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Monitoring Utilization of a Large Scale Addiction Treatment System: The Drug and Alcohol Treatment Information System (DATIS)

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Abstract: Client-based information systems can yield data to address issues of system accountability and planning, and contribute information related to changing patterns of substance use in treatment and, indirectly, general populations. The Drug and Alcohol Treatment Information System (DATIS) monitors the number/types of clients treated in approximately 170 publicly-funded addiction treatment agencies in Ontario. The purpose of this study was to estimate the caseload of addiction treatment agencies, and describe important characteristics of clients, their patterns of service utilization and trends over-time from 2005 to 2010. In 2009–2010, 47,065 individuals were admitted to treatment. Since 2005–2006, there has been an increase in adolescents/youth in treatment, and a decrease in the male-female gender ratio. Alcohol problems predominated, but an increasing proportion of clients used cannabis and prescription opioids. DATIS is an evolving system and an integral component of Ontario's performance measurement system. Linkages with healthcare information systems will allow for longitudinal tracking of client health-related outcomes.

Keywords: client-based information system, addiction treatment, service utilization, client characteristics

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Introduction

While many people using substances at high risk levels, or experiencing substance use disorders, abstain or manage their use without professionally directed treatment,¹ an important subgroup seeks help from specialized treatment services. Longitudinal studies have consistently demonstrated the effectiveness of substance use treatment, particularly in terms of reductions in substance use and related problems.²⁻⁴ There remain, however, many challenges to the development of effective and accessible treatment delivery systems.⁵ These include (1) the need for reliable information about the availability and type of substance use services; (2) the need for measures of population-level impact; and (3) the absence of uniform data on client need and service use. The latter is of particular relevance, as it may contribute to inequitable distribution of treatment resources.⁶

Ontario's addiction treatment system is characterized by approximately 200 specialized programs administered by nearly 170 separate agencies. The province is divided into 14 LHINs (Local Health Integration Networks), which plan, fund and seek to integrate health care services. When there is no single organization with the authority to coordinate the development of the overall treatment system, the abovementioned challenges may be especially acute, as is the case in Ontario, Canada and many other jurisdictions. In Ontario, concerns regarding the development of an optimal treatment system are being partly addressed through the implementation of a comprehensive provincial information system. This includes two information and monitoring programs: ConnexOntario (<http://www.connexontario.ca/>) and the Drug and Alcohol Treatment Information System (DATIS: <http://www.datis.ca/>). The former is a provincial registry that informs professionals and the general public about the availability of drug and/or alcohol services in Ontario.⁷ DATIS, the focus of this paper, is a client-based information system that monitors the number and types of clients treated in Ontario's publicly-funded addiction treatment services.⁸ Examples of similar information systems for clients of substance use services exist in many other countries including the United States,⁹ Netherlands,¹⁰ United Kingdom,¹¹ Australia,¹² and the European Union.¹³

In the past, information systems in Ontario were built upon repeated surveys of community

agency programs.¹⁴ These surveys provided aggregate data on client and agency characteristics as well as service utilization or treatment trends, similar to the National Survey of Substance Abuse Treatment Services¹⁵ in the U.S. However, individual (client) level data were not available, thereby limiting one's capacity for data analysis. DATIS, on the other hand, addresses this gap and is a more reliable and accurate system, representing an enhancement over the agency-level survey data previously collected in Ontario.

In general, comprehensive client-based information systems (ie, DATIS) can yield data useful to addressing issues of system accountability (eg, how many people were treated for what types of substance use problems; what level of service was provided) and provide information critical for planning and ongoing system enhancement. They may also contribute invaluable information related to the changing patterns of drug and/or alcohol use in the general population, as certain types of drugs and trends may appear in the treatment population before being fully recognized in the broader community. Finally, client-based information systems can be effectively used for research purposes, as demonstrated by recent special-topic publications derived from DATIS.^{16,17}

The purpose of this study was to estimate the caseload of addiction treatment agencies, and describe important characteristics of clients, their patterns of service utilization and trends over-time from 2005 to 2010. The present study goes beyond existing research as it provides an overall and recent picture of the treatment system in Ontario, information that until now was unavailable and not readily accessible.

Methods

Data collection

All substance use treatment programs currently funded by the Ontario Ministry of Health and Long-Term Care (MoHLTC) are required to provide routine information to DATIS on client characteristics and services used. Client demographics, substance use and gambling details and other information are collected during the intake and assessment process, typically the first face-to-face appointment. Discharge circumstances and the types and amount of services received during the episode of care are collected at case closure. Programs submit their client information to DATIS routinely (in real-time) either via Catalyst, a browser-based application



system, or third-party software of their choice using an electronic interface. Agencies can only use the latter option after passing rigorous testing and obtaining approval from the DATIS team. Publicly-funded treatment programs for problem gambling are also required to report to DATIS. While not addressed in this paper, more detail on specialized programs for the treatment of problem gambling in Ontario is provided elsewhere.¹⁸ The information described in this paper is collected routinely for the purposes of program accountability and research. Our use of this information is consistent with Ontario's Freedom of Information and Protection of Privacy Act (see http://www.e-laws.gov.on.ca/html/statutes/english/elaws_statutes_90f31_e.htm). Client data in DATIS is anonymous and aggregated, thus consent and IRB review is not required for research publication.

Agency participation

All data presented in this paper are summarized by fiscal year (ie, April 1 to March 31) as this corresponds to the data reporting periods of the treatment programs of the MoHLTC. For the study period April 1, 2009 to March 31, 2010, client-level information from 164 of 166 agencies were used (two agencies were excluded as they had become inactive). For analyses of multiple years (April 1, 2005 to March 31, 2010), seven agencies were excluded due to intermittent reporting to DATIS during the five-year period of interest. Data for multiyear analyses were therefore based on 159 agencies. Reasons for agency non-participation included becoming inactive or not submitting data following conversion to the Catalyst system.

Data elements and definitions

For every case registered in the Web-based information system (Catalyst), mandatory data elements related to demographics, health status, substance use/gambling, treatment intervention, and service utilization are collected.¹⁹ Submitted data contain no identifying information. A unique DATIS key, composed of the client's initials, date of birth and gender, acts as an identifier for tracking a client's service trajectories over time and other statistical purposes.

Client

Any individual who attends at least one face-to-face, scheduled appointment at the agency with the

intention of receiving a service activity for which the agency is funded. One exception is a program which provides telephone-based assessment and referral. In this program, individuals are registered as a DATIS case if the call exceeds 20 minutes, inline with reporting guidelines established by DATIS.

Type of client

An alcohol/drug client is anyone seeking help about their own substance use. A family member/significant other is anyone seeking help about another person's substance use (eg, spouses, family members, and friends of individuals exhibiting substance use problems). All data presented in this study are based on alcohol/drug clients only, unless stated otherwise.

Open cases

The total number of open cases includes those admitted to a program prior to the DATIS submission period and who were also seen during the submission period (ie, it includes carryovers from the previous period). Thus, open cases include multiple counts of the same person within and across programs if they were admitted more than once in the submission period.

Open individuals

The total number of open individuals removes duplicate counts of the same person but still includes carryovers.

New individuals

The total number of new individuals is also an unduplicated client count, and carryovers from previous years are excluded. All analyses were based on new individuals rather than open cases or open individuals since this excludes repeat admissions which might skew the data.

Type of service

For this study, DATIS service categories were grouped into the following: (1) withdrawal management services (includes community withdrawal management services and residential withdrawal management services); (2) non-residential (includes community treatment, community medical/psychiatric treatment services, and community day/evening treatment services); and (3) residential treatment services (includes residential medical/psychiatric treatment services and residential support services).



Data quality and completeness

DATIS provides ongoing support and training to participating agencies to ensure that complete and accurate data are collected across the province. However, some agencies are unable to regularly submit data, and there are also some missing data for specific data elements. The latter may be a result of agency staff omitting information from DATIS required fields. This may be an error in data entry, or items may have been seen as not relevant for certain clients. In other instances, key agency staff members are on leave or have been terminated, thereby requiring a transitioning of DATIS reporting responsibilities to other agency staff. DATIS includes provisions for entering “unknown”; in this study, “missing” comprises both unknown values and missing records. Note that the level of missingness was generally quite low across all data elements of interest (<5.0%).

Analysis

For multiyear analyses of substance use clients (April 1, 2005 to March 31, 2010), chi-square tests ($\alpha = 0.05$) were conducted to evaluate statistical trends in caseload and problem substances reported to DATIS over the five-year period. Significant findings are highlighted in the text and tables where appropriate.

Results

Caseload

Table 1 shows the provincial caseload reported to DATIS during April 1, 2009 to March 31, 2010, stratified by service category and type of client. For alcohol/drug clients, the most liberal estimate of the total provincial caseload was 112,724, based on the number of open cases. The caseload data were

significantly reduced when considering either open or new individuals (66,278 and 47,065, respectively). The reduction was particularly dramatic for withdrawal management services, given the frequency of multiple admissions to these settings. Overall, a greater number of clients were being treated in non-residential services than withdrawal management or residential care.

For family member/significant other clients, the provincial totals were consistent for both open cases and open individuals (5,335 and 5,152, respectively), and across all service categories (see Table 1). Family/significant other clients comprised a small but important proportion of the client population (approximately 6.5% of all new individuals in 2009–2010).

Table 2 presents the provincial caseload reported from 2005–2006 to 2009–2010 by service category. Significant trends were observed for withdrawal management and residential services. For example, the proportions admitted to withdrawal management services increased by 3.6 percentage points between 2005 and 2010 ($P < 0.001$). However, during the same time period, the proportions admitted to residential services decreased by 2.3 percentage points ($P < 0.001$).

Client characteristics

Table 3 describes the clients entering Ontario’s addiction treatment services in terms of key demographic characteristics. The age distribution was approximately bell-shaped, with a small percentage of youth (under 16 years of age) and elderly (65 and over) in treatment. With regard to gender, a greater proportion of men than women were receiving treatment across all service categories.

Table 1. Total caseload by client type and service category, Ontario, 2009–2010.

	Withdrawal management	Non-residential	Residential	Total
Alcohol/drug clients				
Open cases	39,744	70,175	8,510	112,724
Open individuals	17,218	56,988	7,439	66,278
New individuals	16,593	37,314	6,258	47,065
Family/significant other clients				
Open cases	18	4941	440	5335
Open individuals	17	4778	439	5152
New individuals	17	2917	425	3290

Notes: The rows across service categories do not sum to the provincial totals due to the statistical procedure for removing duplicate cases; ie, duplicate counts are deleted *within* each service category to yield open or new cases within that category only.



Table 2. Distribution of caseload^a overtime by service category, Ontario, 2005–2006 to 2009–2010.

Service category	2005–2006 % (n = 44,364)	2006–2007 % (n = 45,882)	2007–2008 % (n = 46,168)	2008–2009 % (n = 46,420)	2009–2010 % (n = 46,862)
Withdrawal management*	31.8	36.7	37.4	36.0	35.4
Non-residential	79.1	77.2	76.7	78.0	79.2
Residential*	15.6	14.9	14.4	13.5	13.3

Notes: ^aBased on new individuals in the study period (alcohol/drug clients only); *Trend test significant, $P < 0.001$.

In terms of ethnicity/cultural diversity, the majority of clients identified as (white) Canadian/American (78.9%). People of Aboriginal heritage represented the next largest subgroup in the client population (8.2%). Furthermore, 23.9% were working full-time and a

large proportion of clients were unemployed (33.7%). This varied substantially by service type (41.1% for withdrawal management, 31.9% for non-residential and 47.8% for residential care). Finally, with respect to education, almost half of the client population had

Table 3. Client characteristics^a at admission by service category, Ontario, 2009–2010.

	Withdrawal management N (%)	Non-residential N (%)	Residential N (%)	Total N (%)
Age				
<16	21 (0.1)	2,211 (5.9)	38 (0.6)	2,231 (4.7)
16–24	2,852 (17.0)	9,275 (24.7)	1,070 (17.0)	10,930 (23.0)
25–34	4,329 (25.8)	8,902 (23.7)	1,816 (28.9)	11,352 (23.9)
35–44	4,228 (25.2)	7,723 (20.6)	1,625 (25.9)	10,249 (21.6)
45–54	3,861 (23.0)	6,499 (17.3)	1,335 (21.3)	8,830 (18.6)
55–64	1,197 (7.1)	2,265 (6.0)	342 (5.4)	3,046 (6.4)
65+	285 (1.7)	613 (1.6)	52 (0.8)	816 (1.7)
Total	16,773 (99.9)	37,488 (99.8)	6,278 (99.9)	47,454 (99.9)
Gender				
Male	11,639 (70.1)	24,261 (65.0)	4,165 (66.6)	31,209 (66.3)
Female	4,954 (29.9)	13,053 (35.0)	2,093 (33.4)	15,856 (33.7)
Total	16,593 (100.0)	37,314 (100.0)	6,258 (100.0)	47,065 (100.0)
Ethnicity				
Aboriginal	1,576 (9.2)	2,817 (7.4)	511 (8.0)	4,043 (8.2)
European	1,206 (7.1)	2,391 (6.3)	449 (7.1)	3,232 (6.6)
Black/African/Caribbean	218 (1.3)	498 (1.3)	79 (1.2)	644 (1.3)
Canadian/American	13,286 (77.8)	30,751 (80.5)	5,034 (79.1)	38,676 (78.9)
Other	458 (2.7)	1,212 (3.2)	126 (2.0)	1,519 (3.1)
Missing	327 (1.9)	538 (1.4)	167 (2.6)	932 (1.9)
Total	17,071 (100.0)	38,207 (100.1)	6,366 (100.0)	49,046 (100.0)
Employment status				
Full-time	4,031 (22.3)	9,743 (24.6)	1,359 (20.9)	12,466 (23.9)
Part-time	899 (5.0)	2,587 (6.5)	266 (4.1)	3,258 (6.3)
Unemployed	7,426 (41.1)	12,639 (31.9)	3,118 (47.8)	17,559 (33.7)
Other ^b	5,098 (28.2)	13,575 (34.3)	1,681 (25.8)	17,225 (33.1)
Missing	593 (3.3)	1,023 (2.6)	93 (1.4)	1,585 (3.0)
Total	18,047 (99.9)	39,567 (99.9)	6,517 (100.0)	52,093 (100.0)
Education				
Less than high school	6,904 (38.9)	16,839 (43.1)	2,477 (38.2)	21,408 (41.8)
High school	4,530 (25.5)	8,862 (22.7)	1,642 (25.3)	11,944 (23.3)
Some postsecondary	2,306 (13.0)	5,035 (12.9)	977 (15.1)	6,642 (13.0)
Postsecondary graduate	2,951 (16.6)	6,837 (17.5)	1,221 (18.8)	8,680 (17.0)
Missing	1,067 (6.0)	1,510 (3.9)	167 (2.6)	2,527 (4.9)
Total	17,758 (100.0)	39,083 (100.1)	6,484 (100.0)	51,201 (100.0)

Notes: ^aBased on new individuals in the study period; ^bIncludes student/retraining, disabled (not working), not in labour force (eg, homemaker), and retired.



not completed high school (41.8%). The percentage of clients with less than high school education was higher among non-residential services (43.1%) than withdrawal management and residential care (38.9% and 38.2%, respectively). This may reflect the higher proportion of youth in non-residential programs.

Problem substances

Table 4 shows the distribution of problem substances at the point of admission for the client population as a whole and by gender. A small percentage of clients (2.8%) reported “no problem substance”. Some of these clients may have been involved in relapse prevention or aftercare to maintain their recovery and were thus uncomfortable reporting alcohol or drugs as a current “problem”. Others may have inappropriately claimed to have no problems, and there may have been some degree of variable miscoding (ie, inaccurate data collection and reporting to DATIS).

Overall, the most commonly reported problem substances were alcohol (68.5%), cannabis (38.2%), crack/cocaine (29.9%) and opiates, including prescription opioids (23.1%). This pattern was consistent across both genders; however more men than women cited alcohol (70.7% vs. 64.1%) and cannabis (40.4% vs. 33.8%), while a greater proportion of women reported opiates as the presenting problem substance for treatment (26.4% vs. 21.5%).

Table 5 presents the distributions of the four most frequently cited problem substances reported by clients from 2005–2006 to 2009–2010. Significant trends

were observed for all four problem substances; for example, the proportions reporting alcohol problems increased by 3.3 percentage points between 2005 and 2010 ($P = 0.0021$). A similar trend was observed for cannabis. However, the most striking trends were observed for crack/cocaine and opiate (including prescription opioid) problems. For the former, a significant decrease by approximately 5.6 percentage points was observed ($P < 0.0001$), while a much larger increase (by 9.4 percentage points) was reported for opiate problems between 2005 and 2010.

Pathways into and out of the treatment system

Table 6 shows the referral sources for clients entering treatment by service category. Informal sources of referral (self/family/friends) were most commonly reported overall (58.0%), and within non-residential and withdrawal management services. However, there was considerable variation across service categories with regard to the distribution of referral sources. Addiction agencies represented the leading referral source for clients receiving residential care, followed by informal sources. For withdrawal management, informal referrals were followed by referrals from medical services, addiction agencies, and the legal system. The distribution of referrals was quite different for non-residential services, where informal referrals (54.8%) were followed by referrals from the legal system (13.6%) and addiction agencies (12.9%).

Table 4. Distribution of presenting problem substances^a at admission by gender, Ontario, 2009–2010.

Presenting problem substances	Males N (%) n = 31,209	Females N (%) n = 15,856	Total N (%) n = 47,065
Alcohol	22,060 (70.7)	10,161 (64.1)	32,221 (68.5)
Crack/cocaine	9,323 (29.9)	4,735 (29.9)	14,058 (29.9)
Amphetamines ^b	1,042 (3.3)	527 (3.3)	1,569 (3.3)
Cannabis	12,602 (40.4)	5,355 (33.8)	17,957 (38.2)
Benzodiazepines ^c	1,619 (5.2)	1,078 (6.8)	2,697 (5.7)
Barbituates	95 (0.3)	82 (0.5)	177 (0.4)
Opiates ^d	6,705 (21.5)	4,186 (26.4)	10,891 (23.1)
Hallucinogens	419 (1.3)	153 (1.0)	572 (1.2)
Inhalants ^e	77 (0.2)	35 (0.2)	112 (0.2)
Ecstasy	863 (2.8)	492 (3.1)	1,355 (2.9)
None	708 (2.3)	622 (3.9)	1,330 (2.8)

Notes: ^aBased on new individuals in the study period (alcohol/drug clients only). Percentages total more than 100 due to reporting of multiple (up to five) problem substances; ^bIncludes other stimulants and methamphetamines; ^cIncludes other psychoactive drugs; ^dIncludes heroin, opium, prescription opioids and over-the-counter codeine preparations; ^eIncluding glue.

**Table 5.** Distributions of the four most frequently cited problem substances reported by clients in Ontario, 2005–2006 to 2009–2010.

Problem substance	2005–2006 % (n = 46,320)	2006–2007 % (n = 46,242)	2007–2008 % (n = 46,168)	2008–2009 % (n = 46,420)	2009–2010 % (n = 46,862)
Alcohol*	65.1	65.5	68.0	69.3	68.4
Crack/cocaine**	35.4	39.6	40.6	35.4	29.8
Cannabis**	35.3	36.4	38.1	38.9	38.1
Opiates**	13.7	16.1	18.7	20.7	23.1

Notes: *Trend test significant, $P = 0.0021$; **trend test significant, $P < 0.0001$.

In terms of outgoing referrals during the study period, 50.8% received no referrals across all service categories (data not shown). The most common referral destination was self-help groups (eg, Alcoholics Anonymous) (20.7%), followed by residential (10.8%) and community-based (10.2%) addiction treatment services. The percentage of referrals going to self-help groups varied from a high of 49.6% for residential services to 15.0% for non-residential and 34.9% for withdrawal management.

Discussion

This paper presents results from a client-based information system that collects data from Ontario's publicly funded addiction treatment agencies. The main goals of the information system are to contribute information related to accountability and planning at the agency, regional and provincial levels. The primary aims of this paper were to estimate the caseload

of addiction treatment agencies, and describe important characteristics of clients and their patterns of service utilization.

Our analysis showed that 47,065 individuals were admitted to treatment at some point during 2009–2010. This number is relatively small when compared with our best estimates of problematic substance use and dependence in the general population. According to a nationally representative mental health survey conducted by Statistics Canada in 2002, 10.1% (weighted frequency = 979,110) of Ontarians were identified as problematic substance users in the past year.²⁰ Applying the results of this prevalence study to our data indicates that only 4.8% of the in-need population sought treatment in 2009–2010. In contrast, 2.5% (weighted frequency = 235,903) of Ontarians were identified as meeting criteria for dependence of alcohol or illicit drugs in the past 12 months (derived from the Public

Table 6. Referral source^a for clients entering treatment by service category, Ontario, 2009–2010.

Referral source	Withdrawal management N (%)	Non-residential N (%)	Residential N (%)	Total N (%)
Self/family/friends	10,593 (63.8)	20,440 (54.8)	2,196 (35.1)	27,306 (58.0)
Education/training programs/services	22 (0.1)	2,063 (5.5)	9 (0.1)	2,077 (4.4)
Addiction agencies	1,580 (9.5)	4,803 (12.9)	3,293 (52.6)	6,893 (14.6)
Psychiatric services/hospital	229 (1.4)	740 (2.0)	148 (2.4)	956 (2.0)
Medical services—private/hospital	1,735 (10.5)	1,250 (3.3)	191 (3.1)	2,686 (5.7)
Physician/private practitioner	199 (1.2)	964 (2.6)	40 (0.6)	1,088 (2.3)
Community mental health agency—adult and child	168 (1.0)	781 (2.1)	64 (1.0)	932 (2.0)
Social service agency—adult and child	224 (1.3)	2,044 (5.5)	66 (1.1)	2,234 (4.7)
Legal system	1,233 (7.4)	5,093 (13.6)	150 (2.4)	6,269 (13.3)
Toronto WMS central access (for Toronto WMS only)	2,657 (16.0)	913 (2.4)	18 (0.3)	2,701 (5.7)
Other ^b	1,147 (7.0)	2,570 (6.7)	590 (9.3)	3,705 (7.9)
Missing	26 (0.2)	175 (0.5)	8 (0.1)	204 (0.4)

Notes: ^aBased on new individuals in the study period. Percentages total more than 100 due to reporting of multiple (up to two) referral sources; ^bIncludes all referral sources that were cited by less than 1% of clients overall.



Use Microdata Files of Statistics Canada). Based on this conservative estimate of the denominator, 20% of the in-need population sought treatment for substance use problems in 2009–2010. While many people with substance use disorders manage their use without professionally directed treatment,¹ the underutilization of addictions treatment services in Ontario suggests a low level of help seeking, or alternatively a large unmet need for treatment in the community. This finding corroborates with population research from the U.S. that shows only a minority of individuals with past-year prescription drug abuse or dependence,^{21,22} and past-year alcohol and drug use disorder²³ seek or receive treatment. From a planning perspective, our result points to a potentially significant under-supply of addiction treatment services and/or a sector that could be much improved in terms of access.²⁴ Turning prevalence data into policy relevant information, however, will require further study on the help-seeking behaviours of problematic substance users in Ontario, the barriers to seeking treatment, and assessments of the availability, efficiency, and effectiveness of the treatment system. In general, closing the gap will require significant capacity-building, support and probably increased funding for the substance use treatment system in Ontario.

Our findings revealed significant changes in provincial caseload overtime when examined by service category. In fact, during the five-year period from 2005–2006 to 2009–2010, the proportion of new individuals in withdrawal management services increased significantly, from 31.8% to 35.4%. The increase in caseload for withdrawal management services was offset by a significant decrease in the use of residential services. This trend is likely a result of policies and programs implemented in the late 1980s by the MoHLTC, which set direction for an increase in the capacity of non-residential treatment alternatives compared to residential services. While the policy directive was expected to result in the growth of outpatient and day treatment services, we found no evidence of a major increase (or decrease) in the use of non-residential services from 2005–2006 to 2009–2010. However, the considerable decrease in the use of residential services likely reflects the long-term trend in the treatment system towards more cost-effective treatment alternatives; this shift is expected to have occurred before 2005–2006.

The descriptive data on client characteristics suggests a diverse help-seeking population. Those under the age of 24 continue to represent just over a quarter of the treatment population in Ontario, similar to data from DATIS reported a decade ago.²⁵ This parallels findings from the Treatment Episode Data Set (TEDS) in the U.S., an administrative data system analogous to DATIS which provides information about national admissions to publicly-funded substance abuse treatment services.²⁶ In 2007, U.S. clients under 24 years of age represented 25.6% of all admissions,²⁶ and from 1996 to 2006, the proportion of younger admissions (less than 25 years of age) increased from 22.0% to 26.0%.²⁷ In Ontario, there is evidence of a comparable increase in the proportion of adolescents and youth in treatment; more specifically, in 1999–2000, youth under the age of 24 accounted for 23.1% of alcohol, drug and gambling clients.²⁵ Currently, this proportion is 27.7% among alcohol/drug clients only. Even with the exclusion of problem gamblers from our estimate, there has been a modest increase in the youth treatment sector, which likely stems from funding initiatives aimed at youth during the past decade. This is also reflected in Ontario's Comprehensive Mental Health and Addictions Strategy, which focuses on children and youth in areas such as access to services, and early identification and support.²⁸ Nonetheless, one of the major challenges being faced by the treatment system is the facilitation of efficient and effective transitions from youth to adult services.

The gender ratio of individuals seen across the treatment system is also of interest, as the ratio of men to women appears to be decreasing. In our study, this ratio was 1.97:1, and in 1999–2000, this ratio was 2.4:1.²⁵ This is in contrast to clients receiving treatment in the European Union and United Kingdom, where on average males outnumber females by four.²⁹ This may reflect differences in the service mix reporting to the European data system, for example, more methadone maintenance programs. The gender ratio reported in this study is, however, more similar to that in the U.S. where, in 2007, there were 2.1 male admissions for every female admission.²⁶ In the Ontario context, while it may appear as though the gender gap in help seeking is slowly narrowing, a gendered perspective to clinical, policy work and research is still needed given known gender differences in substance use treatment utilization, etiology of substance use,



barriers to treatment access, and retention in substance use treatment.³⁰

In terms of ethnicity, our most striking result was that 8.2% of the client population was of Aboriginal descent. However, Aboriginal people accounted for only 2.0% of the Ontario population in 2006.³¹ While specialized programs for Aboriginal people exist, this disparity along with continued problems with alcohol and other drugs indicates a need for more preventative and health promotion work in First Nations communities, as well as culturally-sensitive approaches to treatment and research.³²

In the treatment population, alcohol problems predominate. This pattern is also observed in the general population, as the prevalence of alcohol abuse and dependence is much higher than that of illicit drug use.³³ Alcohol is also the prevailing problem substance in the U.S. treatment population, where it accounted for 40% of all admissions to treatment for abuse of alcohol and drugs in 2007.²⁶ Of particular interest in the present study, however, is the high percentage of clients involved with cannabis, both overall (38.2%) and among younger age groups. Cannabis problems in the treatment population appear to have slightly increased since 2005–2006, paralleling increases in the prevalence of past year cannabis use among Ontarians 18 years and older (8.7% in 1996 to 13.3% in 2009).³⁴ The increase in treatment utilization for cannabis problems may stem from greater: (1) awareness of its health consequences; (2) response from the system, ie, in terms of research, problem identification, and availability of services; and (3) pressure to enter treatment from school officials and family members, particularly among younger clients.¹⁶ On the other hand, problems with crack/cocaine significantly decreased in the treatment population; this trend was concomitant with slight reductions in past year cocaine use in the general Ontario population from 2006 to 2008 (1.7% to less than 1.0%).³⁴ Finally, problematic opiate use increased dramatically in the treatment population during the study period (13.7% in 2005–2006 to 23.1% in 2009–2010). Prescription opioids and over-the-counter codeine preparations were the predominant form of opiate use, accounting for 90.8% and 94.7% of problematic opiate use in 2005–2006 and 2009–2010, respectively. Much of the increase in opiate use was therefore driven by prescription opioid and over-the-counter codeine use.

Our findings parallel those of recent studies indicating a shift towards prescription opioid drugs in North America, with simultaneous decreases in heroin use.^{17,35–37} This trend has implications for the treatment system, as there is a paucity of information related to the extent existing opioid maintenance therapies can be applied to prescription opioid use.³⁸

Finally, client data from DATIS highlight the many pathways into and out of the specialized treatment system for additional services and supports. The most common pathway into treatment was through informal sources such as being self-referred and/or being encouraged to go to treatment by family and friends. The importance of informal control efforts and recommendations for treatment has been previously highlighted. Based on a random sample of Ontarian adults, researchers found that two-thirds of all respondents reported at some time having said something to a relative or friend about their drinking, or suggested that they cut down or seek professional help.³⁹ Developing an understanding of and taking into account the processes of informal social control are therefore integral to any prevention or treatment strategy aimed at alcohol (and drug) problems. Our data also showed the inter-connectivity of broader systems of health, social and correctional services with programs which specialize in substance use treatment. For example, medical services (hospitals) were more likely to refer to withdrawal management services. This is of particular relevance to clients presenting in-crisis, homeless individuals and injection drug users, as these (often overlapping) groups are frequent users of emergency rooms.⁴⁰ In contrast, referrals from the legal system were most often made to non-residential treatment programs. The proportion of referrals from community mental health and other psychiatric services, however, was quite low compared to the high rate of concurrent mental health and substance use problems in the community.⁴¹ Knowledge in this area is nonetheless expanding and there is now a greater push towards the integration of mental health, substance use and problem gambling services in Ontario.⁴²

The patterns in outgoing referrals further reflect the established relationships between different sectors of the addiction treatment system. For example, withdrawal management services were more likely to refer to residential treatment. Despite this finding, there has been a significant decrease in the use of residential



services since 2005–2006 by other specialized services. This phenomenon may be explained in part by provincial efforts aimed at ensuring referrals to residential treatment are made for clients with the most severe and complex needs. Similar referral patterns into and out of the Ontario substance use treatment system were observed by Graham and Brook;⁴³ in particular, withdrawal management services were identified as a hub of the substance use treatment system, figuring prominently in admissions across residential and rehabilitation programs. Furthermore, other than connections to withdrawal management services, the authors found that addictions resources appeared to have few relations with one another, instead forming ties with services outside the addiction-specific system. This suggested the existence of other substance use treatment “systems” (non-addiction specific) operating in parallel (eg, medical services, legal system, etc).⁴³

This study is limited given the potential biases of self-reported data. In considering client characteristics and patterns of service utilization, it is also important to recognize that DATIS does not capture addiction-related treatment provided outside of the publicly-funded specialized system of care. This would include brief interventions delivered in primary care settings, medications and counselling by mental health care providers, private treatment clinics, and self-help groups, such as AA or NA. Substitution therapy, such as methadone maintenance treatment (MMT), is provided through physician offices and health clinics, which also do not report to DATIS. MMT clients are therefore not represented in DATIS unless they also receive counselling at a participating agency. Notwithstanding these limitations, DATIS is unrivalled in scope and quality within Canada as a data source for supporting system-level performance measurement and clinical research.

Future directions

DATIS is an evolving client-based information system for addiction services, and is well-positioned to link with a variety of large health care information systems in Ontario. Currently, efforts are being made to link DATIS information to ICES (Institute for Clinical Evaluative Sciences) data holdings, particularly population and health service data (ie, health insurance claims database and hospitalization records, including

emergency services). Such linkages will allow for longitudinal tracking of DATIS clients through the health care system, before and after treatment, including visits to the emergency room and primary care. This will be integral to better understanding of the treatment trajectories of alcohol/drug clients, particularly with regard to service utilization and health care delivery beyond the addiction treatment system. The data will also support assessment of the cost-offset of treatment in the Canadian context, paralleling work that has been done in the U.S. setting.⁴⁴

Funding has also been secured for a multi-component provincial project (Drug Treatment Funding Program: <http://ontariodtftp.wordpress.com/>) that will pilot an outcome monitoring system for publicly-funded addictions treatment services in Ontario, modelled after similar systems in the U.S. A key component of the feasibility study will be to develop a uniform, system-wide process for assessing client satisfaction and outcomes in order to examine the performance of the treatment system and plan enhancements to improve treatment quality and build capacity. The long-term goal of this project is to integrate outcome measures collected using the Global Appraisal of Individual Needs (<http://www.chestnut.org/li/gain/>) with the DATIS information system, thereby providing the foundation for monitoring outcomes over time.

Finally, a national project is underway in Canada to develop a needs-based planning model that will project the capacity requirements for various levels of care in a given jurisdiction and needs profile. In conjunction with the needs-based capacity requirements, estimates of current utilization can be contrasted with the required service levels to yield estimates of unmet need. Work is underway to implement and evaluate the utility of this systematic gap analysis to decision-makers and administrators responsible for substance use services across the country.

Author Contributions

Conceived and designed the experiments: NKR and BR. Analysed the data: NKR. Wrote the first draft of the manuscript: NKR. Contributed to the writing of the manuscript: NKR and BR. Agree with manuscript results and conclusions: NKR and BR. Jointly developed the structure and arguments for the paper: NKR and BR. Made critical revisions and approved



final version: NKR and BR. All authors reviewed and approved of the final manuscript.

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References

1. Scott CK, Dennis ML, Foss MA. Utilizing recovery management checkups to shorten the cycle of relapse, treatment reentry, and recovery. *Drug and Alcohol Dependence*. 2005;78:325–38.
2. Martin G, Rehm J. The effectiveness of psychosocial modalities in the treatment of alcohol problems: a review of the evidence. *Canadian Journal of Psychiatry*. (In press).
3. Scott CK, Dennis ML, Laudet A, Funk RR, Simeone RS. Surviving drug addiction: the effect of treatment and abstinence on mortality. *American Journal of Public Health*. 2011;101:737–44.
4. Simpson DD, Joe GW, Broome KM. A national 5-year follow-up of treatment outcomes for cocaine dependence. *Archives of General Psychiatry*. 2002;59:538–44.
5. Babor TF, Stenius K, Romelsjo A. Alcohol and drug treatment systems in public health perspective: mediators and moderators of population effects. *International Journal of Methods in Psychiatric Research*. 2008; 17(Suppl 1):S50–9.
6. Rush BR. A systems approach to estimating the required capacity of alcohol treatment services. *British Journal of Addiction*. 1990;85:49–59.
7. Wighton J. The e-network solution for mental health and addictions information management. *Electronic Healthcare*. 2009;8(3):e21–8.
8. Ogborne AC, Braun K, Rush BR. Developing an integrated information system for specialized addiction treatment agencies. *The Journal of Behavioral Health Services and Research*. 1998;25(1):100–7.
9. Substance Abuse and Mental Health Services Administration, Drug and Alcohol Services Information System. The Treatment Episode Data Set (TEDS). 2009. Available at: <http://oas.samhsa.gov/dasis.htm#teds2>. Accessed May 25, 2012.
10. IVZ. The IVZ foundation. 2010. Available at: <http://www.sivz.eu/about-ivz>. Accessed December 16, 2011.
11. National Treatment Agency for Substance Misuse. National drug treatment monitoring system. 2010. Available at: <http://www.ndtms.net/>. Accessed December 20, 2011.
12. Australian Institute of Health and Welfare. Alcohol and other drug treatment services. 2010. Available at: <http://www.aihw.gov.au/drugs/aodtsnmds/index.cfm>. Accessed December 5, 2011.
13. Donmall MC. The global toolkit: guidance for the measurement of drug treatment demand. *United Nations Office on Drugs and Crime*. 2006. Available at: http://www.unodc.org/pdf/gap_toolkit_module8.pdf. Accessed December 16, 2011.
14. Rush BR, Ekdahl A. Recent trends in the development of alcohol drug treatment services in Ontario. *Journal of Studies on Alcohol*. 1990; 51(6):514–22.
15. Substance Abuse and Mental Health Services Administration, Office of Applied Studies. National Survey of Substance Abuse Treatment Services. 2009. Available at: <http://oas.samhsa.gov/dasis.htm#nssats2>. Accessed May 20, 2012.
16. Urbanoski KA, Strike CJ, Rush BR. Individuals seeking treatment for cannabis-related problems in Ontario: demographic and treatment profile. *European Addiction Research*. 2005;11(3):115–23.
17. Fischer B, Nakamura N, Rush B, Rehm J, Urbanoski K. Changes in and characteristics of admissions to treatment related to problematic prescription opioids use in Ontario, 2004–2009. *Drug and Alcohol Dependence*. 2010;109: 257–60.
18. Rush BR, Moxam RS, Urbanoski KA. Characteristics of people seeking help from specialized programs for the treatment of problem gambling in Ontario. *Journal of Gambling Issues, eGambling*. 2002;6. Available at: <http://www.camh.net/egambling/issue6/research/index.html>. Accessed December 12, 2011.
19. Drug and Alcohol Treatment Information System. DATIS required fields. *DATIS*. 2011. Available at: <http://www.datis.ca/pub/reports/DATIS%20Required%20Fields.pdf>. Accessed December 27, 2011.
20. Veldhuizen S, Urbanoski K, Cairney J. Geographical variation in the prevalence of problematic substance use in Canada. *The Canadian Journal of Psychiatry*. 2007;52(7):426–33.
21. McCabe SE, Cranford JA, West BT. Trends in prescription drug abuse and dependence, co-occurrence with other substance use disorders, and treatment utilization: results from two national surveys. *Addictive Behaviors*. 2008;33:1297–305.
22. Huang B, Dawson DA, Stinson FS, et al. Prevalence, correlates, and comorbidity of nonmedical prescription drug use and drug use disorders in the United States: results of the National Epidemiologic Survey on Alcohol and Related Conditions. *Journal of Clinical Psychiatry*. 2006;67: 1062–73.
23. Wu L, Pilowsky DJ, Schlenger WE, Hasin D. Alcohol use disorders and the use of treatment services among college-age young adults. *Psychiatric Services*. 2007;58(2):192–200.
24. Hilton TF. The promise of PROMIS for addiction. *Drug and Alcohol Dependence*. 2011;119(3):229–34.
25. Rush BR. Client characteristics and patterns of service utilization within Ontario's specialized addiction treatment agencies: a provincial report from DATIS. *Centre for Addiction and Mental Health*. 2002.
26. Substance Abuse and Mental Health Services Administration, Office of Applied Studies. Treatment Episode Data Set (TEDS) highlights—2007 National Admissions to Substance Abuse Treatment Services (OAS Series No. S-45, HHS Publication No. (SMA) 09-4360). Rockville: MD; 2009. Available at: <http://www.samhsa.gov/data/TEDS2k7highlights/TEDSHigh2k7.pdf>. Accessed March 20, 2012.



27. Substance Abuse and Mental Health Services Administration, Office of Applied Studies. Treatment Episode Data Set (TEDS): 1996–2006: National Admissions to Substance Abuse Treatment Services (DASIS Series No. S-43, DHHS Publication No. (SMA) 08-4347). Rockville, MD; 2008. Available at: <http://www.dasis.samhsa.gov/teds06/teds2k6aweb508.pdf>. Accessed March 15, 2012.
28. Government of Ontario. Open minds, healthy minds: Ontario's comprehensive mental health and addictions strategy (Catalogue No. 016277). 2011. Available at: http://www.health.gov.on.ca/english/public/pub/mental/pdf/open_minds_healthy_minds_en.pdf. Accessed February 27, 2012.
29. Montanari L, Serafini M, Maffli E, et al. Gender and regional differences in client characteristics among substance abuse treatment clients in the Europe. *Drugs: Education, Prevention, and Policy*. 2011;18(1): 24–31.
30. Brady TM, Ashley OS, editors. *Women in Substance Abuse Treatment: Results from the Alcohol and Drug Services Study (ADSS)*. Rockville, MD: Substance Abuse and Mental Health Services Administration, Office of Applied Studies; 2005.
31. Statistics Canada. Aboriginal identity population by age groups, median age and sex, percentage distribution for both sexes, for Canada, provinces and territories—20% sample data. *Statistics Canada*. 2010. Available at: <http://www12.statcan.ca/census-recensement/2006/dp-pd/hlt/97-58/pages/page.cfm?Lang=E&Geo=PR&Code=01&Table=1&Data=Dist&Sex=1&Age=1&StartRec=1&Sort=2&Display=Page>. Accessed January 3, 2012.
32. Health Canada. Honouring our strengths: a renewed framework to address substance use issues among First Nations people in Canada (HC Pub.: 110114; Cat.: H14-65/2011E). 2011. Available at: <http://www.nnadaprenewal.ca/sites/www.nnadaprenewal.ca/files/en/2011/11/honouring-our-strengths-renewed-framework-address-substance-use-issues-among-first-nations-people-ca.pdf>. Accessed March 10, 2012.
33. Tjepkema M. Alcohol and illicit drug dependence. *Health Reports*. 2004;15:9–19.
34. Ialomiteanu AR, Adlaf EM, Mann RE, Rehm J. CAMH Monitor eReport: addiction and mental health indicators among Ontario adults, 1977–2009 (CAMH Research Document Series No. 31). *Centre for Addiction and Mental Health*. 2011. Available at: http://www.camh.net/Research/camh_monitor.html. Accessed January 12, 2012.
35. Fischer B, Rehm J, Patra J, Cruz MF. Changes in illicit opioid use across Canada. *Canadian Medical Association Journal*. 2006;175(11):1385–7.
36. Fischer B, Gittins J, Rehm J. Characterizing the “awakening elephant” of prescription opioid misuse in North America: epidemiology, harms, interventions. *Contemporary Drug Problems*. 2008;35:397–426.
37. Fischer B, Rehm J, Brissette S, et al. Illicit opioid use in Canada: comparing social, health, and drug use characteristics of untreated users in five cities (OPICAN Study). *Journal of Urban Health*. 2005;82(2):250–66.
38. Fischer B, Rehm J. Illicit opioid use in the 21st century: witnessing a paradigm shift? *Addiction*. 2007;102:499–501.
39. Room R, Bondy S, Ferris J. Determinants of suggestions for alcohol treatment. *Addiction*. 1996;91(5):643–55.
40. Kerr T, Wood E, Grafstein E, et al. High rates of primary care and emergency department use among injection drug users in Vancouver. *Journal of Public Health*. 2004;27(1):62–6.
41. Rush BR, Urbanoski K, Bassani DG, Castel S, Wild TC. The epidemiology of co-occurring substance use and other mental disorders in Canada: prevalence, service use, and unmet needs. In: Cairney J, Streiner DL, editors. *Mental Disorder in Canada: An Epidemiological Perspective*. Toronto: University of Toronto Press; 2010:170–204.
42. Rush BR, Nadeau L. Integrated service and system planning debate. In: Cooper DB, editor. *Responding in Mental Health-Substance Use*. London: Radcliffe Publishing Ltd; 2011:148–75.
43. Graham K, Brook RC. Analysis of an addictions treatment system. *Evaluation and Program Planning*. 1985;8:331–7.
44. Parthasarathy S, Weisner C, Hu T, Moore C. Association of outpatient alcohol and drug treatment with health care utilization and cost: revisiting the offset hypothesis. *Journal of Studies on Alcohol*. 2001;62:89–97.