

# Community Business Intelligence Project: Second Report

Collaboration between the Institute for Clinical Evaluative Sciences  
and Reconnect Community Health Services

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## Participating Community Health Service Providers

- 416 Community Support for Women
- Accommodation Information and Support
- Alpha House
- Alternatives, East York Mental Health Counselling Services Agency
- Alzheimer Society Of Toronto
- Barbra Schlifer Commemorative Clinic
- Baycrest Centre for Geriatric Care
- Bellwoods Centre for Community Living
- Bob Rumball Centre For The Deaf
- Breakaway Addictions Services
- Canadian Hearing Society
- Canadian National Institute for the Blind
- Central Toronto Youth Services
- Centre For Addiction And Mental Health
- CMHA Toronto
- Community Resource Connections of Toronto
- Copernicus Lodge
- COSTI Immigrant Services
- Cota
- Dixon Hall
- Eden Community Homes
- Etobicoke Services For Seniors
- Family Service Toronto
- Fife House
- Fred Victor Centre
- Gerstein Crisis Centre
- Good Shepherd Non-Profit Homes Toronto
- Good Shepherd Refuge Social Ministries
- The Governing Council of the Salvation Army in Canada - Toronto Harbour Light Ministries
- Harmony Hall Centre for Seniors
- Haven Toronto
- Hospital For Sick Children
- Houselink
- Humber Community Seniors' Service Inc.
- The Jean Tweed Centre
- Lakeshore Area Multi-Services Project
- Les Centres d'Accueil Héritage
- LOFT Community Services
- Madison Community Services
- Margaret's Housing and Community Support Services
- Mood Disorders Association of Ontario
- Native Canadian Centre Of Toronto
- Neighbourhood Link Support Services
- Parkdale Activity - Recreation Centre
- Parkdale Golden Age Foundation
- Pilot Place Society
- Pine River Institute
- Progress Place
- Reconnect Community Health Services
- Regeneration Community Services
- Renascent
- SPRINT Senior Care
- Sinai Health System
- Sistering - A Woman's Place
- Society of Saint Vincent de Paul, Toronto Central Council (Ozanam House)
- Sound Times Support Services
- Spinal Cord Injury Ontario
- St. Clair O'Connor Community Inc.
- St. Clair West Services for Seniors
- St. Joseph's Health Centre Toronto
- St. Jude Community Homes
- St. Matthew's Bracondale House
- St. Michael's Homes
- St. Michael's Hospital
- St. Stephen's Community House
- Storefront Humber Inc.
- Street Haven At The Crossroads
- Street Health
- Tobias House Attendant Care Inc.
- Toronto East Health Network
- Toronto Public Health, City of Toronto
- Transition House Toronto
- Trinity Square Café
- University Health Network
- Warden Woods Community Centre
- West Neighbourhood House
- West Park Healthcare Centre
- West Toronto Support Services
- Women's College Hospital
- WoodGreen Community Services
- YMCA Of Greater Toronto
- YWCA Toronto

# About Contributing Organizations

## **Reconnect Community Health Services**

Established in 1981, Reconnect Community Health Services (Reconnect) is a community-based health services provider, located in the Toronto Central Local Health Integration Network (TC LHIN). Reconnect is governed by a volunteer board of directors, and has over 250 staff.

Reconnect has two streams of services:

1. Reconnect offers a wide range of programs, treatment, support and help to individuals 16 years of age and older. These services include Adult Day Services, Assisted Living Services, Case Management, Community Programs, Home Help and Personal Care, Meals on Wheels, Therapeutic Falls Prevention, Transportation, Mental Health Multidisciplinary Teams, Addictions Case Management, Crisis Outreach and Short-Term Crisis Beds.
2. Reconnect Project Management Services offers community health service providers with unique ways to build capacity and infrastructure in their sector, including systems integration expertise, capacity building tools, and leadership aptitude and knowledge.

## **Institute for Clinical Evaluative Sciences**

The Institute for Clinical Evaluative Sciences (ICES) is an independent, non-profit organization that uses population-based health information to produce knowledge on a broad range of health care issues. ICES' unbiased evidence provides measures of health system performance, a clearer understanding of the shifting health care needs of Ontarians, and a stimulus for discussion of practical solutions to optimize scarce resources. Key to ICES' work is its ability to link population-based health information, at the patient level, in a way that ensures the privacy and confidentiality of personal health information. Linked databases reflecting 13 million of 34 million Canadians allow researchers to follow patient populations through diagnosis and treatment, and to evaluate outcomes.

ICES receives core funding from the Ontario MOHLTC. In addition, ICES scientists and staff compete for peer-reviewed grants from federal funding agencies, such as the Canadian Institutes of Health Research, and project-specific funds from provincial and national organizations. ICES knowledge is highly regarded in Canada and abroad, and is widely used by government, hospitals, planners, and practitioners to make decisions about health care delivery and to develop policy.

## **Centre for Addiction and Mental Health**

The Centre for Addiction and Mental Health (CAMH) provides technology, informatics and infrastructure to support the Community Business Intelligence (CBI) environment. In addition, CAMH acts as a Health Information Network Provider (HINP) for CBI. As well, CAMH contributes to thought leadership for the project.

## About the Community Business Intelligence Project

The Community Business Intelligence initiative (CBI) is a data collection project that was established by TC LHIN for the purposes of improving decision support capabilities within the community health services sector which is broadly comprised of three sub-sectors: Community Addictions, Community Mental Health, and Community Support Services. CBI collects and aggregates individual-level service utilization data across providers and services, maintaining a single repository that has begun to yield new insights into how clients navigate this system, their length of stay, and geography of utilization.

Reconnect is the Project Sponsor and has led the development and implementation through a phased approach since the initiation of the project in 2012. At the time of this report, 82 community health service providers were uploading data to CBI in near-real-time. This has been achieved through technical integrations with client management system software solutions and a data warehousing partnership with the Drug and Alcohol Treatment Information System hosted at CAMH.

In fiscal year 2014-15, with the support of the TC LHIN and the CBI working group, CBI entered into a partnership with ICES to open up opportunities for research and enhanced reporting. The first copy of CBI data transferred to ICES demonstrated that data quality was sufficient to link to ICES's administrative health data holdings.

## Chapter 1: Introduction

*Open Minds, Healthy Minds*,<sup>1</sup> Ontario's comprehensive mental health and addictions strategy, identified the need for strong service collaboration across sectors to better coordinate community mental health, family health care, acute care and emergency department services for all Ontarians. Through the creation of a responsive and integrated system of care, the aim of the strategy is to strengthen services and develop capacity to identify and respond to the mental health and addictions needs of persons within communities.

Similarly, the need to plan local services aligned with patient need has been identified at the LHIN level. With the introduction of the Patients First Act (2016)<sup>2</sup>, LHINs have an enhanced emphasis on coordinating integrated care at a local level for their population. To do so, a deep understanding of the services people are receiving across the health care spectrum is required. LHINs, sub-regions and service providers are working to ascertain how service provision in one organization or sector impacts service in another— and what combination of services leads to the best outcomes for patients.

The unique examination of the intersection between community care information with data from the acute and primary care sectors provides an important lens on the full suite of services patients are receiving within TC LHIN. Working with the MOHLTC, ICES is leading an initiative to develop performance measures focusing on access to timely and appropriate services for populations in need. In 2015, ICES and Reconnect established a data sharing partnership allowing for the linkage of CBI data to ICES health administrative data holdings. This helps to support the development of performance indicators related to the community health system within TC LHIN, as well as the ability to explore the transition of persons across health sectors.

In 2016, the first report resulting from this CBI/ICES partnership was released, titled *Data Partnership between the Community Business Intelligence Project and ICES*.<sup>3</sup> This report described the population using community health services and presented indicators of acute care and hospital use within TC LHIN. The purpose of this second report will be similar to the first report, in that it will provide a description of the population in the CBI dataset, where they are receiving services, and their level of acute care and hospital use. We will also extend the first report by exploring the following selected focus areas: primary care attachment and 30-day repeat emergency department visits. Furthermore, this report includes a larger sample of clients, which will provide us with a more representative view of those receiving community-based health services in TC LHIN.

As CBI implementation is still a work in progress, it is important to note that the dataset continues to evolve as new community health service providers are on-boarded to CBI. In addition to providing a larger sample, the number of health service providers in the CBI dataset has grown by 60 percent over the previous year. Consequently, findings from this report should not be compared with previous results from the first report, nor should they be considered representative of the sector as a whole.

## Chapter 2: Description of the CBI Data and the Data Linkage Process

### *Description of the CBI data*

There are five mandated data elements that must be provided by all health service providers contributing to the CBI data. A sixth mandatory data element, *Last name at birth*, is only required for health service providers in the Addictions sector. These elements are listed below in Exhibit 1.

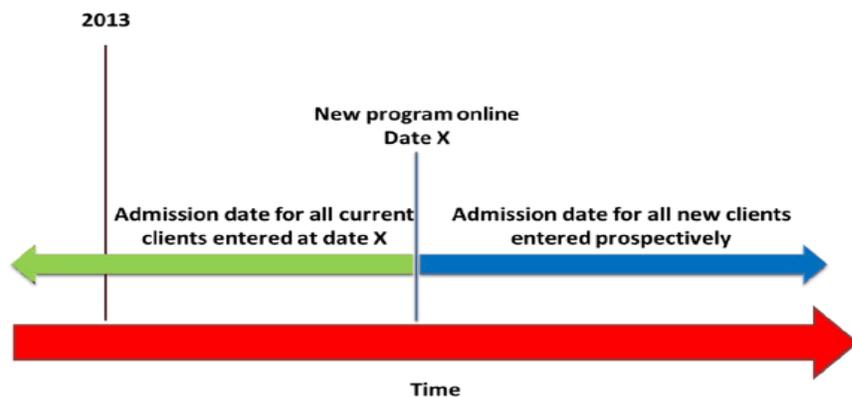
**Exhibit 1.** Description of the mandated data elements in the CBI dataset

Data element	Description
<b>Client ID</b>	This uniquely identifies a client within a software and agency record.
<b>Functional centre ID</b>	Functional centres were selected for collection rather than collecting at the program level since the LHIN control over functional centre identification has made naming and numbering conventions more consistent across different health service providers.
<b>Organization ID</b>	This identifies specific health service providers.
<b>Program enrollment ID</b>	This variable identifies each new program enrollment. Within a single functional centre, clients may be enrolled in multiple programs.
<b>Admission date</b>	The date when the health service provider admits a client into a functional centre for service.
<b>Last name at birth</b>	This is only mandatory for health service providers in the Addictions sector.

In addition to the above mandated data elements, other common data elements collected and provided by health service providers include: health card number, first name, current last name, middle name(s), date of birth, current age, gender, postal code, as well as program specific variables such as referral, service initiation, and discharge dates. For each program, providers uploaded data on all prevalent cases as of the upload date (Exhibit 2). After this date, all new clients were entered prospectively, and their data automatically uploaded to the CBI server. In cases where a single provider delivered multiple programs and utilized multiple client management systems, it was common for the provider to have staggered implementation dates. Therefore, both the number of providers and the number of programs have increased over time.

A practical consequence of this upload process is that only providers that were online as of March 31, 2016 are included in this report. As more data are uploaded to CBI and subsequently transferred and linked to ICES holdings, these data will be more comprehensive and thus more accurately reflect the entirety of agencies reporting to CBI.

## Exhibit 2. Entry of existing and future clients into the CBI database



### *Data linkage process*

The process of linking CBI data to ICES administrative data holdings is an essential step in our ability to adequately measure health status, health outcomes, and acute and outpatient service use among users of Ontario's community health system. Through the use of a common set of identifiers found in CBI data and ICES data, an anonymous, unique identifier known as an ICES key number (IKN) is assigned to each individual in CBI. All datasets at ICES contain this IKN variable, which allow us to identify a linked client in the CBI dataset across multiple health administrative datasets.

There are two primary ways in which data from two or more datasets can be linked together: deterministic linkage and probabilistic linkage. Deterministic linkage algorithms use a combination of rules that determine whether an individual in one dataset is the same individual in another dataset based on a given set of chosen identifiers.<sup>4</sup> A match on these selected identifiers indicates that two records belong to the same individual, regardless of differences that may exist in other identifiers. In the current report, exact matches on health card number and date of birth between records in the CBI data and the ICES data were considered a deterministic match.

Probabilistic linkage methods use an algorithm that assesses the probability or likelihood that two records are a true match. This method accounts for variance and discriminatory power of each identifier, assigning weights that signify whether agreement or disagreement on a selected set of indicators suggests a likely match or non-match.<sup>4</sup> Records above a certain weight are deemed matches, and those below a specific weight are rejected. Records with intermediate weights are then reviewed manually, and each designated a match or rejected. Probabilistic linkage methods for this report used a combination of surname and surname initials, given name(s), sex, date or year of birth, and postal code. In general, probabilistic linkage is a more time-consuming approach compared to deterministic linkage.

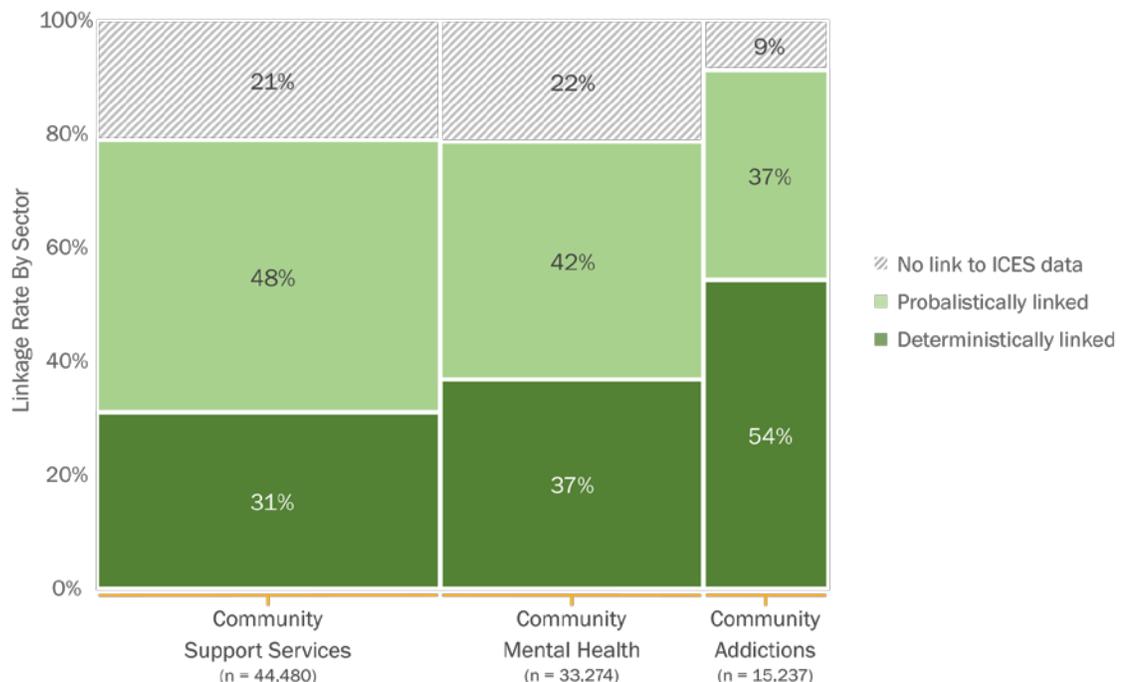
### **CBI data linked to ICES data**

The full CBI dataset up to fiscal year 2015/16 that ICES received contained 165,245 records, a 3-fold increase from the 49,952 records provided for the previous report. The number of unique Client IDs on

the original file was 92,533. Since clients may access more than one service provider and Client IDs are generated by client management system software, some individuals had more than one Client ID. After excluding records that did not successfully link to ICES data, there were a total of 141,104 CBI enrollment records, corresponding to 74,808 unique Client IDs and 61,071 unique individuals. Of the 92,533 unique Client IDs received, 36.9 percent (34,164) linked deterministically, 43.9 percent (40,644) linked probabilistically, while 19.2 percent (17,725) did not link to the ICES data. Overall, 80.8 percent of the Client ID records were linked (Exhibit 4).

Linkage rates for unique Client IDs were further examined by sub-sector and functional centre categories. Functional centre categories are aggregate reporting levels derived from the embedded hierarchical arrangement of functional centres as defined by the Ministry of Health and Long-Term Care. Functional centres are used by health service providers to identify and record statistics for specialized services.<sup>5</sup> For more information on functional centre categories and their corresponding functional centres used in this report, please refer to Appendix A. Functional centres were also categorized into three broad sub-sectors: Community Support Services (CSS), Community Mental Health (CMH), and Community Addictions (CA). For the CSS and CMH sectors, just over 20 percent of the Client IDs enrolled in these sectors did not link to ICES data (Exhibit 3). Linkage rates were higher for clients enrolled in CA, with 91 percent of the corresponding Client IDs linking to ICES data. Furthermore, CA also had the highest deterministic linkage rate (54 percent; Exhibit 3). Across functional centre categories, the highest linkage rates were found for Residential-Addictions (95.9 percent), while the lowest rate was for Consumer/Survivor/Family Initiatives, in which less than 50 percent of the Client IDs enrolled in these functional centres linked to ICES data (Exhibit 4). Overall, five of the nine functional centre categories had at least an 80 percent linkage rate to the ICES data.

**Exhibit 3.** Proportion of Client IDs in the CBI dataset, by type of linkage and community-based health services sector



**Exhibit 4.** Proportion of Client IDs in the CBI dataset, by type of linkage and functional centre category

	Total Client IDs N	Total linked n (%)	Type of linkage		
			Deterministic n (%)	Probabilistic n (%)	No link n (%)
<b>Overall</b>	92533	74808 (80.8)	34164 (36.9)	40644 (43.9)	17725 (19.2)
<b>Functional Centre Category</b>					
In-Home and Community Services (IH & CS)	39338	31412 (79.9)	10407 (26.5)	21005 (53.4)	7926 (20.1)
Case Management	10482	9352 (89.2)	4205 (40.1)	5147 (49.1)	1130 (10.8)
Consumer/Survivor/Family Initiatives	3595	1718 (47.8)	601 (16.7)	1117 (31.1)	1877 (52.2)
Crisis Intervention	3981	3447 (86.6)	1583 (39.8)	1864 (46.8)	534 (13.4)
Health Promotion and Education	306	228 (74.5)	20 (6.5)	208 (68.0)	78 (25.5)
In-Home Health Professional Services (HPS) Home Care	5581	4165 (74.6)	3696 (66.2)	469 (8.4)	1416 (25.4)
Primary Care- Clinics/Programs	23853	19116 (80.1)	9396 (39.4)	9720 (40.7)	4737 (19.9)
Residential - Mental Health	3646	3350 (91.9)	1509 (41.4)	1841 (50.5)	296 (8.1)
Residential - Addictions	8417	8071 (95.9)	6068 (72.1)	2003 (23.8)	346 (4.1)

**Note:** Functional centre categories are not mutually exclusive and therefore do not add up to the overall count, i.e. clients may be in more than one functional centre.

Please note that for the remainder of this report, results will be presented at the individual level and not at the Client ID level.

### Importance of collecting health card information

As part of the LHIN specific obligations outlined in the Multi-Sector Service Accountability Agreement between TC LHIN and community health service providers, providers are to collect health card information on clients receiving LHIN-funded services. Capturing this information is beneficial for administrative purposes such as facilitating proper tracking and coordination of persons receiving multiple services within the system. Furthermore, it can inform transitions of care by providing a better understanding of the interrelationship between an individual’s journey through multiple sectors of the healthcare system.

As previously mentioned, this project used health card numbers to perform deterministic linkage— a cost-effective, efficient, and less time consuming approach than probabilistic linkage— to link CBI and ICES data together. To demonstrate the value of receiving CBI records with health card numbers, it took approximately 25 hours to deterministically link 46% of all records that matched; while, probabilistic linkage took approximately 200 hours to link the remaining 54% of records.



# Chapter 3: Demographics Profile and Health Service Use among Clients in the CBI dataset

## *Overview*

The following section will provide a breakdown of the demographic characteristics and acute care and outpatient physician service use among clients in the CBI dataset. Demographic characteristics were measured as of April 1, 2015 and included sex, age, neighbourhood income quintile, immigrant status, and LHIN of residence. For comparison purposes, the general population living in TC LHIN was used as a reference population for the description of the demographic characteristics. Indicators of outpatient health service and acute care use among clients in the CBI dataset were: outpatient physician visits (defined as visits to a family physician/general practitioner, psychiatrist, or paediatrician), emergency department visits, and hospitalizations for any health reason occurring between April 1, 2015 and March 31, 2016.

### **Inclusion criteria**

The following inclusion criteria were applied, as of April 1, 2015:

- Age 16 to 105 years old
- Ontario resident
- Eligible for OHIP
- Non-missing sex
- Had contact with the healthcare system in the last 5 years

Please note that the demographic characteristics for clients enrolled in the Vision Impaired Services and In-Home PS – Speech Language Pathology functional centres were not consistent with the demographics profile of the other community-based service users within the CBI data. Therefore, clients that were only enrolled in either of these two functional centres were excluded from the analysis.

## *3.1 Demographic characteristics of clients in the CBI dataset*

### **Overall population in the CBI dataset**

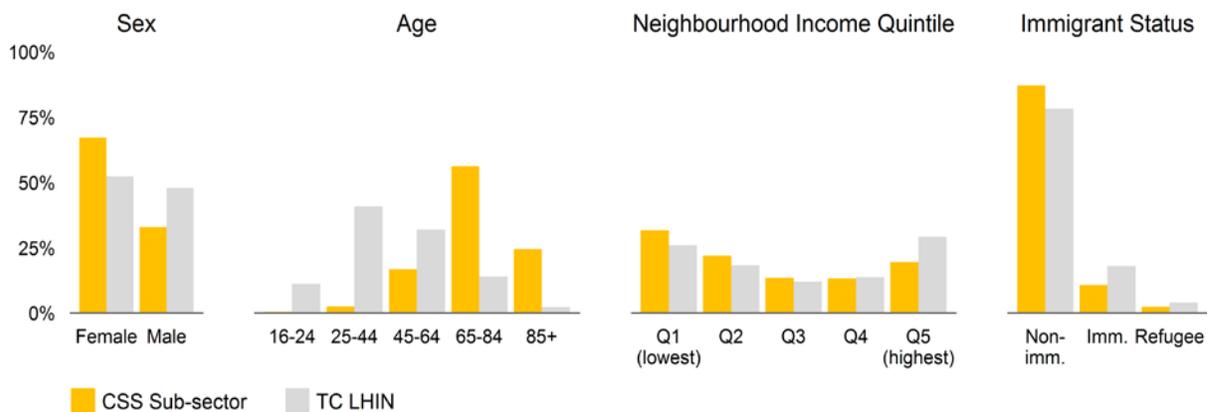
After inclusion criteria were applied, there were 37,688 clients in the CBI dataset and 953,341 Toronto Central LHIN residents not found in the CBI dataset.

The demographic characteristics for the overall population of clients in the CBI dataset are found in Appendix B. Compared to the general TC LHIN population, a greater proportion of clients in the CBI data were female (58.0 percent vs. 52.2 percent), older than 64 years of age (44.2 percent vs. 16.1 percent), non-immigrants (85.2 percent vs. 78.2 percent), and lived in the lowest neighbourhood income quintile (33.3 percent vs. 25.9 percent). Additionally, over one-third of clients in the CBI dataset lived outside of TC LHIN.

## Community Support Services (CSS)

There were 18,788 clients receiving services from the CSS sector as of April 1, 2015. These clients were more often female (67.2 percent), aged 65 to 84 years old (56.1 percent), and non-immigrants (87.0 percent). Furthermore, nearly one-third of CSS clients lived in the lowest neighbourhood income quintile (31.5 percent) compared to just 19.5 percent who lived in the highest neighbourhood income quintile. Compared to the overall population in the CBI dataset, a greater proportion of clients enrolled in CSS functional centres live in TC LHIN (76.5 percent vs. 65.7 percent).

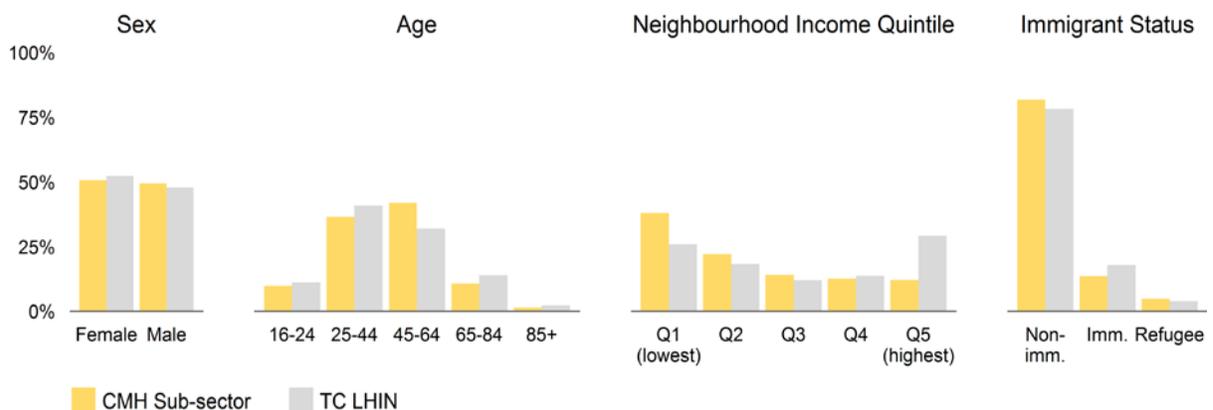
**Exhibit 5.** Demographics profile of clients enrolled in CSS functional centres compared to a TC LHIN reference population, as of April 1, 2015



## Community Mental Health (CMH)

As of April 1, 2015, there were 14,087 clients receiving services from the CMH sector. A similar proportion of males (49.4 percent) and females (50.6 percent) were enrolled in CMH functional centres. Compared to the overall CBI population, a smaller proportion of CMH clients lived in the highest neighbourhood income quintile or was over the age of 64 years; however, relative to TC LHIN, clients enrolled in CMH were still an older population.

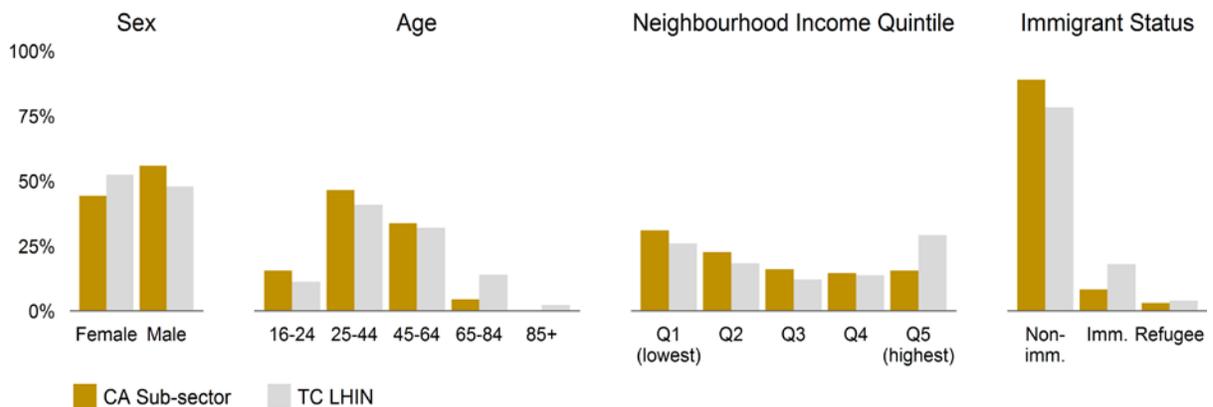
**Exhibit 6.** Demographics profile of clients enrolled in CMH functional centres compared to a TC LHIN reference population, as of April 1, 2015



## Community Addictions (CA)

There were 6,665 clients enrolled in services within the CA sector. Clients were more often male (55.7 percent), aged 25 to 44 years old (46.4 percent), a non-immigrant (88.8 percent), and residing outside of TC LHIN (57.1 percent). Similar to clients accessing CSS and CMH services, nearly one in three clients enrolled in CA functional centres lived in the lowest neighbourhood income quintile compared with only 15.4 percent living in the highest neighbourhood income quintile.

**Exhibit 7.** Demographics profile of clients enrolled in CA functional centres compared to a TC LHIN reference population, as of April 1, 2015



## 3.2 Indicators of acute care and outpatient physician service use

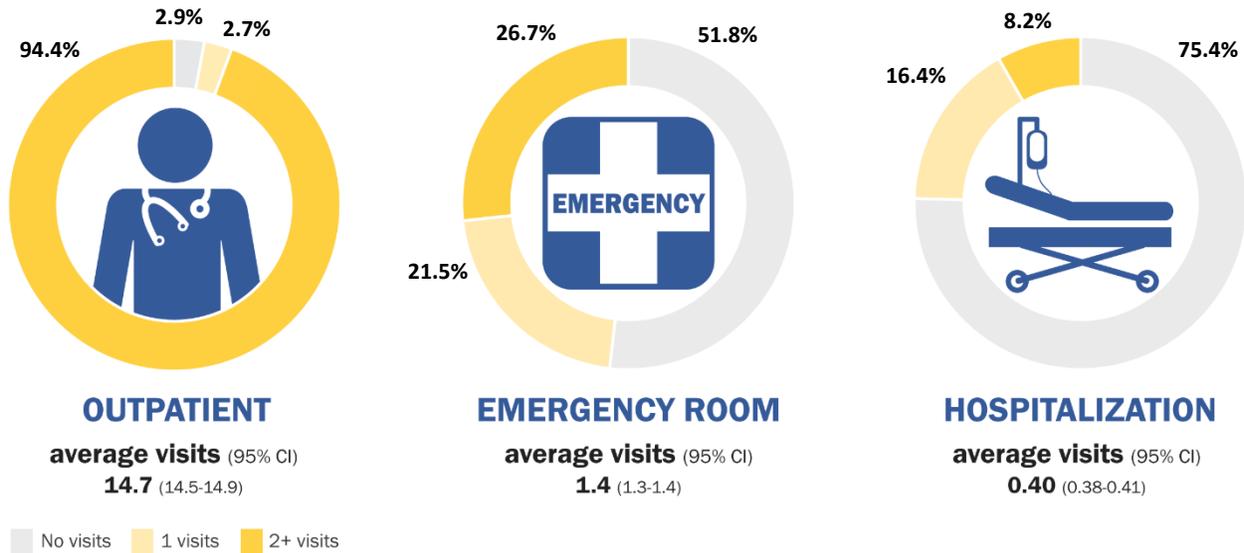
### Overall population in the CBI dataset

In general, clients in the CBI dataset had high acute care and outpatient physician service use, with an average of 15.0 outpatient visits, 1.9 ED visits, and 0.4 hospitalizations per person in the past year (Appendix C). Overall in 2015/16, 95.5 percent of clients had at least one outpatient physician visit, 51.3 percent had at least one ED visit, and 21.7 percent had at least one hospitalization.

### Community Support Services

Clients enrolled in CSS functional centres had on average 14.7 outpatient physician visits, 1.4 ED visits, and 0.4 hospitalizations per person in 2015/16 (Exhibit 8). Overall, the percentage of clients enrolled in CSS that had at least one outpatient physician visit, ED visit, or hospitalization was 97.1 percent, 48.2 percent, and 24.6 percent, respectively.

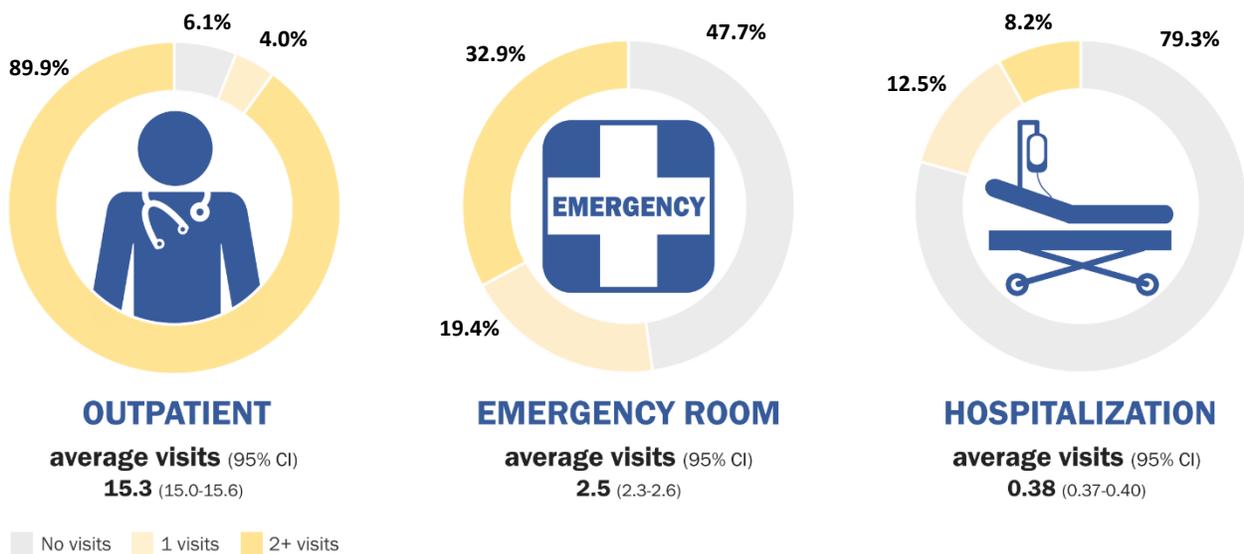
**Exhibit 8.** Acute care and outpatient physician service use among clients enrolled in CSS functional centres, 2015/16



**Community Mental Health**

Clients enrolled in CMH functional centres had on average 15.3 outpatient physician visits, 2.5 ED visits, and 0.4 hospitalizations per person in 2015/16. Overall, the percentage of clients enrolled in CMH that had at least one outpatient physician visit, ED visit, or hospitalization was 93.9 percent, 52.3 percent, and 20.7 percent, respectively.

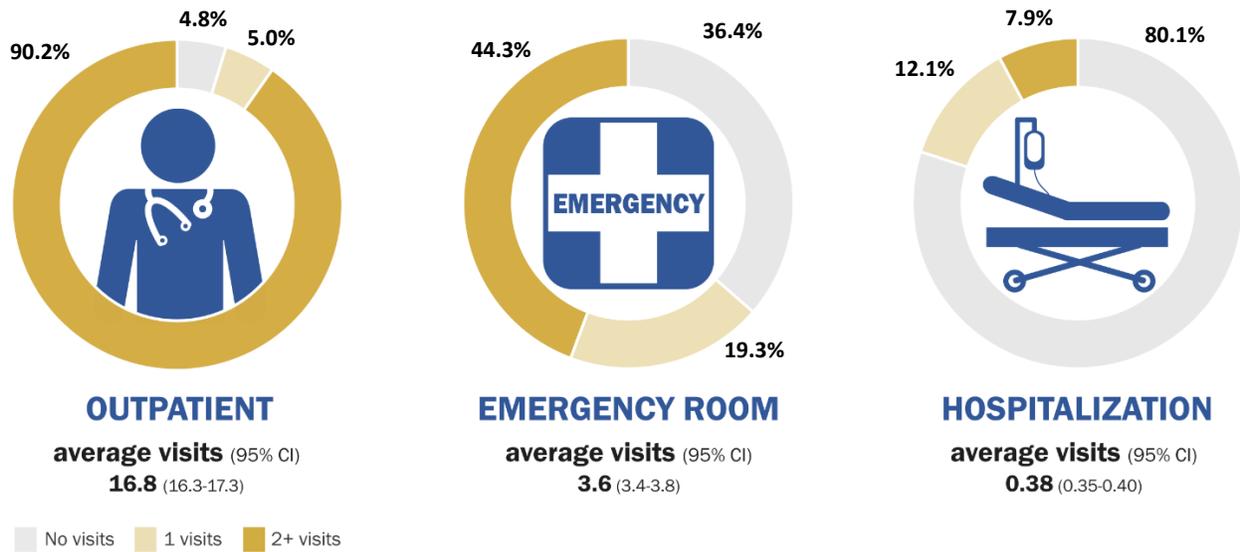
**Exhibit 9.** Acute care and outpatient physician service use among clients enrolled in CMH functional centres, 2015/16



## Community Addictions

Clients enrolled in CA functional centres had on average 16.8 outpatient physician visits, 3.6 ED visits, and 0.4 hospitalizations per person in 2015/16. The percentage of CA clients with at least one outpatient physician visit or at least one hospitalization was similar to those enrolled in CSS and CMH; however, use of emergency services was higher for those in community addictions than in CSS and CMH, with 63.6 percent having at least one ED visit in 2015/16 (compared to 48.2 percent and 52.3 percent, respectively).

**Exhibit 10.** Acute care and outpatient physician service use among clients enrolled in CA functional centres, 2015/16



# Chapter 4: Special Focus Areas

## 4.1 Primary Care Attachment

### Overview

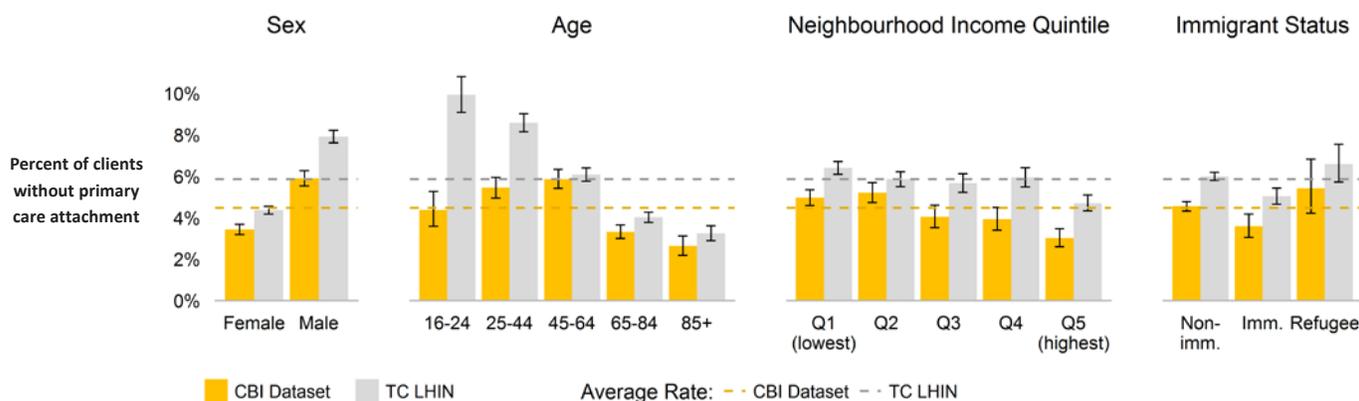
Patient rostering is the process by which a patient registers with a family practice, family physician, or team. It has become a key component of primary care models in Canada and other Western countries and has been recognized as a key feature of a high-performing primary health care system.<sup>7,8</sup> Patient rostering is widespread in Ontario and is associated with several positive outcomes including improved health,<sup>8</sup> timely access to appointments,<sup>9</sup> continuity of care,<sup>10,11</sup> and receipt of preventive care services.<sup>12</sup> In this report, primary care attachment was defined as patients who were rostered and those not rostered but were receiving care from the same family physician over the past two years (also known as virtually rostered).

In this report, we examined rates of clients in the CBI dataset who were without primary care attachment and compared this to rates calculated for a TC LHIN reference population, matched on age, sex, and neighbourhood income. Inclusion criteria described in Chapter 3 was applied in this section.

### Characteristics of clients in the CBI dataset without primary care attachment

A smaller proportion of clients in the CBI dataset were without primary care attachment compared to the general TC LHIN population (4.5 percent vs. 5.9 percent, respectively). Females were less likely to be without primary care attachment compared to males, and this was consistent for both CBI and TC LHIN populations. By age, the largest proportion of clients in the CBI dataset without attachment was in the 45 to 64 age group; this was in contrast to TC LHIN, in which the highest rates were for the youngest age group. Across income and immigrant groups for both populations, higher rates of individuals without primary care attachment were found among those living in lower income neighbourhoods and of refugee status.

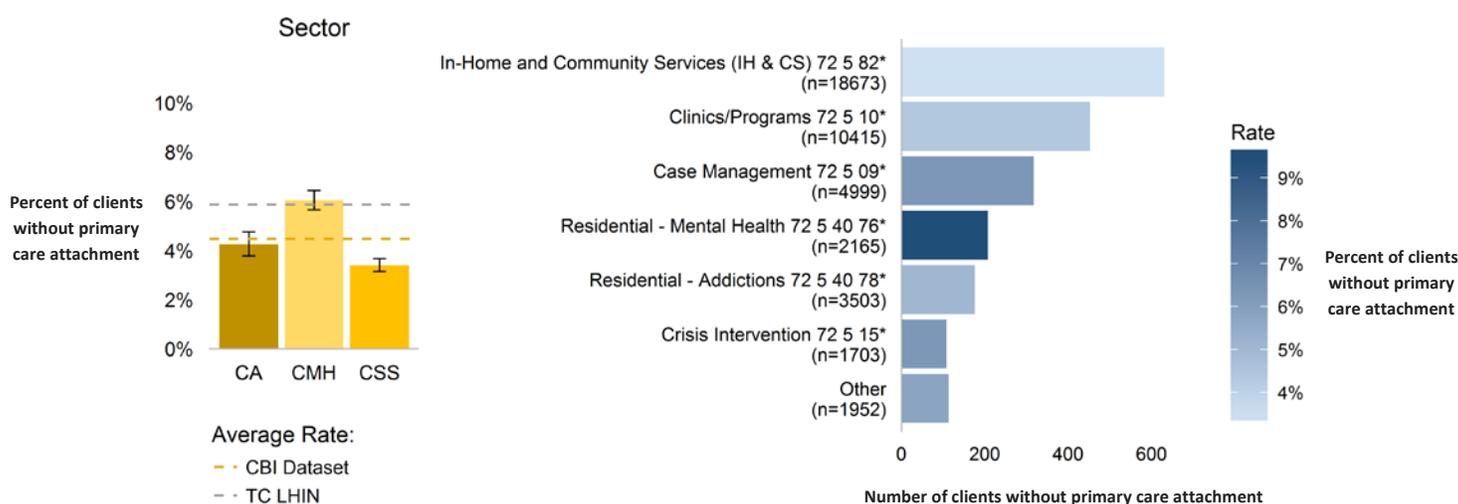
**Exhibit 11.** Proportion of clients in the CBI dataset without primary care attachment compared to a TC LHIN reference population, by sociodemographic characteristics, 2015/16



## Clients in the CBI dataset without primary care attachment across functional centres

Clients receiving services in the CMH functional centre sector had the highest rates of clients without primary care attachment (6.0 percent), while only 3.4 percent of those enrolled in CSS were without primary care attachment. Across functional centre categories, those enrolled in Residential – Mental Health had the highest rate of clients without primary care attachment at 9.6 percent. In-Home and Community Services functional centres had the lowest rate of clients without primary care attachment (3.4 percent); however, due to the large number of individuals enrolled in this functional centre category, this group had the most number of clients not attached to a family physician (n = 631).

**Exhibit 12.** Proportion of clients in CBI dataset without primary care attachment, by functional centre sector and categories, 2015/16



**Note:** For functional centre categories, n values in brackets represent the total number of CBI clients enrolled in the functional centre category.

## 4.2 Repeat emergency department visit within 30 days of a previous visit

### Overview

An unscheduled return to the emergency department (ED) following an initial visit is an indicator of quality of care.<sup>13</sup> The return visit may be for non-preventable reasons such as a natural progression of disease but there are also several factors that may influence one's return to the ED that may have been preventable, suggesting a gap in the quality of care.<sup>14,15</sup> Some of these factors include inadequate access to primary care, poor post-discharge follow-up with outpatient or community-based services, and unmet needs related to the previous discharge.<sup>16</sup>

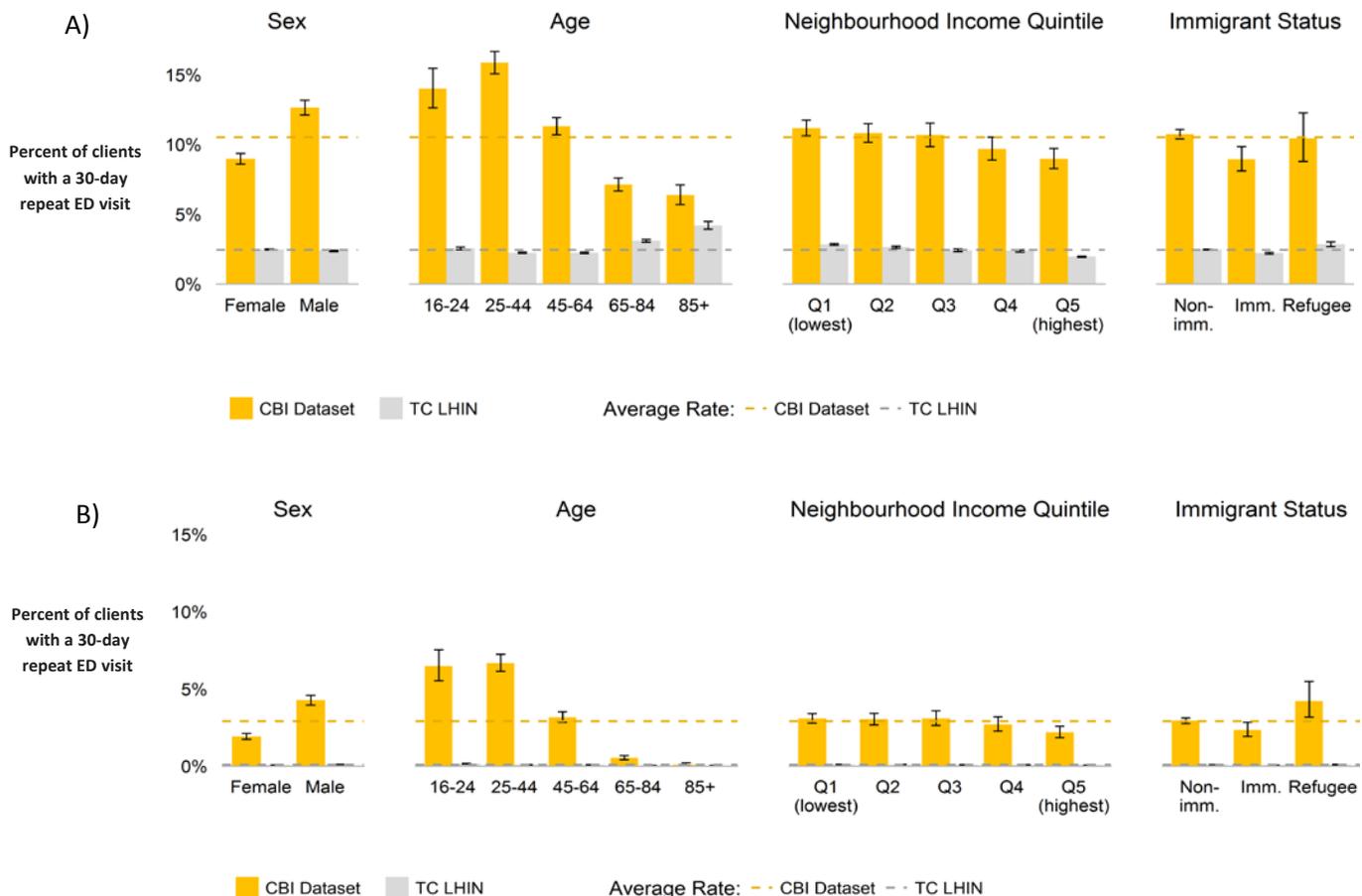
Among all clients in the CBI dataset, we calculated the proportion with an unscheduled return ED visit within 30 days of an initial ED visit for any condition and for conditions related to mental health and addictions (MHA) in the 2015 calendar year. Rates were also calculated for a comparison TC LHIN population. Inclusion criteria described in Chapter 3 were applied. In addition, individuals who died within 30 days of an initial ED visit but prior to a return ED visit were excluded from the denominator.

### Characteristics of clients in the CBI dataset with a 30-day repeat ED visit

In 2015, compared to the TC LHIN population, clients in the CBI dataset were about four times more likely to have a 30-day repeat ED visit for any condition and were over 33 times more likely to have a 30-day repeat ED visit for a MHA-related condition (Appendix D).

The demographic characteristics for clients in the CBI dataset who had a 30-day repeat ED visit for any condition and those who had a 30-day repeat ED visit related to MHA were similar. Among those in the CBI dataset, males were more likely to have a 30-day repeat ED visit than females, whereas no difference was seen between sexes for TC LHIN. By age, clients in the CBI dataset who were 44 years of age and younger had the highest 30-day repeat ED visit rates, which was in contrast to the TC LHIN, in which the highest rates were found among the oldest age group. For both populations, higher rates of 30-day repeat ED visits were found among those living in the lowest neighbourhood income quintile. Lastly, among clients in the CBI dataset, those who were non-immigrants and those who were refugees had the highest rate of 30-day repeat ED visits for any condition; while refugees had the highest rate of 30-day repeat ED visits related to MHA.

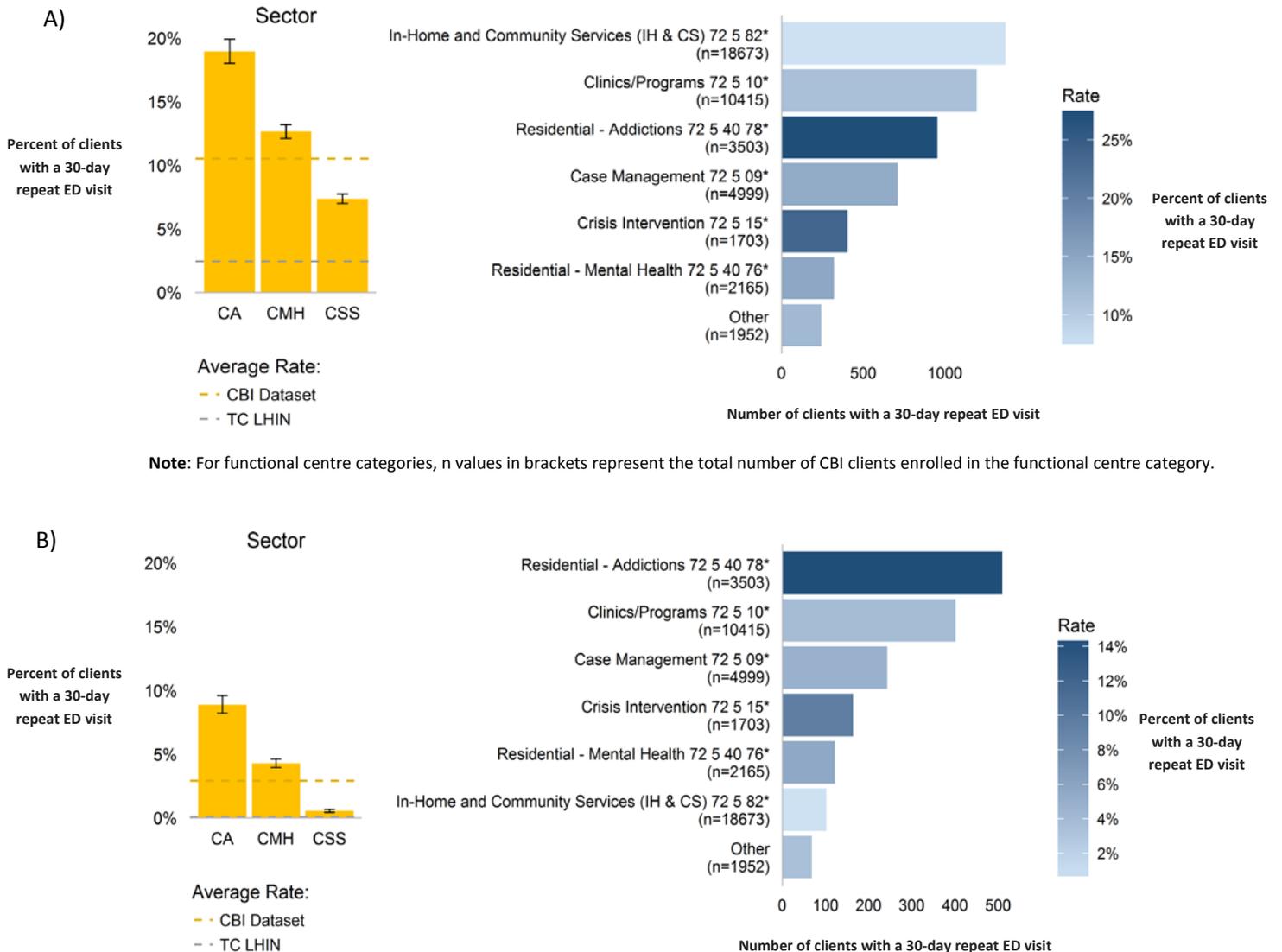
**Exhibit 13.** Proportion of clients in the CBI dataset with a 30-day repeat emergency department visit for A) any condition and B) mental health and addictions reasons compared to a TC LHIN reference population, 2015



### 30-day repeat ED visits across functional centres

Clients receiving services through the Community Addictions sector had the highest rate of 30-day repeat ED visits for any condition and for conditions related to MHA (19.0 and 8.9 percent, respectively), while those enrolled in CSS had the lowest rate of 30-day repeat ED visits for any condition and for MHA-related conditions. Across functional centre categories, those enrolled in Residential-Addictions had the highest rate of 30-day repeat ED visits for any condition and for MHA-related conditions (27.3 and 14.6 percent, respectively). The lowest 30-day repeat ED visit rate was found among those enrolled in In-Home and Community Services functional centres (any condition: 7.4 percent; MHA-related: 0.5 percent)

**Exhibit 14.** Proportion of clients in the CBI dataset with a 30-day repeat emergency department visit for A) any condition and B) mental health and addictions reasons, by functional centre sector and categories, 2015



**Note:** For functional centre categories, n values in brackets represent the total number of CBI clients enrolled in the functional centre category.

**Note:** For functional centre categories, n values in brackets represent the total number of CBI clients enrolled in the functional centre category.

# Chapter 5: Summary and Future Directions

## *Summary*

This report describes the linkage between CBI data and health administrative data from ICES, and highlights how individuals receiving community-based services in the TC LHIN access and utilize services in other healthcare sectors, specifically acute care and outpatient physician services. An overall linkage rate of 80 percent was found; however, this varied across functional centre categories, with linkage rates ranging from 47.8 percent to 95.9 percent. Furthermore, only 36.9 percent of CBI records were linked deterministically through the use of health card numbers, demonstrating the need for improved compliance from Health Service Providers in collecting health card information from clients. Capturing this information is not only beneficial for administrative purposes but also for gaining a better understanding of transitions of care across multiple sectors of the healthcare system.

We found in this report that the demographic profile for clients in the CBI dataset was quite different from the general TC LHIN population, with a greater proportion of females, individuals older than 65 years of age, non-immigrants, and those living in the lowest neighbourhood income quintile. Furthermore, high acute care and outpatient physician service use was noted in 2015/16, with the percentage of clients in the CBI dataset having at least one outpatient physician visit, ED visit, or hospitalization found to be 95.5 percent, 51.3 percent, and 21.9 percent, respectively. These findings highlight that those receiving community-based services remain active users across other sectors of the healthcare system, further demonstrating the need for proper coordination of care provided to clients.

Lastly, this report explored two focus areas: primary care attachment and repeat ED visits. Primary care attachment or rostering is associated with several positive outcomes including improved health and continuity of care. In this report, we found that clients in the CBI dataset had higher primary care attachment rates compared to the TC LHIN, which was not surprising given their high use of outpatient physician services. However, it is important to note that while our results demonstrated high attachment rates to family physicians, it is unclear to what degree high attachment rates translated into better quality of care for clients accessing community-based services, which is particularly important to understand given the complex health needs of this population. Clients in the CBI dataset had high rates of repeat ED visits for any condition and for conditions related to MHA compared to the TC LHIN population. While a return visit to the ED may reflect a natural progression of disease, the results reported here suggest that individuals receiving community-based services are at a particularly increased risk of receiving an inadequate quality of care during and following their ED visit. The finding of higher rates of repeat ED visits may reflect greater illness severity, but it may also reflect the challenges of coordinating post-discharge care once an ED visit has occurred.

## **Limitations**

This report was not without limitations. Only those data that were uploaded as of March 31, 2016 were included, as such, new health service providers that uploaded their data to CBI since that time were excluded from the analysis of this report. Furthermore, of the 124 health service providers that could be

part of CBI, only 82 were included in this transfer. Nonetheless, this was an improvement from the previous report in which data from only 52 providers were included. As more providers will continue to participate in the CBI initiative, a greater sample size of users of the TC LHIN community health system will allow us to answer more key questions in future reports.

### *General discussion and future directions*

This report demonstrates the art of the possible. The availability of community health services data in the CBI dataset and its successful linkage to the health administrative data held at ICES makes visible health service intersections and outcomes that were previously invisible. A substantial proportion of community-based mental health, addiction, and support services are provided by agencies that do not routinely report data to ICES. As such, to date the TC LHIN is the only LHIN that has the capacity to measure health service utilization within the community-based health services sector and to link it to the acute care and other data sources held at ICES. This is important for a number of reasons.

First, the clients who are receiving services through health service providers reporting into CBI are among the most vulnerable. Greater transparency about their health care outcomes and health care needs through this type of data linkage will facilitate better policy development, sub-region planning, and funding decisions. Second, the client experience of services does not adhere to data silos created by administrative structures— clients' needs do not start and stop with each service interaction. When a client of a community-based health service provider ends up in the emergency department, the care provision should be seamless across the different health care providers and supports. The ability to measure the performance and quality of this service coordination is critical to understanding whether the needs of these individuals are being met. This is impossible if the capacity to measure performance is constrained within systems despite the very common use of services across multiple sectors.

Several key Ontario healthcare efforts are reliant on a strong community sector that is tightly linked and integrated to the rest of the health care system. *Open Minds, Healthy Minds*, the 10-year mental health and addictions strategy,<sup>1</sup>; the implementation of Patients First,<sup>2</sup> and the design of Health Quality Ontario's quality standards<sup>17</sup> for the community sector are notable examples. There is widespread recognition that the data systems and infrastructure in the community are insufficient for effective evidence-based policy and implementation. Ultimately, healthcare planning, design, and funding are at their best when the data landscape mirrors the patient experience of the entire healthcare system.

The CBI linkage project shows the importance of creating a concise, complete and accurate data source for community-based health services; the possibility of linking this data source to other information sources; and to use this linkage to empirically describe patient pathways and outcomes that were previously invisible. The CBI linkage project demonstrates a successful framework for sector-wide performance measurement to address a critical infrastructure gap.

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## Appendix A. List of functional centre sectors, categories and corresponding functional centres

Sector	Code	Functional Centre Name
<b>Case Management 72 5 09*</b>		
CMH	72 5 09 76	Case Management/Supportive Counselling & Services - Mental Health
CA	72 5 09 78 10	Case Management/Supportive Counselling & Services - Addictions Supportive Housing
CA	72 5 09 78 11	Case Management Addictions - Substance Abuse
CA	72 5 09 78 12	Case Management Addictions - Problem Gambling
<b>Clinics/Programs 72 5 10*</b>		
CMH	72 5 10 76 12	Clinics/Programs - MH Counseling and Treatment
CMH	72 5 10 76 20	Clinics/Programs - MH Assertive Community Treatment Teams
CMH	72 5 10 76 30	Clinics/Programs - MH Community Clinic
CMH	72 5 10 76 40	Clinics/Programs - MH Vocational /Employment
CMH	72 5 10 76 41	Clinics/Programs - MH Clubhouses
CMH	72 5 10 76 50	Clinics/Programs - MH Child/Adolescent
CMH	72 5 10 76 51	Clinics/Programs - MH Early Intervention
CMH	72 5 10 76 55	Clinics/Programs - MH Forensic
CMH	72 5 10 76 56	Clinics/Programs - MH Diversion and Court Support
CMH	72 5 10 76 60	Clinics/Programs - MH Abuse Services
CMH	72 5 10 76 70	Clinics/Programs - MH Eating Disorders
CMH	72 5 10 76 81	Clinics/Programs - MH Social Rehab./Recreation
CMH	72 5 10 76 96	Clinics/Programs - MH Psycho-geriatric
CMH	72 5 10 76 99	Clinics/Programs - Other MH Services Not Elsewhere Identified
CA	72 5 10 78 11	Clinics/Programs - Addictions Treatment-Substance Abuse
CA	72 5 10 78 12	Clinics/Programs - Addictions Treatment-Problem Gambling
CA	72 5 10 78 20	Clinics/Programs - Addictions Withdrawal Mgmt.
<b>Crisis Intervention 72 5 15*</b>		
CMH	72 5 15 76	Crisis Intervention - Mental Health
<b>In-Home Health Professional Services (HPS) - Home Care 72 5 30 40*</b>		
CSS	72 5 30 40 62	In-Home HPS - Speech Lang. Path.
CSS	72 5 30 40 70	In-Home HPS - Social Work
CSS	72 5 30 40 75	In-Home HPS - Psychology
<b>Addictions Home Care 72 5 30 78*</b>		
CA	72 5 30 78 10	Addictions Home Care - Addictions
<b>Residential - Mental Health 72 5 40 76*</b>		
CMH	72 5 40 76 30	Res. Mental Health - Support within Housing
CMH	72 5 40 76 60	Res. Mental Health - Short Term Crisis Support Beds
<b>Residential - Addictions 72 5 40 78*</b>		
CA	72 5 40 78 11	Res. Addictions - Treatment Services-Substance Abuse

CA	72 5 40 78 12	Res. Addictions - Treatment Services-Problem Gambling
CA	72 5 40 78 30	Res. Addictions - Supportive Treatment
CA	72 5 40 78 45	Res. Addictions - Withdrawal Management Centres
<b>Health Promotion, Education and Community Development 72 5 50*</b>		
CSS	72 5 50 10	Health Prom/Educ. & Com. Dev. - General
CMH	72 5 50 76 10	Health Prom/Education MH - Awareness
CMH	72 5 50 76 40	Health Prom/Education MH - Community Development
CSS	72 5 50 96 10	Health Prom/Educ.& Com. Dev. - General Geriatric
<b>Consumer/Survivor/Family Initiatives 72 5 51 76*</b>		
CMH	72 5 51 76 11	Consumer Survivor Initiatives - Peer/Self Help
CMH	72 5 51 76 20	Consumer Survivor Initiatives - Family Initiatives
<b>In-Home and Community Services (IH &amp; CS) 72 5 82*</b>		
CSS	72 5 82 05	IH & CS - Service Arrangement/Coordination
CSS	72 5 82 09	IH & CS - Case Management
CSS	72 5 82 10	IH & CS - Meals Delivery
CSS	72 5 82 12	IH & CS - Social and Congregate Dining
CSS	72 5 82 14	IH & CS - Transportation - Client
CSS	72 5 82 15	IH & CS - Crisis Intervention and Support
CSS	72 5 82 20	IH & CS - Day Services
CSS	72 5 82 31	IH & CS - Homemaking
CSS	72 5 82 32	IH & CS - Home Maintenance
CSS	72 5 82 33	IH & CS - Personal Support/Independence Training
CSS	72 5 82 34	IH & CS - Respite
CSS	72 5 82 35	IH & CS - Comb. PS/HM/Respite Services
CSS	72 5 82 40	IH & CS - Overnight Stay Care
CSS	72 5 82 45	IH & CS - Assisted Living Services
CSS	72 5 82 50	IH & CS - Caregiver Support
CSS	72 5 82 60	IH & CS - Visiting - Social and Safety
CSS	72 5 82 65	IH & CS - Visiting - Hospice Services
CSS	72 5 82 75	IH & CS - Vision Impaired Care Services
CSS	72 5 82 77	IH & CS - Deaf, Deafened and Hard of Hearing Care Services
<b>ABI Services 72 5 83*</b>		
CSS	72 5 83 20	ABI - Day Services
CSS	72 5 83 33	ABI - Personal Support/Independence Training
CSS	72 5 83 45	ABI - Assisted Living Services

**Appendix B. Demographics profile of clients in the CBI dataset compared to a Toronto Central LHIN reference population, as of April 1, 2015**

Characteristic	CBI Dataset N (%)	Toronto Central LHIN N (%)
<b>Overall, N</b>	37,688	953,341
<b>Sex</b>		
Female	21,847 (58.0)	497,843 (52.2)
Male	15,841 (42.0)	455,498 (47.8)
<b>Age category</b>		
16-24	2,378 (6.3)	106,340 (11.2)
25-44	8,128 (21.6)	389,390 (40.8)
45-64	10,526 (27.9)	303,989 (31.9)
65-84	11,927 (31.6)	132,790 (13.9)
85+	4,729 (12.5)	20,832 (2.2)
<b>Immigrant status</b>		
Refugee	1,237 (3.3)	37,289 (3.9)
Non-refugee immigrant	4,325 (11.5)	170,800 (17.9)
Non-immigrant	32,126 (85.2)	745,252 (78.2)
<b>Income quintile</b>		
1 (Lowest)	12,564 (33.3)	246,518 (25.9)
2	8,321 (22.1)	174,049 (18.3)
3	5,277 (14)	114,851 (12)
4	5,020 (13.3)	129,834 (13.6)
5 (Highest)	6,179 (16.4)	277,720 (29.1)
Missing	327 (0.9)	10,369 (1.1)
<b>LHIN of residence</b>		
Central	4,592 (12.2)	
Central East	2,920 (7.7)	
Central West	1,258 (3.3)	
Mississauga Halton	2,316 (6.1)	
Toronto Central	24,763 (65.7)	953,341 (100)
Other	1,812 (4.8)	
Missing	27 (0.1)	

**Note:** Clients only enrolled in Vision Impaired Services and/or In-Home PS-Speech Language Pathology functional centres were excluded.

**Appendix C. Acute care and outpatient physician service use among the overall population in the CBI dataset (n = 37,688), 2015/16**

	Emergency department (ED) visits				
	Hospitalizations	Outpatient physician visits	All ED visits	Admitted to hospital	Discharged home
<b>Mean (95% CI)</b>	0.37 (0.36-0.38)	15.0 (14.8-15.1)	1.93 (1.9-2.0)	0.38 (0.37-0.39)	1.4 (1.3-1.4)
<b>Number of visits</b>	<b>%</b>	<b>%</b>	<b>%</b>	<b>%</b>	<b>%</b>
0	78.3	4.5	48.7	78.1	57.5
1	14.1	3.6	20.6	13.6	19.7
2+	7.6	91.9	30.7	8.3	22.9

**Note:** Clients only enrolled in Vision Impaired Services and/or In-Home PS-Speech Language Pathology functional centres were excluded.

**Appendix D. Crude rate ratios of 30-day repeat emergency department (ED) visits for any condition and for mental health and addictions (MHA)-related conditions among clients in the CBI dataset, 2015**

Characteristic	Repeat ED visit Rate Ratios (95% CI)	Repeat MHA ED visit Rate Ratio (95% CI)
<b>Overall</b>	4.3 (4.2-4.5)	33.5 (30.6-36.6)
<b>Sex</b>		
Female	3.6 (3.5-3.8)	27.5 (23.9-31.7)
Male	5.3 (5.1-5.6)	40.4 (36.0-45.4)
<b>Age category</b>		
16-24	5.5 (4.9-6.1)	42.2 (34.0-52.5)
25-44	7.1 (6.7-7.5)	71.5 (62.7-81.6)
45-64	5.1 (4.8-5.4)	37.9 (32.2-44.6)
65-84	2.3 (2.1-2.5)	15.2 (10.4-22.3)
85+	1.5 (1.3-1.7)	5.9 (1.3-26.2)
<b>Immigrant status</b>		
Refugee	3.7 (3.1-4.4)	47.5 (30.8-73.2)
Non-refugee immigrant	4.1 (3.7-4.5)	39.1 (29.8-51.4)
Non-immigrant	4.4 (4.2-4.5)	31.5 (28.6-34.8)
<b>Income quintile</b>		
1 (Lowest)	3.9 (3.7-4.3)	29.5 (25.3-34.6)
2	4.1 (3.8-4.4)	29.1 (24.1-35.2)
3	4.4 (4.0-4.8)	39.4 (30.5-50.9)
4	4.1 (3.7-4.5)	36.0 (27.8-46.7)
5 (Highest)	4.6 (4.2-5.0)	34.7 (27.7-43.3)

**Note:** Rate ratios for clients accessing community-based health services are in comparison to a Toronto Central LHIN reference population.

95% confidence intervals were calculated using exact binomial limits.