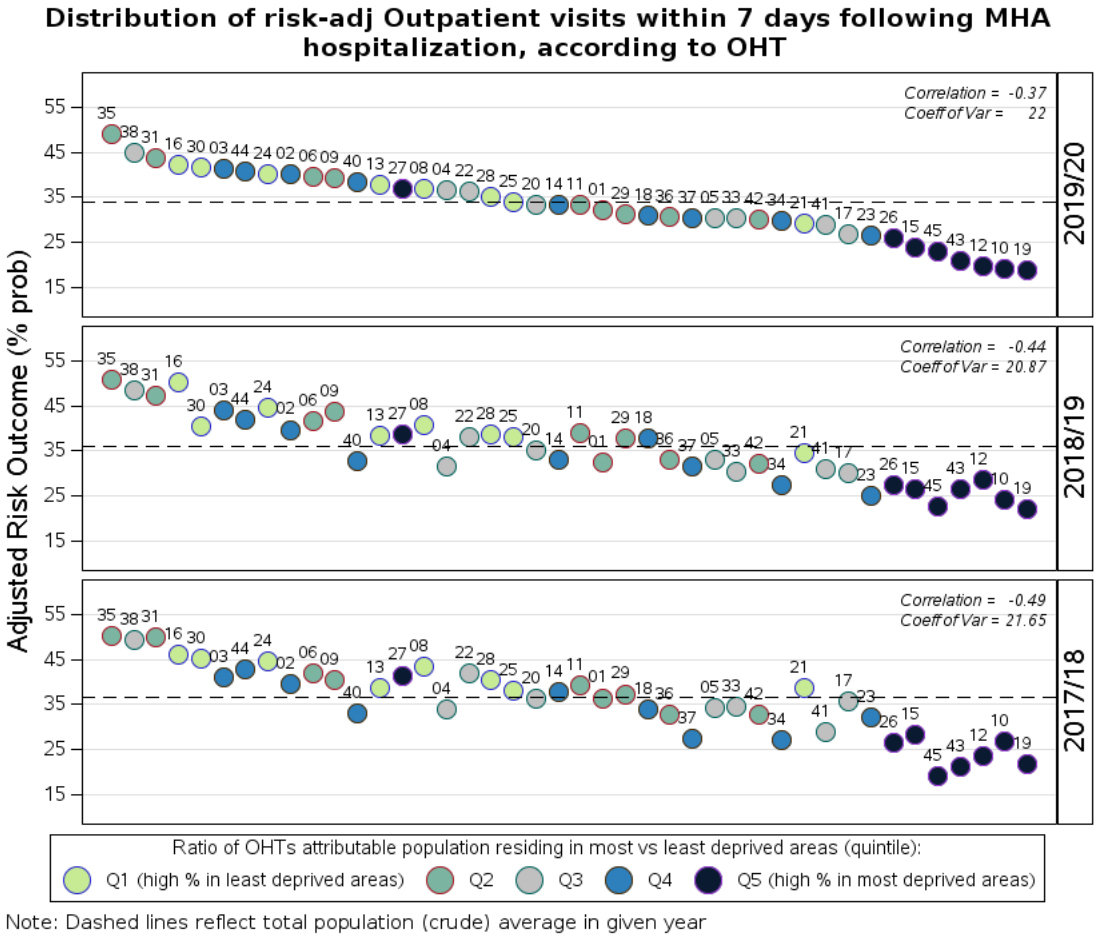
Note: Dashed lines reflect total population (crude) average in given year

7-Day Follow-up with a Physician After Hospitalization for MHA

Timely follow-up with a physician after hospital discharge may help to improve adherence to treatment and reduce the likelihood of readmissions

- In 2019/20, 34% of patients discharged from hospital for MHA-related care had follow-up with a physician within 7 days, which was marginally lower to prior reporting periods (36.1% in 2018/19 and 36.7% in 2017/18)
- The range in OHT-level risk-adjusted estimates was from 18.9% to 48.9%, a 2.5-fold difference. The CV was 22, indicative of high variability across all 42 OHTs.
- Few OHTs improved (higher %) in each successive reporting period (OHTs 02, 34, 45), though others worsened (lower %, by as much as 21% from the 2018/19 to 2019/20, OHT 10)
- Seven-day physician follow-up following a MHA hospitalization showed weak to moderate (negative) correlation with the concentration of the attributable population residing in the most (vs least) deprived areas ($T_{2019/20}$=-0.37) and moderate (negative) correlation with the concentration of the attributable population residing in rural (vs urban) areas ($T_{2019/20}$=-0.51, figure not shown)

Exhibit 3: 7-day follow-up with a physician after hospitalization for MHA by OHT, 2017/18 to 2019/20



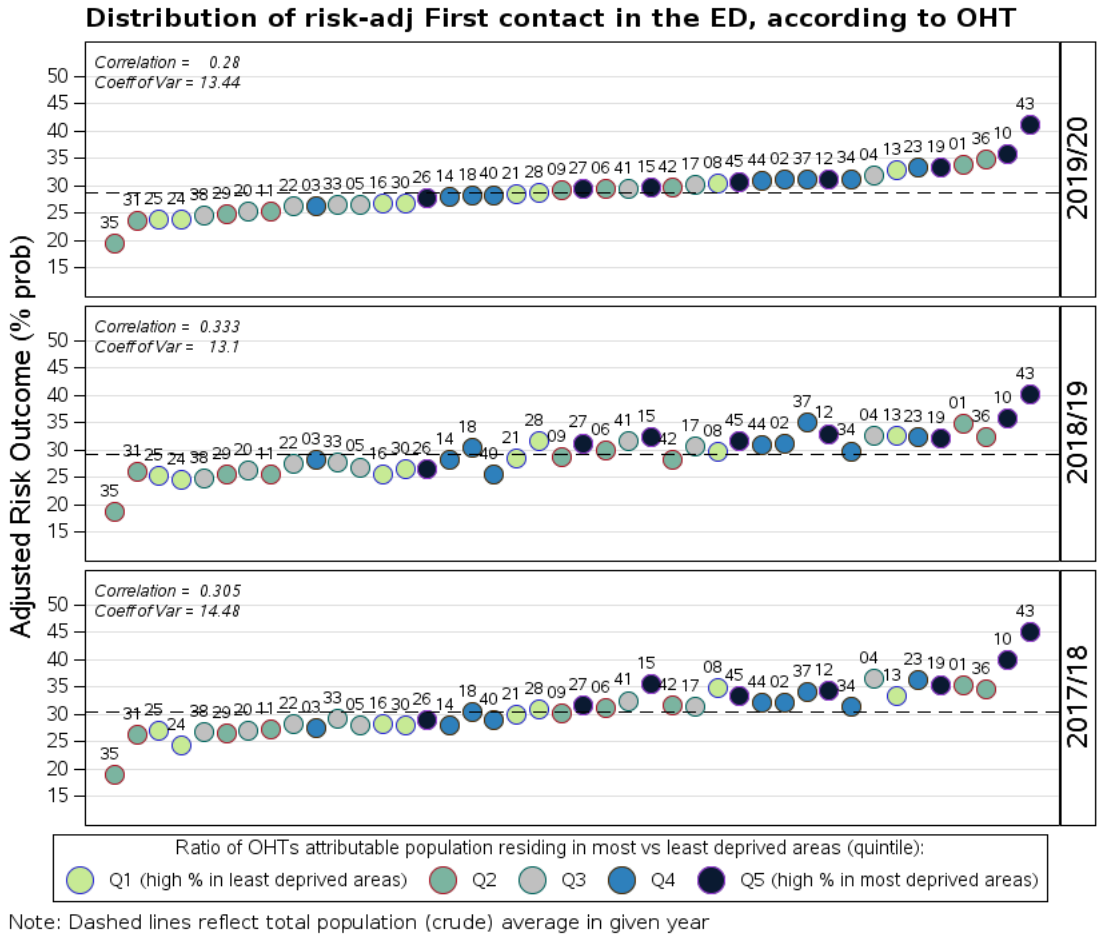
Note: Dashed lines reflect total population (crude) average in given year

First Contact in the Emergency Department for MHA

When community-based MHA services are unavailable, individuals who require service may use the emergency department as their first point of contact.

- In 2019/20, first contact in the ED for MHA in the attributable population was 28.8%, which was marginally lower than prior reporting periods (29.3% in 2018/19 and 30.3% in 2017/18)
- The range in OHT-level risk-adjusted estimates was from 19.5% to 41.2%, more than a 2-fold difference. The CV was 13, indicative of moderate variability across all 42 OHTs.
- Most OHTs improved (lower %) over each reporting period. For example, OHT 15 had approx. 8% reduction in each successive year. None of the OHTs worsened (higher %) in each successive reporting period.
- First contact in the ED for MHA diagnoses showed weak correlation with the concentration of the attributable population residing in the most (vs least) deprived areas ($T_{2019/20}$=0.28) and with the concentration of the attributable population residing in rural (vs urban) areas ($T_{2019/20}$=0.31, figure not shown)

Exhibit 4: First contact in the emergency department for MHA by OHT, 2017/18 to 2019/20



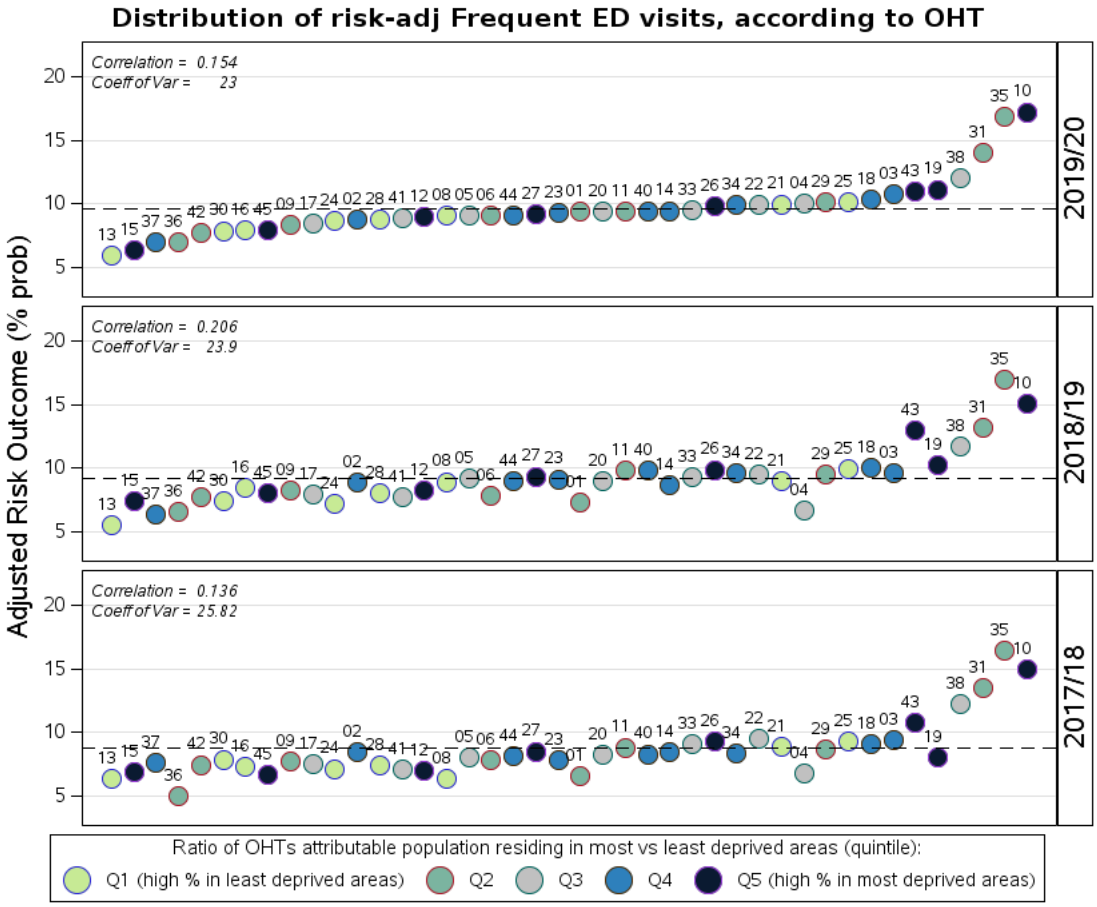
Note: Dashed lines reflect total population (crude) average in given year

Frequent (4+) Emergency Department Visits for Help with MHA

Frequent ED visits may be an indication that people do not have access to the community-based services or support they need

- In 2019/20, the proportion of the attributable population that had 4+ ED visits within a year (among those with at least 1 ED visit in the reporting period) was 9.7%. This proportion was slightly higher than prior reporting periods (9.3% in 2018/19 and 8.8% in 2017/18)
- The range in OHT-level risk-adjusted estimates was from 5.9% to 17.2%, nearly a 3-fold difference. The CV was 23, indicative of high variability across all OHTs.
- None of the OHTs improved (lower %) over each reporting period, though many others worsened (higher %) in each successive reporting period (by as much as 49% from 2018/19, OHT 04).
- Four or more MHA-related ED visits showed weak correlation with the concentration of the attributable population residing in the most (vs least) deprived areas ($T_{2019/20}$=0.15) and with the concentration of the attributable population residing in rural (vs urban) areas ($T_{2019/20}$=0.10, figure not shown)

Exhibit 5: Frequent (4+) emergency department visits for help with MHA by OHT, 2017/18 to 2019/20



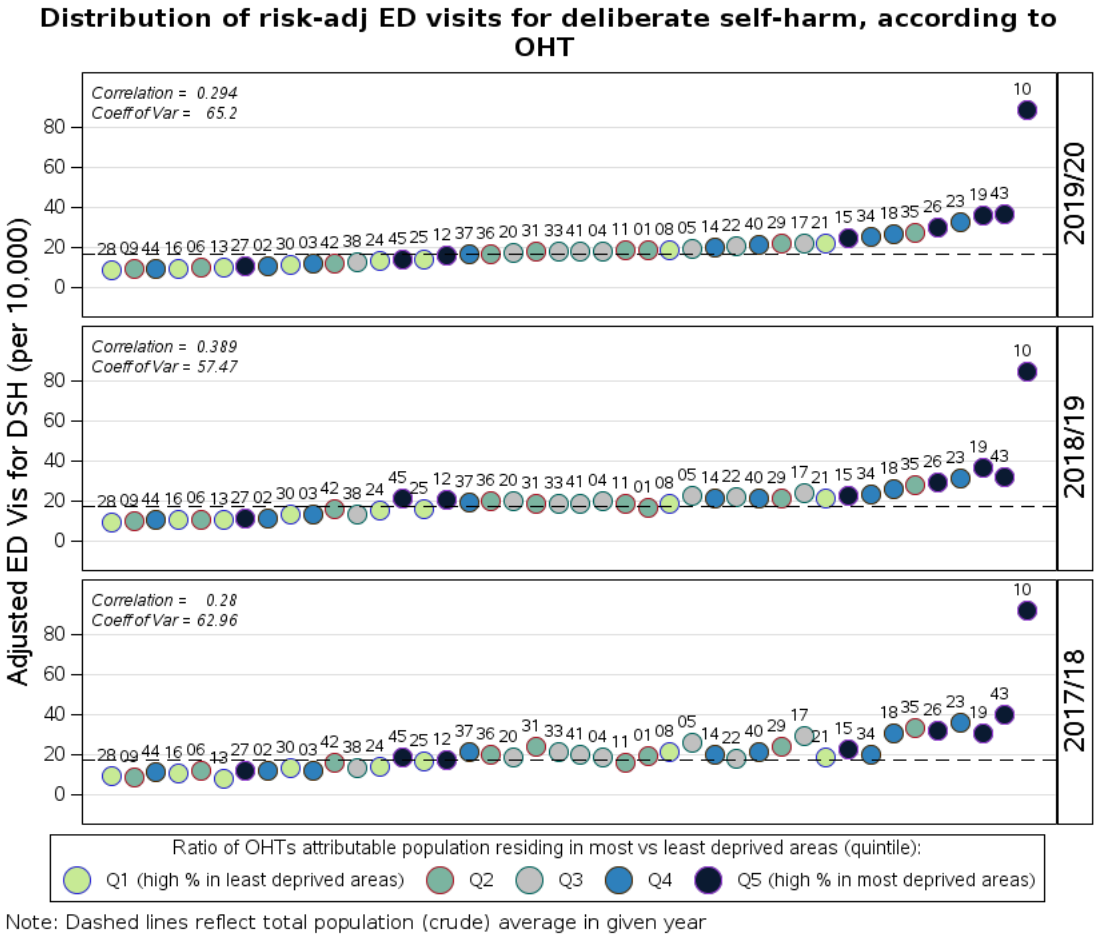
Note: Dashed lines reflect total population (crude) average in given year

Rate of Emergency Department Visits for Deliberate Self-Harm

Deliberate self-harm includes nonfatal self-poisoning or self-injury

- In 2019/20, rate of emergency department for deliberate self-harm in the attributable population aged 10-105 years was 16.4 per 10,000 population, which was marginally lower than prior reporting periods (17.6 in 2018/19 and 17.4 in 2017/18)
- The range in OHT-level risk-adjusted estimates was from 8.8 to 88.9, though one outlier (OHT 10) was apparent. The CV was 65, indicative of very high variability across all 42 OHTs.
- Many OHTs improved (lower %) over each reporting period. For example, OHT 05 had a 12% and 15% improvement from each successive year. Three OHTs worsened (higher %) in each successive reporting period (OHT 15, 21, and 34).
- Deliberate self-harm related ED visits showed weak correlation with the concentration of the attributable population residing in the most (vs least) deprived areas ($T_{2019/20}$=0.29). However, correlation with concentration of the attributable population residing in rural (vs urban) areas was moderate ($T_{2019/20}$=0.54, figure not shown).

Exhibit 6: Rate of emergency department visits for deliberate self-harm by OHT, 2017/18 to 2019/20

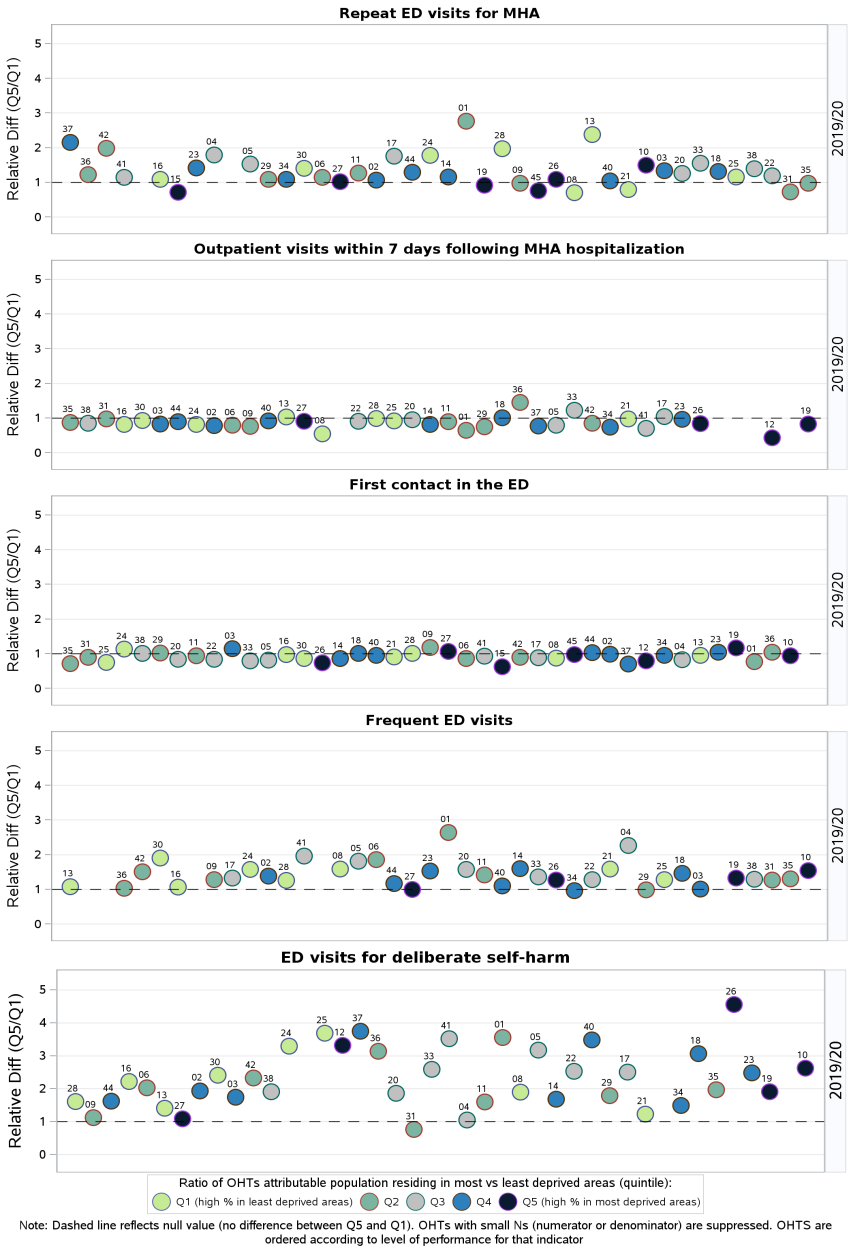


Note: Dashed lines reflect total population (crude) average in given year

Differences by Highest vs Lowest Deprivation Quintile within OHTs

The following exhibit shows the relative difference in the risk-adjusted estimates for residents of the most vs least (materially) deprived areas within each OHT across all MHA indicators. Values >1 indicate that the outcome is higher or more common for those in the most deprived areas and values <1 indicate that the outcome is lower among those in the most deprived areas. For outpatient physician visits within 7 days following MHA hospitalization and first contact in the ED were there minimal differences in the rates between quintiles 5 and 1 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 varies considerably by OHT.

Exhibit 7: Difference in MHA indicator results in the highest vs lowest deprivation quintile within each OHT, 2019/20 data



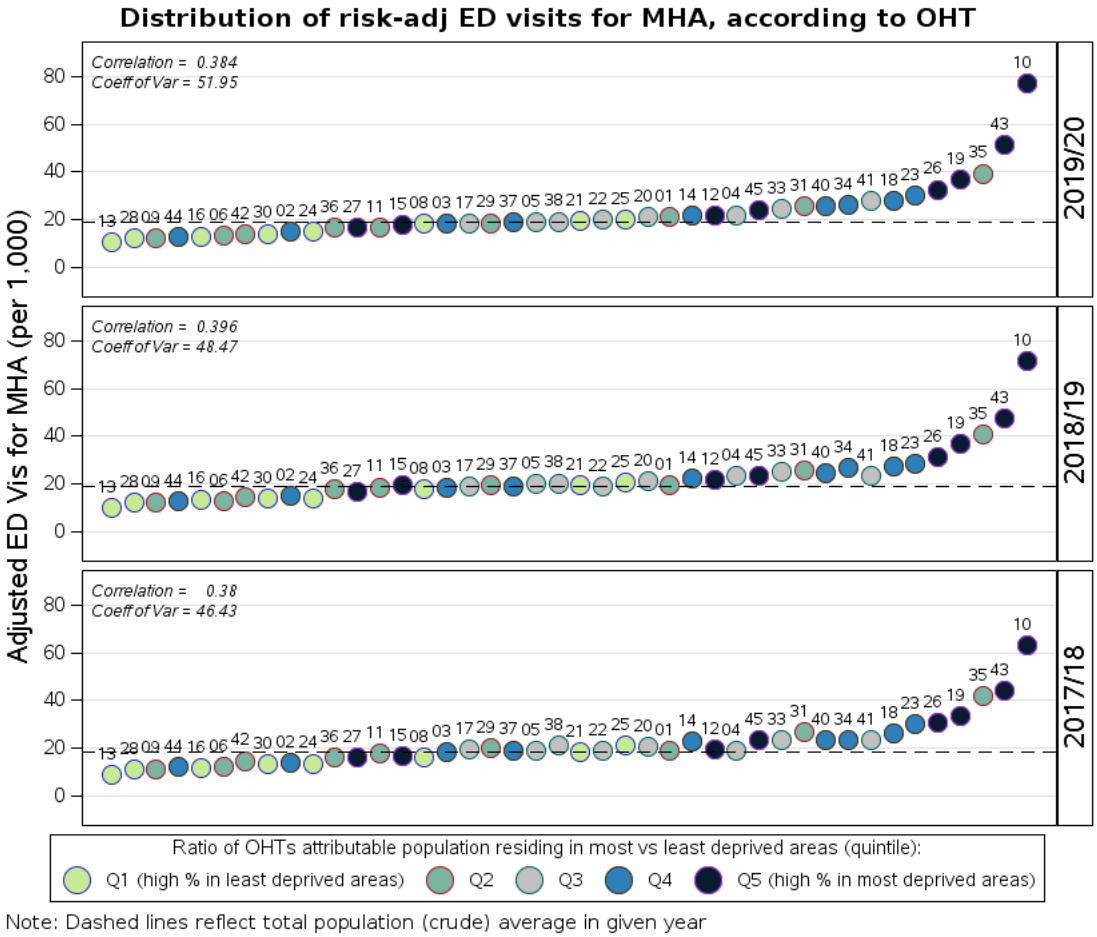
Note: Dashed line reflects null value (no difference between Q5 and Q1). OHTs with small Ns (numerator or denominator) are suppressed. OHTS are ordered according to level of performance for that indicator

Rate of Emergency Department Visits for MHA (contextual indicator)

Use of the emergency department for MHA issues may indicate a lack of, in inability to access, appropriate community-based services for MHA

- In 2019/20, rate of emergency department for MHA in the attributable population was 19.2 per 1,000 population, which was similar to reporting periods (19.2 in 2018/19 and 18.5 in 2017/18)
- The range in OHT-level risk-adjusted estimates was from 10.8 to 77.0, a 7-fold difference and the CV was 52, indicative of very high variability across all 42 OHTs.
- Eight OHTs improved (lower rate) over each reporting period. For example, OHTs 29 and 35 both improved by 3% in each successive year.
- ED visit rates showed weak to moderate correlation with the concentration of the attributable population residing in the most (vs least) deprived areas ($T_{2019/20}$=0.38) and with concentration of the attributable population residing in rural (vs urban) areas ($T_{2019/20}$=0.40, figure not shown).

Exhibit 8: Rate of emergency department visits for MHA by OHT, 2017/18 to 2019/20



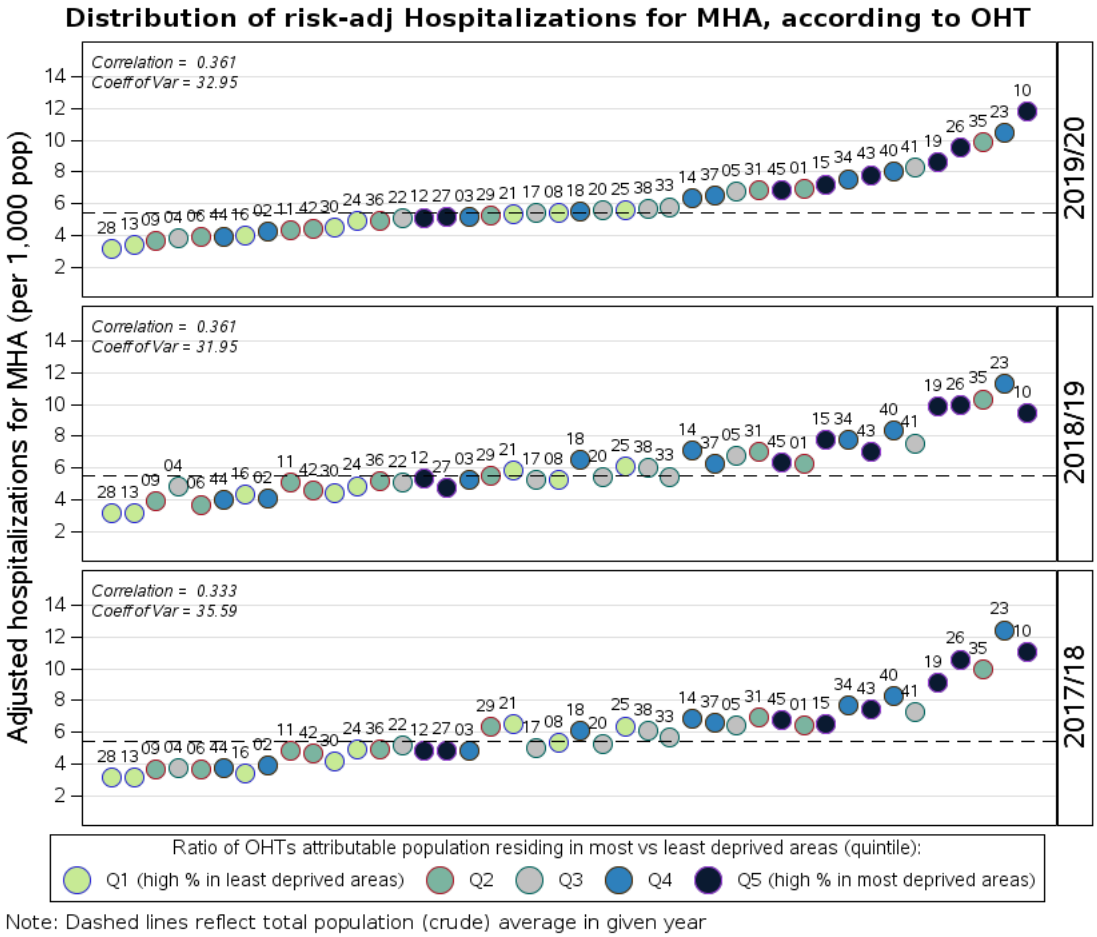
Note: Dashed lines reflect total population (crude) average in given year

Rate of MHA-Related Hospitalizations (contextual indicator)

Hospitalizations represent a costly and intensive form of care for persons with MHA

- In 2019/20, rate of MHA-related hospitalizations in the attributable population was 5.4 per 1,000 population, which was similar to reporting periods (5.5 in 2018/19 and 5.4 in 2017/18)
- The range in OHT-level risk-adjusted estimates was from 3.2 to 11.8, more than a 3.5-fold difference and the CV was 33, indicative of high variability across all 42 OHTs.
- Eight OHTs improved (lower rate) over each reporting period. Notably, OHT 21 improved from 6.6 to 5.4 (18% reduction) from 2017/18 to 2019/20.
- MHA-related hospitalizations showed weak to moderate correlation with the concentration of the attributable population residing in the most (vs least) deprived areas ($T_{2019/20}$=0.36) and moderate correlation with concentration of the attributable population residing in rural (vs urban) areas ($T_{2019/20}$=0.40, figure not shown).

Exhibit 9: Rate of MHA-related hospitalizations by OHT, 2017/18 to 2019/20



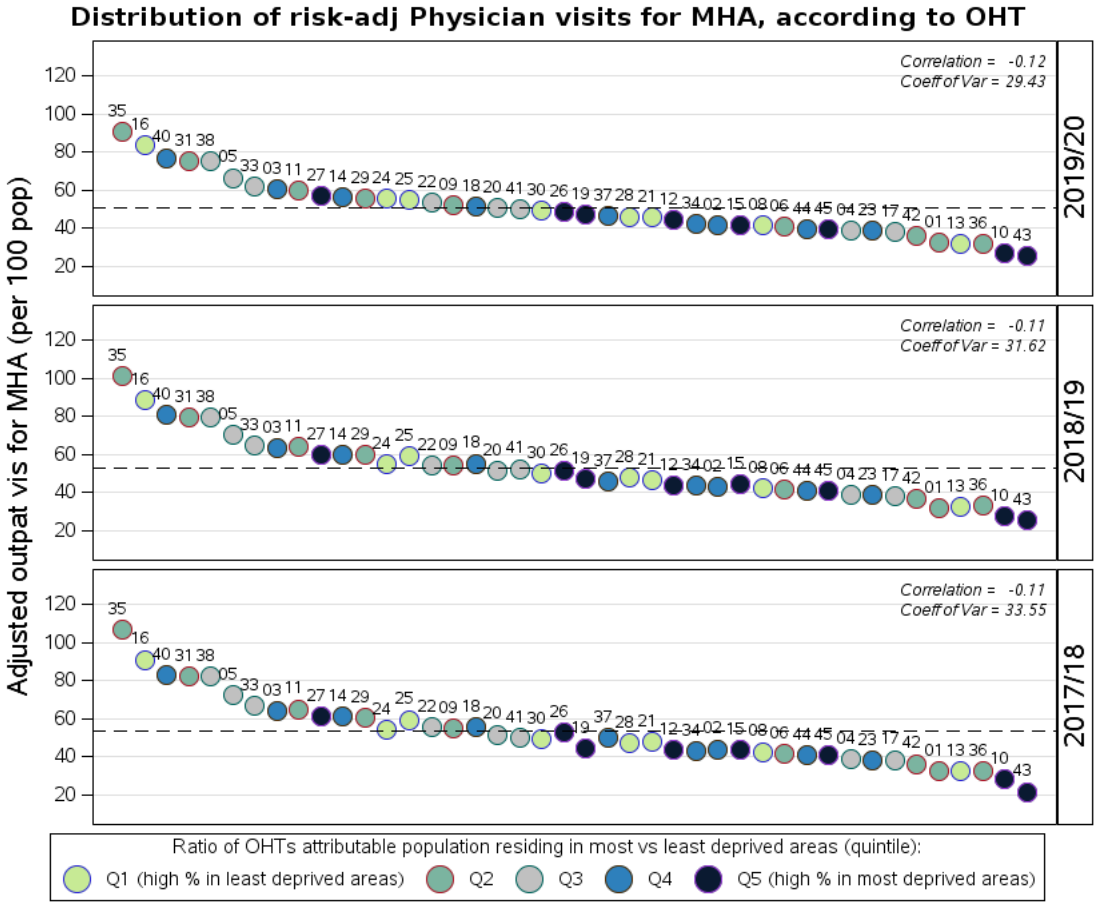
Note: Dashed lines reflect total population (crude) average in given year

Rate of MHA-Related Outpatient Physician Visits (contextual indicator)

Measuring outpatient visits provides data regarding service needs

- In 2019/20, rate of outpatient visits for MHA in the attributable population was 51.0 per 100 population, declined slightly from prior reporting periods (52.9 in 2018/19 and 53.5 in 2017/18)
- The range in OHT-level risk-adjusted estimates was from 25.6 to 90.5, a 3.5-fold difference and the CV was 29, indicative of high variability across all 42 OHTs.
- Few OHTs had a higher rate year after year, and percent improvement was small.
- MHA-related outpatient physician visits showed weak (negative) correlation with the concentration of the attributable population residing in the most (vs least) deprived areas ($T_{2019/20}$=-0.12) and with concentration of the attributable population residing in rural (vs urban) areas ($T_{2019/20}$=-0.30, figure not shown).

Exhibit 10: Rate of MHA-related outpatient physician visits by OHT, 2017/18 to 2019/20



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

Limitations

There are limitations of this work requiring comment. We quantified a series of indicators specific to MHA care measurable with routinely collected health administrative data in Ontario, selected through a modified Delphi approach. Other indicators specific to the quadruple aim framework and relevant to integrated care for this target population were not quantified. 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. The OHTAM dataset we analyzed encompassed the attributable population based on health care utilization patterns from 2017 but is a closed cohort. Because of this, without regular updates of the OHTAM data, results further from 2017/18 are subject to increasing bias. Last, 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 general associations.

Conclusions

In 2019/20, for almost 30% of the OHT attributable population, the ED was their first point of contact for mental illness and this varied from 19.5% to 41.2% across the 42 OHTs. Among those that had at least one ED visit for a mental illness, one in five had a repeat ED visit within 30-days of the first visit, and one in ten had 4+ mental illness-related ED visits, with similar variation across the OHTs. Among those hospitalized with a mental illness, only one in three patients had a physician follow-up within 7-days of discharge and this varied from 18.9% to 48.9% across the OHTs. Variation across the OHTs was most notable for self-harm related ED visits which ranged from 8.8 to 88.9 per 100,000 population.

OHT indicator performance was weakly correlated with the concentration of the attributable population in the most vs least deprived areas. However, seven-day physician follow-up after an MHA hospitalization was moderately negatively correlated with rurality (i.e., OHTs with a higher proportion of urban patients received outpatient follow-up after being hospitalized for mental illness) and self-harm related ED visits were moderately correlated with rurality (i.e., OHTs with a higher proportion of rural residents had more self-harm related ED visits). Similar patterns were observed for the contextual indicators.

Within OHTs, some inequities by material deprivation were evident for repeat ED visits, frequent ED visits and ED visits for deliberate self-harm, however, the direction and magnitude of association varied considerably. For example, **within** each OHT, there was up to a 5-fold difference between the indicator rate for those residing in the most deprived area (Q5) vs those residing in the least deprived area (Q1). Similar findings have been reported by Public Health Ontario which showed rates of ED visits for self-harm among youths are higher among persons residing in the most (vs least) deprived areas of Ontario within most (but not all) district health units [5].

These baseline findings illustrate where there are opportunities for OHTs to focus their implementation activities to improve patient experience and outcomes specific to MHA 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.

Given the relatively stable overall historical trend across many of these indicators (including contextual indicators), and the early stage in the OHT journey towards an integrated health care system, movement of these indicators at the level of the entire OHT attributable population, is not expected for most indicators within the near future (1-2 years). However, within segments of MHA patients that OHTs select to implement their integrated care pathways, movement can be expected. Evidence from Ontario's Integrated Funding Model pilot program showed that well-specified interventions focused on specific target populations were able to improve patient outcomes [6].

OHTs that have selected MHA as their priority population will need to build capacity to be able to measure, monitor and report on most of these indicators to evaluate their new integrated care models to determine whether they are having an impact.

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Appendix: Indicator Technical Specifications

Repeat emergency visits for mental health (within 30 days)	
Rationale:	Repeat unscheduled emergency department visits for mental health and addictions may indicate inadequate transitions from hospital to community care
Indicator Reference:	Ontario MOH http://www.health.gov.on.ca/en/pro/programs/ris/docs/repeat_er_visits_mental_health_en.pdf [accessed Mar26,2021]
Data Sources:	NACRS, OHTAM, RPDP
Numerator (a subset of the denominator):	Presence of 1 or more unscheduled ED visits for mental health conditions or substance abuse within 30 days of the index visit (see denominator)
Denominator:	All unscheduled ED visits for mental health conditions ((Primary diagnosis field = F06–F99 or secondary diagnosis fields = X60–X84, Y10–Y19, Y28 when primary diagnosis is not F06–F99, and excluding substance abuse, ICD-10 F10-F19) in the reporting period
Exclusions:	n/a
Standardization:	Model-based risk-adjusted via logistic regression using individual-level data, controlling for age (continuous) and sex.
Notes and Limitations:	• A lower value (%) is desirable for this indicator

7-day follow-up with a physician after hospitalization for MHA	
Rationale:	Timely follow-up with a physician after hospital discharge may help to improve adherence to treatment and reduce the likelihood of readmissions
Indicator Reference:	Mental Health and Addictions System Performance in Ontario, 2021 Scorecard: https://www.ices.on.ca/Publications/Atlases-and-Reports/2021/Mental-Health-and-Addictions-System-Performance-in-Ontario-2021-Scorecard [accessed Mar26, 2021]
Data Sources:	DAD, OHIP, OHTAM, OMHRS, RPDB
Numerator (a subset of the denominator):	Consults/ visits with primary care providers, psychiatrists and/or pediatricians occurring within 7 days from discharge taking place in an office, home or long-term care setting.
Denominator:	Patients discharged alive from a hospital in Ontario for mental health and addictions in the reporting period
Exclusions:	Patients readmitted to hospital or that died within 30 days of discharge
Standardization:	Model-based risk-adjusted via logistic regression using individual-level data, controlling for age (continuous) and sex.
Notes and Limitations:	• A higher value (%) is desirable for this indicator

First contact in the emergency department for MHA	
Rationale:	When community-based mental health and addictions services are unavailable, individuals who require service may use the emergency department as their first point of contact.
Indicator Reference:	Mental Health and Addictions System Performance in Ontario, 2021 Scorecard: https://www.ices.on.ca/Publications/Atlases-and-Reports/2021/Mental-Health-and-Addictions-System-Performance-in-Ontario-2021-Scorecard [accessed Mar26, 2021]
Data Sources:	DAD, NACRS, OHIP, OHTAM, OMHRS, RPDB
Numerator (a subset of the denominator):	Population without a mental health and addictions-related service contact (hospitalization, ED visit or physician visit) in the 2 years prior to the incident ED visit (see denominator)
Denominator:	Population with an incident (first in the reporting period) unscheduled ED visit for mental health and addictions
Exclusions:	n/a
Standardization:	Model-based risk-adjusted via logistic regression using individual-level data, controlling for age (continuous) and sex.
Notes and Limitations:	• A lower value (%) is desirable for this indicator

Frequent (4+) emergency department visits for help with MHA	
Rationale:	Frequent ED visits may be an indication that people do not have access to the community-based services or support they need
Indicator Reference:	Canadian Institute for Health Information indicator library: https://indicatorlibrary.cihi.ca/pages/viewpage.action?pageId=15565180 [accessed Mar26, 2021]
Data Sources:	NACRS, OHTAM, RPDB
Numerator (a subset of the denominator):	Total population with 4 or more ED visits for mental health and addictions in 1 year prior to index visit (see denominator)
Denominator:	Total population with at least 1 ED visit for mental health and addictions (Primary diagnosis field = F06–F99 or secondary diagnosis fields = X60–X84, Y10–Y19, Y28 when DX10CODE1 is not F06–F99) in the reporting period. The most recent encounter is considered the index visit.
Exclusions:	n/a
Standardization:	Model-based risk-adjusted via logistic regression using individual-level data, controlling for age (continuous) and sex.
Notes and Limitations:	• A lower value (%) is desirable for this indicator

Rate of emergency department visits for deliberate self-harm	
Rationale:	Deliberate self-harm includes nonfatal self-poisoning or self-injury
Indicator Reference:	Mental Health and Addictions System Performance in Ontario, 2021 Scorecard: https://www.ices.on.ca/Publications/Atlases-and-Reports/2021/Mental-Health-and-Addictions-System-Performance-in-Ontario-2021-Scorecard [accessed Mar26, 2021]
Data Sources:	NACRS, OHTAM, RPDB
Numerator (a subset of the denominator):	Total number of ED visits for deliberate self-harm (Secondary diagnosis fields = X60–X84, Y10–Y19, Y28 when primary diagnosis is not F06–F99)
Denominator:	Total population aged 10 years and older
Exclusions:	n/a
Standardization:	Model-based risk-adjusted via generalized regression (Poisson distribution, log link function and log of person time contribution offset term) using individual-level data, controlling for age (continuous) and sex. Results are expressed as a rate per 10,000 population.
Notes and Limitations:	• A lower value is desirable for this indicator

Rate of emergency department visits for MHA (contextual indicator)	
Rationale:	Use of the emergency department for mental health and addictions issues may indicate a lack of, in inability to access, appropriate community-based services for MHA
Indicator Reference:	Mental Health and Addictions System Performance in Ontario, 2021 Scorecard: https://www.ices.on.ca/Publications/Atlases-and-Reports/2021/Mental-Health-and-Addictions-System-Performance-in-Ontario-2021-Scorecard [accessed Mar26, 2021]
Data Sources:	NACRS, OHTAM, RPDB
Numerator (a subset of the denominator):	Total number of ED visits for mental health and addictions (Primary diagnosis field = F06–F99 or secondary diagnosis fields = X60–X84, Y10–Y19, Y28 when DX10CODE1 is not F06–F99)
Denominator:	Total population
Exclusions:	n/a
Standardization:	Model-based risk-adjusted via generalized regression (Poisson distribution, log link function and log of person time contribution offset term) using individual-level data, controlling for age (continuous) and sex. Results are expressed as a rate per 1,000 population.
Notes and Limitations:	• A lower value is desirable for this measure • This is a contextual indicator describing service use and outcomes for persons with MHA

Rate of MHA-related hospitalizations (contextual indicator)	
Rationale:	Hospitalizations represent a costly and intensive form of care for persons with mental health and addictions
Indicator Reference:	Mental Health and Addictions System Performance in Ontario, 2021 Scorecard: https://www.ices.on.ca/Publications/Atlases-and-Reports/2021/Mental-Health-and-Addictions-System-Performance-in-Ontario-2021-Scorecard [accessed Mar26, 2021]
Data Sources:	DAD, OHTAM, OMHRS, RPDB
Numerator (a subset of the denominator):	Total number of hospitalizations for mental health and addictions (Primary diagnosis field = F06–F99 or secondary diagnosis fields = X60–X84, Y10–Y19, Y28 when primary diagnosis is not F06–F99)
Denominator:	Total population
Exclusions:	n/a
Standardization:	Model-based risk-adjusted via generalized regression (Poisson distribution, log link function and log of person time contribution offset term) using individual-level data, controlling for age (continuous) and sex. Results are expressed as a rate per 1,000 population.
Notes and Limitations:	• A lower value is desirable for this measure • This is a contextual indicator describing service use and outcomes for persons with MHA

Rate of MHA-related outpatient physician visits (contextual indicator)	
Rationale:	Measuring outpatient visits provides data regarding service needs
Indicator Reference:	Mental Health and Addictions System Performance in Ontario, 2021 Scorecard: https://www.ices.on.ca/Publications/Atlases-and-Reports/2021/Mental-Health-and-Addictions-System-Performance-in-Ontario-2021-Scorecard [accessed Mar26, 2021]
Data Sources:	OHIP, OHTAM, RPDB
Numerator (a subset of the denominator):	Total number of outpatient visits to a psychiatrist, pediatrician or primary care provider from OHIP for mental health and addictions
Denominator:	Total population
Exclusions:	n/a
Standardization:	Model-based risk-adjusted via generalized regression (Poisson distribution, log link function and log of person time contribution offset term) using individual-level data, controlling for age (continuous) and sex. Results are expressed as a rate per 100 population.
Notes and Limitations:	• A lower value is desirable for this measure • This is a contextual indicator describing service use and outcomes for persons with MHA