Opioid agonist therapy during residential treatment of opioid use disorder

Cohort study on access and outcomes

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Abstract

Objective To determine access to opioid agonist therapy (OAT) for those entering residential treatment for opioid use disorder; to report on treatment outcomes for those taking OAT and those not taking OAT; and to determine the association between OAT use and residential treatment completion.

Design Retrospective cohort study.

Setting Ontario.

Participants Patients with opioid use disorder admitted to publicly funded residential treatment programs in the province of Ontario between January 1, 2013, and December 31, 2016.

Main outcome measures Access to OAT during residential treatment using descriptive statistics. Treatment outcomes (ie, completed the program, voluntarily left early, involuntary discharged, and other) for the entire cohort and for the OAT and non-OAT groups using descriptive statistics. Association between OAT use at admission and treatment completion (a binary outcome) using bivariate and multivariate models.

Results Among an identified cohort of 1910 patients with opioid use disorder, 52.8% entered programs that permitted access to OAT. Overall, 56.8% of patients completed treatment, 23.3% voluntarily left early (eg, were no-shows, dropped out), 17.0% were involuntarily discharged, and 2.9% were discharged early for other reasons. Those taking OAT were as likely to complete treatment as those not taking OAT (53.9% vs 57.5%, respectively; adjusted odds ratio of 1.07, 95% CI 0.77 to 1.38).

Conclusion This study demonstrates 2 large gaps in care for patients with opioid use disorder. First, these patients have poor access to OAT—the first-line treatment of opioid use disorder—while in publicly funded residential treatment programs; and second, many are involuntarily discharged from treatment. Additionally, this study indicates that patients taking OAT have similar likelihood of completing residential treatment as those not taking OAT do. Limitations of this study are that it is based on observational data for patients who self-selected before admission to use OAT or not, and it is likely not all confounders were accounted for.

Editor's key points

- Opioid agonist therapy (OAT), with methadone or buprenorphine, is the first-line treatment of opioid use disorder. As various North American guidelines are recommending the removal of barriers to OAT within addiction treatment programs, changes within these programs might be required. This study sought to determine access to OAT and treatment outcomes in residential treatment programs.
- In this large study of 1910 people with opioid use disorder entering residential treatment in Ontario, the authors found that slightly more than half entered programs that permitted access to OAT during their admission; few entered programs with on-site access to OAT. About 20% of the cohort was taking OAT at the time of admission (ie, the OAT group). More than 40% of people did not complete treatment. Seventeen percent of the cohort was involuntarily discharged from the treatment program. The OAT group was as likely as those not taking OAT to complete treatment.
- Although the OAT group was not more likely to complete treatment, this might be due to confounding. Data from outpatient studies suggest that OAT leads to much better retention in treatment. Residential treatment programs should receive support to create the appropriate infrastructure to allow patients to access OAT. Researchers should further examine the effect of OAT on residential stay and longer-term outcomes after discharge. They should also identify ways to reduce involuntary discharge from residential programs.

Points de repère du rédacteur

- La thérapie aux agonistes opioïdes (TAO), avec de la méthadone ou de la buprénorphine, représente le traitement de première intention pour un trouble de consommation d'opioïdes. Diverses lignes directrices nord-américaines recommandent d'éliminer les obstacles à la TAO au sein des programmes de désintoxication. C'est pourquoi il y aurait peut-être lieu d'apporter des changements à de tels programmes. Cette étude cherchait à déterminer l'accès à une TAO et ses issues thérapeutiques dans des programmes de traitement en établissement.

- Dans cette étude d'envergure portant sur 1910 personnes souffrant d'un trouble de consommation d'opioïdes et ayant été admises dans un programme de désintoxication en établissement en Ontario, les auteurs ont constaté qu'un peu plus de la moitié d'entre elles amorçaient des programmes où l'accès à la TAO était permis durant leur séjour; peu d'entre elles suivaient des programmes qui offraient sur place l'accès à la TAO. Environ 20 % des patients de la cohorte suivaient une TAO au moment de leur admission (le groupe de la TAO). Plus de 40 % des personnes n'ont pas terminé le traitement. Quelque 17 % des sujets de la cohorte ont involontairement été retirés du programme de désintoxication. La probabilité de terminer le traitement était à peu près égale dans le groupe de la TAO et dans celui qui n'en suivait pas.

- Même s'il n'était pas plus probable que le groupe de la TAO suive le traitement jusqu'à la fin, cela pourrait être attribuable à des facteurs confusionnels. Des données provenant d'études sur des patients en consultation externe font valoir que la TAO favorise une meilleure rétention en désintoxication. Les programmes de traitement en établissement devraient recevoir du soutien pour établir l'infrastructure appropriée permettant aux patients d'avoir accès à la TAO. Les recherches devraient examiner plus en profondeur les effets de la TAO sur le séjour en établissement et sur les résultats à long terme après le congé. Ils devraient aussi cerner des façons de réduire les retraits involontaires des programmes en établissement.

Thérapie aux agonistes opioïdes durant le traitement en établissement d'un trouble de consommation d'opioïdes

Étude de cohortes sur l'accès et les résultats

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Résumé

Objectif Déterminer l'accès à une thérapie aux agonistes opioïdes (TAO) par les personnes qui commencent un traitement en établissement pour un trouble de consommation d'opioïdes; signaler les résultats thérapeutiques chez les personnes qui suivent une TAO et chez celles qui n'en suivent pas; et cerner les liens entre le recours à la TAO et l'achèvement du traitement en établissement.

Type d'étude Étude rétrospective de cohortes.

Contexte Ontario.

Participants Les patients souffrant d'un trouble de consommation d'opioïdes admis dans des programmes de désintoxication en établissement financés par le secteur public dans la province de l'Ontario, entre le 1er janvier 2013 et le 31 décembre 2016.

Principaux paramètres à l'étude L'accès à la TAO durant le traitement en établissement, à l'aide de statistiques descriptives. Les issues du traitement (p. ex. achèvement du programme, départ précoce volontaire, retrait involontaire et autres résultats) pour l'ensemble de la cohorte, de même que pour les groupes de la TAO et sans TAO, à l'aide de statistiques descriptives. L'association entre l'utilisation de la TAO au moment de l'admission et l'achèvement du traitement (résultat binaire), à l'aide de modèles bivariés et multivariés.

Résultats Parmi une cohorte de 1910 patients identifiés comme souffrant d'un trouble de consommation d'opioïdes, 52,8 % des patients ont amorcé des programmes qui autorisaient l'accès à une TAO. Dans l'ensemble, 56,8 % des patients ont terminé le traitement, 23,3 % l'ont volontairement cessé de manière précoce (p. ex. absence, abandon), 17,0 % en ont été involontairement retirés, et 2,9 % ont reçu un congé précoce pour d'autres motifs. Il était aussi probable que les personnes suivant une TAO terminent le traitement que celles qui n'en suivaient pas (53,9 contre 57,5 % respectivement; rapport de cotes corrigé de 1,07, IC à 95 % de 0,77 à 1,38).

Conclusion Cette étude met en évidence 2 importantes lacunes dans les soins aux patients souffrant d'un trouble de consommation d'opioïdes. Premièrement, ces patients n'ont pas facilement accès à la TAO, qui est le traitement de première intention pour le trouble de consommation d'opioïdes, lorsqu'ils suivent des programmes de désintoxication en établissement financés par le secteur public. Deuxièmement, les retraits involontaires du traitement sont nombreux. En outre, cette étude indique que les patients qui suivent une TAO sont aussi enclins à terminer le traitement en établissement que ceux qui n'en suivent pas. Cette étude a pour limitations qu'elle se fonde sur des données observationnelles concernant des patients qui avaient choisi eux-mêmes, avant leur admission, de suivre ou non une TAO, et il est probable que tous les facteurs confusionnels n'ont pas tous été pris en compte.

Access to effective treatment of opioid use disorder has never been more important. In Canada, there was a 45% increase in the number of opioid-related deaths from January to September 2017 compared with the same time period in 2016.[1] In the province of Ontario, opioids are responsible for 1 in 8 deaths for those aged between 25 and 34.[2] In 2015, more than 2.5 million Americans had opioid use disorder,[3] and in 2016 more than 42 000 people died from an opioid overdose.[4]

Opioid agonist therapy (OAT), with methadone or buprenorphine, is the first-line treatment of opioid use disorder. It has higher rates of retention in outpatient treatment than treatments that do not incorporate OAT.[5-8] Opioid agonist therapy is also associated with improved psychosocial functioning and health status; fewer risky and criminal behaviours; and reduced all-cause mortality.[9-13] The effect of psychosocial treatment alone on addiction, health, and social outcomes is much less clear.[14] Outcomes appear to improve with longer duration (at least 8 to 12 weeks) in treatment.[15-20]

To improve access to OAT, Canada's *National Guideline for the Clinical Management of Opioid Use Disorder,*[14] a 2017 coroner's inquest in the province of British Columbia,[21] a report by the Ontario Ministry of Health and Long-Term Care's Methadone Treatment and Services Advisory Committee,[22] and the US President's Commission on Combating Drug Addiction and the Opioid Crisis[23] all recently recommended removing barriers to OAT within the addiction treatment system.

This might require changes in residential addiction treatment programs. Historically many programs have not permitted the use of OAT,[24-26] and recent surveys indicate that might still be the case.[27,28] In 2018, Health Quality Ontario reported that approximately 1 in 4 residential facilities in Ontario do not allow patients to take OAT during admission.[29] Health service data on access to OAT during residential treatment have not been reported in the United States or Canada.

Additionally, the effect of OAT on residential treatment outcomes has not been adequately studied.[24] Based on the evidence from outpatient studies, initiating OAT before discharge from a residential facility would improve outcomes after discharge, including retention in ongoing outpatient treatment, health, and social functioning, and would reduce mortality.[5-7,10] However, it is unknown if initiating or continuing OAT from the start of the residential stay affects retention in residential treatment. Therefore, we sought to 1) determine access to OAT for the population entering residential treatment for opioid use disorder, 2) report on treatment outcomes for those taking OAT and those not taking OAT, and 3) determine the association between OAT use and residential treatment completion.

Methods

We conducted a retrospective population-based cohort study of patients who entered publicly funded residential treatment programs for opioid use disorder in Ontario between January 1, 2013, and December 31, 2016. The study was approved by the Research Ethics Board of Women's College Hospital in Toronto, Ont.

Setting

Ontario is an ethnically diverse province in Canada with a population of 14 million in 2016.[30] The provincial government provides all residents with publicly funded coverage for all necessary laboratory and radiologic testing, clinic and hospital visits, and psychosocial addiction treatment. Ontarians can also access private addiction treatment programs, either by paying out of pocket or by being funded by a third-party payer such as an employer.

Data sources

We used data from the Drug and Alcohol Treatment Information System (DATIS), which captures all publicly funded admissions to inpatient and residential treatment programs in Ontario. Approximately 170 agencies, which administer more than 200 programs, submit data, with less than 5% of data missing.[31] Agencies report demographic data and service type, as well as information on patients' health, social, psychological, and legal status. They also submit data on treatment including treatment completion and reasons for failure to complete treatment. The database has been used in a number of studies.[31-35]

We used the ConnexOntario Health Services Information database to determine which programs permitted patients to use OAT—methadone or buprenorphine or both—during residential treatment, and which programs dispensed or prescribed OAT on-site. ConnexOntario is an organization funded by the Government of Ontario that maintains a database of detailed health service information including information on which programs permit OAT, dispense OAT on-site, and prescribe OAT on-site. ConnexOntario conducts program validations for each organization on an annual basis to ensure that program details are accurate.

We linked the ConnexOntario data to the DATIS database using a unique program identifier: the Drug and Alcohol Registry of Treatment number, which allows for merging information between the DATIS and ConnexOntario databases. We stored, linked, and analyzed data on a secure, central server located at the Centre for Addiction and Mental Health in Toronto, Ont. We anonymized and aggregated patient data before extraction and reporting.

Identification of the cohort

Using the DATIS database, we identified all patients aged 18 and older, who were admitted to residential

treatment programs on or after January 1, 2013, and were discharged by December 31, 2016 (accrual period), who reported opioids as a presenting problem substance, and who had used opioids daily in the past 30 days. We excluded those who reported use of opioids but did not report that opioids were a problem substance. We also excluded those admitted to a detoxification or outpatient program. We selected a single randomly chosen admission for each patient during the accrual period (as some patients had multiple admissions in the accrual time period). We defined the OAT group as patients taking OAT at admission to the program and defined the non-OAT group as patients not taking OAT at admission. The DATIS database does not record OAT use after the time of admission to the program.

We used the ConnexOntario database to determine access to OAT. We defined a program that "permitted OAT" as a program that allowed patients to use methadone or buprenorphine or both during the admission. We defined a program that "prescribed OAT" as a program that prescribed methadone or buprenorphine or both. We defined a program that "dispensed OAT" as a program that dispensed methadone or buprenorphine or both on-site.

We used the DATIS database to assess treatment outcomes. Reasons for program termination included the following: completed the program, internal program transfer, agreed to terminate, client withdrew, client dropped out or was a no-show, incarceration, death, hospitalization, other, unknown, or staff termination. For our second objective, reporting on treatment outcomes for those taking OAT and those not taking OAT, we grouped the reasons for failure to complete treatment into voluntarily left early (client withdrew, dropped out or was a no-show, or agreed to terminate), involuntary discharge (terminated by staff), and other (internal program transfer, incarcerated, deceased, hospitalized, other, or unknown). For our third objective, determining the association between OAT use and treatment completion, we dichotomized the treatment outcomes variable as completed the program or failed to complete treatment (ie, binary outcome).

Statistical analysis

For our first objective we used descriptive statistics to report on the demographic and clinical characteristics of the entire cohort and the OAT group and the non-OAT group. We also described access to OAT during residential treatment in 2 ways: first, as the percentage of programs that permitted OAT, prescribed OAT, or dispensed OAT; and second, as the percentage of patients who were admitted to a program that permits OAT, prescribes OAT, or dispenses OAT.

For our second objective, we reported on treatment outcomes (ie, completed the program, voluntarily left early, involuntarily discharged, and other) for the entire cohort and for the OAT and non-OAT groups using descriptive statistics. To determine if differences in treatment outcomes existed between the OAT and the non-OAT groups, we fit a random intercept multinomial regression model. Probability estimates are obtained from a random intercept multinomial regression model (4-level outcome: complete, voluntary discharge, involuntary discharge, and other). The linear predictor includes only a fixed intercept effect, a fixed binary treatment effect, and a random intercept term for each site. We estimated the conditional probability of treatment completion in each treatment arm and their associated pairwise differences. Delta method–style arguments were used to obtain standard errors for the pairwise probability difference estimates. Traditionally this type of subanalysis could be performed using a simple χ^2 test (and subsequent follow-up pairwise binomial tests on each level of the outcome); however, given the clustered nature of the data from this design, a random intercept multinomial logit model was used to properly estimate standard error for the associated hypothesis tests.

For our third objective, we estimated bivariate and multivariate models to determine if there was an association between OAT use at admission and treatment completion, a binary outcome. We determined the intraclass correlation and fit a random intercept logistic regression model. We used this approach because our outcome (treatment completion) is a patient-level response nested within treatment programs (and hence responses are expected to be positively correlated within treatment centres). We presented the results as adjusted odds ratios and 95% CIs. In the models, we excluded patients who were taking OAT at admission but entered a program where OAT was not permitted (**Figure 1**). We excluded these patients because, although we assume they were tapered off OAT during the admission, we did not have access to this information.

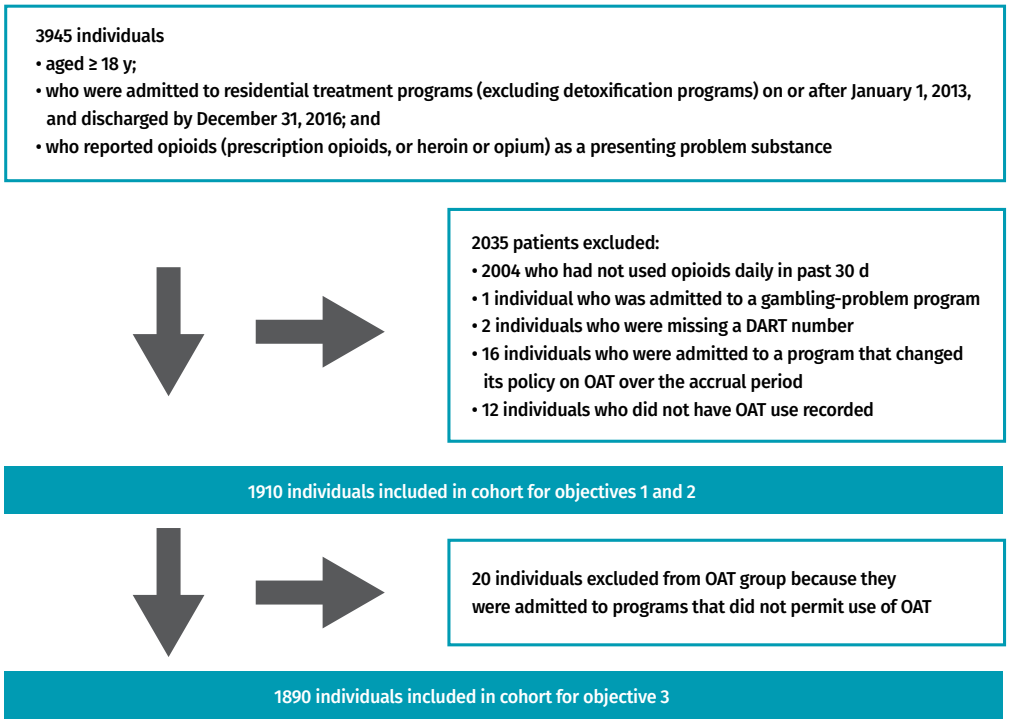
Statistical analyses were performed using SAS, version 9.4,[36] and R, version 3.4.3.[37]

Results

After exclusions (**Figure 1**), we identified 1910 individuals who were eligible for inclusion in our cohort. These individuals were admitted to 36 different residential treatment programs across Ontario. The average length of programs was 61.8 days with a median program length of 35 days (interquartile range of 21 to 90 days). Eight of the programs admitted women only and 9 admitted men only. Overall, 20 out of 36 (55.6%) programs permitted patients to use OAT. Of the 20 programs that permitted OAT, 2 prescribed OAT on-site and 2 dispensed OAT on-site.

The cohort was young (median age 31.9 years), predominantly men (66.4%), and resided mostly in urban areas (83.7%). Overall 38.5% had recent injection drug use, 22.4% were fully employed, and 20.3% were taking

Figure 1. Flow diagram of exclusion criteria for study cohort



DART—Drug and Alcohol Registry of Treatment, OAT—opioid agonist therapy.

OAT (**Table 1**). We determined that 52.8% (1008 of 1910) of patients in the cohort entered programs that permitted OAT (**Table 2**). Most of those in the OAT group entered programs where OAT was permitted. However, 5.2% (20 of 388) entered programs that banned OAT. **Tables 1** and **2** present further information on the cohort and the stratifications (OAT group and the non-OAT group).

For our second objective, we determined that overall 56.8% of the cohort completed the program, 17.0% were involuntarily discharged early from the program, 23.3% voluntarily left early from the program, and 2.9% did not complete the program for other reasons. Treatment outcomes for the entire cohort and the stratifications are presented in **Table 3**. We found no statistically significant differences in treatment completion outcomes between the OAT group and the non-OAT group (53.9% and 57.5%, respectively). For the group taking OAT that entered a program where OAT was banned, 11 out of 20 individuals completed treatment (55.0%). Results for the other treatment outcomes for this group were too small to report. Aggregate outcomes ranged from 5% to 25%.

For our third objective, we determined that the intraclass correlation was 0.083. This indicates that 8.3% of the total response variation can be attributed to site-level effects. In the bivariate analysis (**Table 4**), those in the OAT group were as likely to complete treatment as those in the non-OAT group (odds ratio of 0.96, 95% CI 0.73 to 1.26). As OAT was our primary target of inference, we forced this variable into our final multivariable random intercept logistic regression model. Additionally, we included covariates that were associated with treatment completion on bivariate analysis at a 5% α level (**Table 4**). On multivariate modeling, we observed that the OAT group was as likely to complete treatment as the non-OAT group was (adjusted odds ratio of 1.07, 95% CI 0.77 to 1.38) (**Table 5**).

Discussion

In this large study of people with opioid use disorder entering residential treatment in Ontario, we found that almost half entered programs where they were not permitted to have access to OAT, the first-line treatment of opioid use disorder,[5,14] during their admission. Few entered programs with on-site access to OAT. About 20% were taking OAT at the time of admission (the OAT group). More than 40% of people did not complete treatment and 17.0% were involuntarily discharged from a treatment program. The OAT group was as likely as those not taking OAT to complete treatment.

Table 1. Description of the opioid use disorder cohort and of the stratifications, OAT and non-OAT groups

VARIABLE	TOTAL COHORT, N = 1910*	NON-OAT GROUP, N = 1522*	OAT GROUP, N = 388*
Mean (SD) age, y	31.9 (9.9)	32.1 (10.3)	31.2 (8.3)
Male, n (%)	1269 (66.4)	1043 (68.5)	226 (58.3)
Ethnicity, n (%)			
• Canadian	1572 (86.2)	1278 (86.6)	294 (84.7)
• Indigenous	115 (6.3)	95 (6.4)	20 (5.8)
• Other	136 (7.5)	103 (7.0)	33 (9.5)
Rural, n (%)	311 (16.3)	252 (16.6)	59 (15.2)
Pregnant (women only), n (%)	33 (5.1)	17 (3.5)	16 (9.9)
Housing status, n (%)			
• Housed	1712 (89.8)	1375 (90.5)	337 (86.9)
• Unknown	144 (7.5)	97 (6.4)	47 (12.1)
• No fixed address	51 (2.7)	47 (3.1)	4 (1.0)
Substance use, n (%)			
• Reported other presenting problem substances	1616 (84.6)	1292 (84.9)	324 (83.5)
• Used other substances in past 12 mo	1724 (90.3)	1375 (90.3)	349 (90.0)
• Tobacco use	867 (45.4)	600 (39.4)	267 (68.8)
• Heroin or opium as a presenting problem substance	398 (20.8)	263 (17.3)	135 (34.8)
• Injection drug use in past year	736 (38.5)	499 (32.8)	237 (61.1)
Health status, n (%)			
• Mental health problems	1130 (59.2)	890 (58.5)	240 (61.9)
• Self-reported disability	285 (14.9)	221 (14.5)	64 (16.5)
• Hospitalized in past 12 mo	390 (20.4)	309 (20.3)	81 (20.9)
Social characteristics, n (%)			
• Mandated treatment	277 (14.5)	214 (14.1)	63 (16.2)
• Criminal justice involvement	543 (28.4)	396 (26.0)	147 (37.9)
• In a relationship	354 (18.5)	292 (19.2)	62 (16.0)
• Not completed high school	682 (36.6)	538 (36.4)	144 (37.5)
• Fully employed	428 (22.4)	378 (24.8)	50 (12.9)
• Recipient of governmental income support†	858 (44.9)	618 (41.0)	240 (61.9)
Mean (SD) no. of previous admissions‡	0.1 (0.5)	0.1 (0.5)	0.1 (0.4)

DATIS—Drug and Alcohol Treatment Information System, OAT—opioid agonist therapy.
*Information was not available for all participants for all variables. Proportions are calculated based on the number of participants with data related to the variable.
†This includes Ontario Disability Support Plan or Ontario Works.
‡Ever recorded in DATIS.

To our knowledge, this is the first study to clearly quantify patients' access to OAT in publicly funded residential treatment by linking administrative data on patient admissions to program policies. Other studies have estimated access by surveying programs.[28,38] The poor access to OAT is concerning. Many patients leaving residential treatment will relapse soon after discharge.[14] Given the data on the benefits of OAT for outpatients,[5-7,10] initiation of OAT before discharge is likely to prevent many of these outpatient relapses and lead to health and social benefits.

As reported in other studies,[39] many patients in our study were involuntarily discharged from treatment. Despite the important role involuntary discharge plays in failure to complete treatment, it has received little attention in the medical literature.[40] In 1 small study reasons for premature discharge ranged from conflict with counselors to tampering with urine drug test samples

Table 2. Description of patient-level access to OAT during admission for the opioid use disorder cohort and the stratifications, OAT and non-OAT groups

VARIABLE	TOTAL COHORT (N = 1910), N (%)	NON-OAT GROUP (N = 1522), N (%)*	OAT GROUP (N = 388), N (%)*
Entered program that does not permit OAT	902 (47.2)	882 (58.0)	20 (5.2)
Entered program that permits OAT	1008 (52.8)	640 (42.1)	368 (94.9)
• But does *not* prescribe or dispense on-site	761 (75.5)	500 (78.1)	261 (70.9)
• And *only* prescribes on-site	86 (8.5)	45 (7.0)	41 (11.1)
• And *only* dispenses on-site	131 (13.0)	82 (12.8)	49 (13.3)
• And prescribes *and* dispenses on-site	30 (3.0)	13 (2.0)	17 (4.6)

OAT—opioid agonist therapy.
*Not all percentages add to 100% owing to rounding.

Table 3. Crude rates of treatment completion and failure to complete treatment (voluntary discharge, involuntary discharge, and other) for the opioid use disorder cohort and for the stratifications, OAT and non-OAT groups

VARIABLE	TOTAL COHORT (N = 1910), N (%)	NON-OAT GROUP (N = 1522), N (%)	OAT GROUP (N = 388), N (%)	*P* VALUE*
Completed program	1084 (56.8)	875 (57.5)	209 (53.9)	.5020
Failed to complete program				
• Voluntary discharge (withdrew, dropped out or was a no-show, agreed to terminate)	445 (23.3)	361 (23.7)	84 (21.7)	.9957
• Involuntary discharge (staff termination)	325 (17.0)	241 (15.8)	84 (21.7)	.3135
• Other (internal program transfer, incarcerated, deceased, hospitalized, other, unknown)	56 (2.9)	45 (3.0)	11 (2.8)	.6709

OAT—opioid agonist therapy.

to missing treatment.[41] Some argue that involuntary discharges are essential to avoid program disruption and to ensure individuals actively engage with treatment.[42] Others argue that involuntary discharge leads to harm and has no evidence to support its use.[39,43] Either way, a high rate of involuntary discharge means that a large number of people—who have not made the decision to withdraw—are denied the opportunity to continue treatment.

Our finding that those taking OAT have the same likelihood of completing residential treatment as those not taking OAT might be due to confounding. Our results are contrary to numerous randomized controlled trials among outpatients where the use of OAT leads to much better retention in treatment.[6-8] It is possible that patient factors we could not measure—such as addiction severity—led to confounding. Given that patients self-select to use OAT, this is very likely. It is also possible that program factors caused confounding. For example there is evidence that patients who take OAT face stigma and discrimination in treatment programs.[24,25,44,45] This might also lead them to leave treatment prematurely. Finally, it is also possible that the duration of the residential programs was too short to see an effect from OAT use. Most of the residential programs in our study had a very short planned duration of stay (median duration of 35 days). It is possible that with longer duration of stay, OAT would have an effect. In outpatient studies retention is typically measured at 6 months.[6-8] In any case, our results should not be interpreted as reason to withhold offering OAT. It is also possible that OAT might not have an effect on retention during residential treatment. Another small cohort study of 125 patients found that those taking OAT had similar outcomes to those not taking OAT.[46] The lack of association between OAT use and treatment completion might be owing to the nature of residential programs. These programs provide a short-term, highly structured, and controlled treatment environment[47] where OAT's role in reducing cravings and blocking the euphoric effect of illicit opioids might be less important. Even if OAT does not affect residential treatment completion, it clearly provides addiction, health, and social benefits for patients after discharge.[11] This is particularly important as most residential programs in our study were less than 8 to 12 weeks in duration and therefore unlikely to have an effect on longer-term outcomes. A residential admission therefore is an opportunity for programs to encourage patients to initiate OAT before discharge.

Limitations

Our study has several limitations. First, we were unable to access data for those admitted to privately funded treatment programs, as such programs are not required to report to DATIS. Second, the diagnosis of opioid use disorder was not available in DATIS. Instead we used

Table 4. Odds of residential treatment completion (binary outcome: complete vs not complete) for patients with opioid use disorder in bivariate random intercept logistic regression analyses

	BIVARIATE GLMM			
VARIABLE	ODDS RATIO	LOWER LIMIT 95% CI	UPPER LIMIT 95% CI	*P* VALUE
OAT on admission	0.96	0.73	1.26	.7773
Age (1-y change, continuous)	1.03	1.02	1.04	< .0001
Male sex	1.12	0.89	1.41	.3311
Ethnicity				
• Canadian	Reference	Reference	Reference	Reference
• Indigenous	1.73	1.06	2.83	.0289
• Other	1.20	0.80	1.80	.3598
Rural	1.08	0.82	1.42	.5806
Pregnant (women only)	0.72	0.31	1.65	.4235
Housing status				
• Housed	Reference	Reference	Reference	Reference
• Unknown	0.91	0.47	1.75	.7632
• No fixed address	1.08	0.74	1.59	.6812
Substance use				
• Reported other presenting problem substances	1.02	0.77	1.34	.9124
• Used other substances in past 12 mo	1.07	0.77	1.50	.6767
• Tobacco use	0.91	0.71	1.16	.4304
• Heroin or opium as a presenting problem substance	0.97	0.72	1.21	.7870
• Injection drug use in past y	0.79	0.65	0.97	.0278
Health status				
• Mental health problems	0.98	0.80	1.20	.8213
• Self-reported disability	1.15	0.86	1.52	.3323
• Hospitalized in past 12 mo	0.85	0.66	1.09	.2019
Social characteristics				
• Mandated treatment	1.38	1.04	1.84	.0262
• Criminal justice involvement	0.92	0.74	1.14	.4220
• In a relationship	1.48	1.14	1.93	.0046
• Not completed high school	0.71	0.58	0.88	.0022
• Fully employed	1.55	1.21	1.99	.0009
• Recipient of governmental income support*	0.68	0.55	0.83	.0005
No. of previous admissions (continuous)†	0.98	0.79	1.21	.8442

DATIS—Drug and Alcohol Treatment Information System, GLMM—generalized linear mixed model, OAT—opioid agonist therapy.
*This includes Ontario Disability Support Plan or Ontario Works.
†Ever recorded in DATIS.

patient reports of opioids as a problem substance, combined with recent daily use. Additionally, as data on OAT use were only recorded at the time of admission, some people might have stopped or started OAT during their admission. To address this we excluded from the adjusted analysis those who were taking OAT but were admitted to a program that banned OAT, as these patients likely discontinued OAT before or during admission. Finally, we did not have data on addiction severity before admission nor data on outcomes after discharge from a treatment program. Linking the DATIS database to hospital data would allow researchers to look at important long-term outcomes after residential stay such as emergency department visits for opioid use disorder.

Table 5. Odds of residential treatment completion (binary outcome: complete vs not complete) for patients with opioid use disorder in adjusted multivariate random intercept logistic regression model

VARIABLE	ADJUSTED ODDS RATIO	LOWER LIMIT 95% CI	UPPER LIMIT 95% CI	*P* VALUE
OAT use	1.07	0.77	1.38	.6206
Age (10-y change, continuous)	1.38	1.24	1.55	< .0001
Injection drug use in past y	0.92	0.72	1.13	.4655
Mandated treatment	1.47	1.03	1.91	.0125
In a relationship	1.16	0.84	1.49	.2824
Not completed high school	0.78	0.61	0.95	.0261
Fully employed	1.21	0.87	1.55	.1748
Recipient of governmental income support (yes)*	0.73	0.56	0.90	.0101
Ethnicity (Indigenous vs Canadian)	1.90	0.94	2.86	.0142
Ethnicity (other vs Canadian)	1.17	0.69	1.66	.4393

OAT—opioid agonist therapy.
*This includes Ontario Disability Support Plan or Ontario Works.

Conclusion and next steps

Our study demonstrates 2 large gaps in care for people with opioid use disorder that have received little attention to date. First, they have poor access to OAT—the first-line treatment of opioid use disorder—while in publicly funded residential treatment programs. Second, many are involuntarily discharged from treatment. Additionally, our study indicates that patients taking OAT have a similar likelihood of completing residential treatment as those not taking OAT do.

To address current guidelines and recommendations, and the evidence indicating poor access to OAT in our study, programs should receive support to create the appropriate infrastructure to allow patients to access OAT. As the guidelines for the clinical management of opioid use disorder state:

> Given the known benefits of opioid agonist treatment, priority should be given to programs and initiatives aimed at strengthening both the opioid agonist and residential treatment systems of care through an integration of evidence-based treatment approaches to opioid use disorder.[14]

Researchers should further examine the effect of OAT on residential stay and longer-term outcomes after discharge. They should also identify ways to reduce involuntary discharge from residential programs.

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Contributors

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Competing interests

None declared

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