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Are patients' goals in treatment associated with expected treatment outcomes? Findings from a mixed-methods study on outpatient pharmacological treatment for opioid use disorder

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ABSTRACT

Objectives Existing methods of measuring effectiveness of pharmacological treatment for opioid use disorder (OUD) are highly variable. Therefore, understanding patients' treatment goals is an integral part of patient-centred care. Our objective is to explore whether patients' treatment goals align with a frequently used clinical outcome, opioid abstinence.

Design Triangulation mixed-methods design.

Setting and participants We collected prospective data from 2030 participants who were receiving methadone or buprenorphine-naloxone treatment for a diagnosis of OUD in order to meet study inclusion criteria. Participants were recruited from 45 centrally-managed outpatient opioid agonist therapy clinics in Ontario, Canada. At study entry, we asked, 'What are your goals in treatment?' and used NVivo software to identify common themes.

Primary outcome measure Urine drug screens (UDS) were collected for 3 months post-study enrolment in order to identify abstinence versus ongoing opioid use (mean number of UDS over 3 months=12.6, SD=5.3). We used logistic regression to examine the association between treatment goals and opioid abstinence.

Results Participants had a mean age of 39.2 years (SD=10.7), 44% were women and median duration in treatment was 2.6 years (IQR 5.2). Six overarching goals were identified from patient responses, including 'stop or taper off of treatment' (68%), 'stay or get clean' (37%) and 'live a normal life' (14%). Participants reporting the goal 'stay or get clean' had lower odds of abstinence at 3 months than those who did not report this goal (OR=0.73, 95% CI 0.59 to 0.91, p=0.005). Although the majority of patients wanted to taper off or stop medication, this goal was not associated with opioid abstinence, nor were any of their other goals.

Conclusions Patient goals in OUD treatment do not appear to be associated with programme measures of outcome (ie, abstinence from opioids). Future studies are needed to examine outcomes related to patient-reported treatment goals found in our study; pain management,

Strengths and limitations of this study

► This study is strengthened by its large sample size (2000 participants) and multisite design.
► Participating clinics follow a harm-reduction approach to treatment and these findings may not generalise to abstinence-based treatment settings.
► The goals and treatment outcomes of patients newly entering treatment may differ from those of patients who have been in treatment longer and may not be captured in this study.

employment, and stopping/tapering treatment should all be explored.

INTRODUCTION

Opioid use disorder (OUD) remains a clinical and public health challenge, with ongoing high rates of opioid use and overdose deaths.[1] Consequently, growing numbers of patients are enrolled in pharmacological treatment for OUD.[2 3] Methadone, a full opioid agonist, and buprenorphine, a partial opioid agonist, are the two most commonly used medications in the management of OUD; they act to reduce cravings and withdrawal, and support abstinence from ongoing opioid use.[4] Evidence from systematic reviews of experimental studies indicates that both medications reduce opioid use.[5 6] However, not all patients have favourable outcomes,[7 8] and patients who continue to use opioids during treatment have a high risk of overdose and death.[9 10] Other treatments, including heroin-assisted treatment, are available in

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some jurisdictions for patients who have limited response to treatment with first-line medications.[11]

Better understanding patients' goals in treatment is considered increasingly important within the field of substance use and addiction.[12–14] The now well-known concept of *patient-centred care* was originally coined with the definition of "care that is respectful of, and responsive to, individual patient preferences, needs and values",[15 16] and is demonstrated to have a significant impact on patients' outcomes and satisfaction in treatment.[17] Increasing attention is being paid to patients' goals and the implementation of patient-centred care principles in addiction treatment.[18]

Identifying core treatment outcomes is an active area of investigation within the field of Addiction Medicine.[19] Unfortunately, there is still significant variability in the outcomes used to evaluate the effectiveness of pharmacological treatment for OUD.[20 21] How to best measure and assess treatment outcomes remains uncertain, and current practices risk being based on convenience. Opioid use, measured by urine drug screens (UDS), and retention in treatment are the most commonly used primary outcomes measured in clinical studies and treatment programmes;[21] however, it is unknown how well these outcomes are associated with patients' goals in treatment. Personal and social functioning outcomes are, in contrast, much less commonly assessed.[21] As core endpoints and outcome sets for studies of OUD are developed, it is critical to understand which goals in treatment are important to patients and how to best measure them.

In a recent study by Sanger *et al*, 2020, we used qualitative analysis methods to examine patient-reported treatment goals in a cohort of more than 2000 patients receiving outpatient pharmacological treatment for OUD.[22] We identified six distinct goals in treatment from patient responses, including to control cravings or withdrawal, to maintain or stabilise medication dose, to stop or taper off treatment, to 'stay or get clean', to manage pain and to 'live a normal life'.[22]

The objective of the present study was to explore whether these patient-reported treatment goals are associated with abstinence from opioid use (a frequently measured programme outcome). We hypothesised that patient goals related to drug use would be associated with opioid use during treatment; meanwhile, goals unrelated to drug use would have no association with UDS results.

METHODS
Data

We collected prospective observational data from 2030 participants recruited from 45 outpatient clinics in the Pharmacogenetics of Opioid Substitution Treatment Response (POST) study. To meet study inclusion criteria, participants were required to be at least 16 years of age and receive pharmacological treatment with methadone or buprenorphine-naloxone (for any length of time) for a diagnosis of OUD, as per the Diagnostic and Statistical Manual of Mental Disorders, 5th Edition (DSM-5).[23] The diagnosis of OUD was made by treating physicians according to DSM-5 criteria and is an eligibility criterion for treatment entry and clinical follow-up at the outpatient clinics included in this study. No other inclusion or exclusion criteria were applied in order to increase the generalisability of this study. Participants completed face-to-face interviews at study entry to collect information on demographic and clinical characteristics.

We used a triangulation mixed-methods design to combine quantitative and qualitative data collection, where both quantitative and qualitative data were collected within one study instrument using closed- and open-ended questions.[24 25] At study intake, participants were interviewed by trained research staff to obtain information on sociodemographic and clinical information, medical history and substance use history. Research staff had a background in addiction research, as they previously participated in recruitment of participants for a study investigating genetic influences on methadone treatment.[26] Their experience allowed for familiarity of addiction-related terms used in interview responses; however, research staff were not known to the participants of this study. Study interviews were conducted in-person. The interview data used in this study is from participants recruited between May 2018 and August 2019. During the interview, all participants who met the inclusion and exclusion criteria above were asked the open-ended question, 'What are your goals in treatment?'. Details regarding the study settings and data collection are outlined in our previous study.[22] Verbal responses, in their entirety, were transcribed by research staff word-for-word in online anonymised records, where each participant was given an anonymised record number.

We collected the results of UDSs for opioids for each participant for 3 months following study entry to assess treatment outcome. The FaStep Assay (Trimedic Supply Network Ltd, Concord, Ontario, Canada) was used to detect morphine, oxycodone, fentanyl, methadone metabolite and buprenorphine, as well as other non-opioid substances.[27] Though other methods may be used to assess ongoing opioid use during treatment, such as saliva and hair tests, as well as self-reported drug use,[28] UDSs are collected as part of routine clinical protocol in the clinics participating in this study and are a recommended method of assessment based on Canadian Guidelines.[4] UDSs were collected following clinic protocol (typically weekly or biweekly). For each participant, we calculated the percentage of opioid-positive UDSs by dividing the number of opioid-positive urines by the number of urine samples taken. Abstinence from opioids was selected as our primary study outcome as it is a routinely measured treatment outcome in both clinical practice and research studies.

Another commonly studied treatment outcome, retention in treatment, was not formally assessed in the present study for two reasons. First, treatment retention is not equivalent to the duration of time enrolled in this study

(as our study used a naturalistic design and enrolled patients in various stages of their treatment). Second, with the exception of patients who have entered treatment for the first time, there exists some uncertainty in defining treatment retention because patients frequently enter and discontinue treatment at various points in their course of illness. Instead, we asked participants to report their length of time enrolled in this treatment episode (as a proxy for treatment retention) and adjusted all study analyses for length of time in treatment.

We report methods and quantitative results in accordance with the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines.[29]

Qualitative analysis

The qualitative approach used to analyse the data was data-driven thematic analysis.[30] We began by familiarising ourselves with the data through active, repeated reading of the interview responses and began to recognise emerging patterns. This phase of data familiarisation also allowed us to minimise typographical errors present in the free-text responses. We began phase two by generating initial codes using NVivo software (QSR International (Americas) Inc, Burlington, Massachusetts, USA) for qualitative analysis to identify common themes from patient answers.[31] We began cataloguing main ideas, phrases and patterns into meaningful nodes using word and text queries, and a review of the transcribed data. Word and text queries helped us capture the patterns in data and improve analytical accuracy by identifying stemmed variants. Each data item was given equal attention and in addition to text and word queries, key phrases were tagged within each data item. This phase is characterised by the generation of a codebook that provided specific definitions of the key phrases, words and patterns. The next phase consisted of the labelling of some nodes as themes and the collapsing of related nodes into one node, eventually being labelled as a themes or subthemes. The final phase consisted of a review of identified themes and resultant reworking of themes to better establish coherent patterns within each theme. Defining and refining of each theme followed this phase, where patterns and content were considered before choosing relevant and reflective theme names.[30 32] To increase rigour in our analysis, we used investigator triangulation, where phases concerning the generation of themes involved the consultation of four investigators to ensure incorporation of diverse perspectives. This was reflected in the iterative review of nodes and patterns, where meaningfulness of coding was discussed and was reassessed at every identified phase. We report qualitative methods and results in accordance with the Standards for Reporting Qualitative Research (SRQR).[33]

Quantitative analysis

We conducted all quantitative analyses using Stata version 15.1 (StataCorp LP, College Station, Texas, USA). We report demographic and clinical data using mean and SD for normally distributed continuous variables and median with quartiles 1 and 3 or interquartile range (IQR) for skewed data. We report categorical variables as frequency with percentage. We summarise the results of UDSs in three ways: (1) the mean number of UDSs collected; (2) the percentage of opioid-positive UDSs; and (3) abstinence from opioid use, defined as no opioid-positive UDSs during the 3-month time period.

We used logistic regression analysis to examine the association between patient goals in treatment and abstinence from opioid use, adjusting for other important covariates. We constructed a logistic regression model, using the dependent variable abstinence from opioid use throughout the 3 months following study entry. We included the six identified treatment goals in the model and controlled for other factors believed to impact ongoing opioid use in treatment, including age, sex,[34 35] type of treatment (methadone or buprenorphine-naloxone), medication dose,[36] length of time in treatment[37] and abstinence from opioids at baseline. We also conducted an additional logistic regression to determine whether the number of goals reported by participants was associated with opioid abstinence, as patients who report more treatment needs tend to have more opioid use.[38] Results are reported as ORs with 95% CIs and associated p values. We report the estimates of effect for our main variables of interest (treatment goals) in the results table and describe all variables adjusted for in a footnote in the table in order to focus solely on the variables of interest to our specific study question. We assessed for multicollinearity using variance inflation factor (VIF) and examined model diagnostics using the Hosmer-Lemeshow statistic and deviance residuals. We conducted a sensitivity analysis after excluding observations with a deviance residual lower than −2 or higher than 2. Our sample size of 2030 participants and event rate of more than 1000 participants abstinent from opioids is adequate, based on the rule of thumb for number of events needed (n=10) per covariate included in logistic regression analysis.[39]

Missing data were identified and reported for each variable of interest. There were less than five cases with missing data for baseline demographic or clinical variables. For 3-month UDS, missing data affected 34 participants (1.7%). Reasons for missing 3-month UDS data included: results not yet available (n=6), transfer to another clinic (n=8), treatment failure (n=10), incarceration (n=3), completion of treatment (n=2) and other (n=4), such as hospitalisation, moving or never starting treatment. Due to the low percentage of missing data, all missing data were handled by available case analysis.

Patient and public involvement

Patients or the public were not involved in the design, or conduct, or reporting, or dissemination plans of our research.
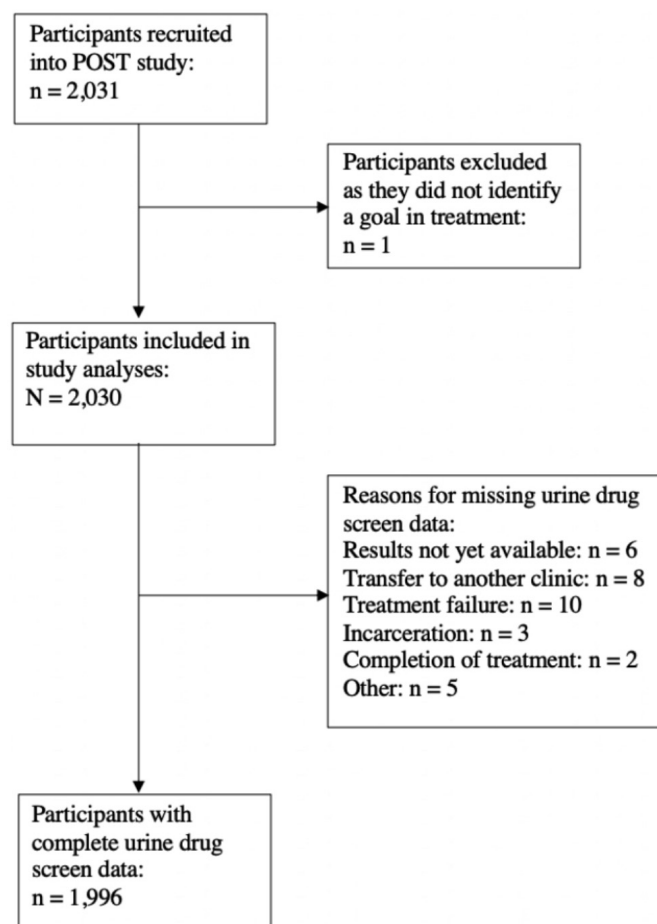
Figure 1 Study flow diagram. POST, Pharmacogenetics of Opioid Substitution Treatment Response.

RESULTS
Participant characteristics and goals in treatment

Altogether, 2030 participants were included in the analyses (figure 1; study flow diagram), with a mean age of 39.2 years (SD=10.7) and 44% were women (table 1). The majority of participants were receiving treatment with methadone (78.9%) compared with buprenorphine-naloxone (21.1%) and the median length of time in treatment was 2.6 years (IQR 5.2). UDSs collected for the 3 months of study duration were available for 1996 participants. Among these participants, 57% were abstinent from opioid use during those 3 months. Ultimately, we identified six distinct 'themes' or 'goals' in treatment: (1) to control cravings or withdrawal, (2) to maintain or stabilise medication dose, (3) to stop or taper off treatment, (4) to 'stay or get clean', (5) to manage pain and (6) to 'live a normal life', as presented by our previous paper looking at patient important outcomes in the OUD population receiving opioid agonist therapy.[22] The 'control cravings or withdrawal' theme consisted of participants responses stating they would like to avoid withdrawal or control their cravings. Participant responses grouped in the second theme of 'to maintain or stabilise medication dose' were made up of responses indicating that they wanted to maintain opioid agonist medication doses,

Table 1 Characteristics of participants at study entry (n=2030)

Characteristic	Statistic
Demographic and clinical	
Age in years; mean (SD)	39.2 (10.7)
Female sex;* n (%)	894 (44.1)
Type of treatment; n (%)	
Methadone	1601 (78.9)
Buprenorphine-naloxone	429 (21.1)
Dose in mg/day; mean (SD)	
Methadone	70.5 (41.4)
Buprenorphine-naloxone	12.0 (6.7)
Years in treatment;* median (IQR)	2.6 (5.2)
Abstinence from opioid use at baseline;† n (%)	646 (31.9)
Number of opioid urine drug screens at 3 months;‡ mean (SD)	12.6 (5.3)
Median percentage of opioid-positive urine drug screens at 3 months;‡ median (Q1, Q3)	0 (0 to 20)
Abstinence from opioid use at 3 months;‡ n (%)	1127 (56.5)
Patient-reported goals in treatment§	
Number of goals reported; n (%)	
One	1222 (60.2%)
Two	643 (31.7%)
Three	150 (7.4%)
Four	13 (0.64%)
Five	2 (0.1%)
Control cravings/withdrawal	247 (12.17%)
Maintain or stabilise medication dose	122 (6.01%)
'Live a normal life'	283 (13.94%)
Manage pain	240 (11.82%)
'Stay or get clean'	742 (36.55%)
Stop or taper off treatment	1386 (68.28%)

*Data available for 2029 participants.
†Data available for 2028 participants.
‡Data available for 1996 participants (missing for 34 participants).
§Percentages sum to more than 100% as patients could report multiple goals in treatment.
Q1, 25th percentile; Q3, 75th percentile.

stabilise their dose or did not have any reported goals. The third goal to 'stop or taper off treatment' included goals to stop treatment completely, to not be dependent on opioid agonist therapy, or to taper off or reduce their medication dose. Participant goals such as wanting to get clean, stay clean, achieve abstinence or achieve sobriety from all drugs were included in the fourth goal of 'to stay or get clean'. The fifth theme of 'pain management' either mentioned chronic pain, or pain management in general. The sixth theme of 'living a normal life' consisted of responses such as wanting a stable life, normal life, to get qualifications related to education, job or work, to achieve good mental health or wanting to support their family.[22]

The most common patient-reported goal was to 'stop or taper off treatment' (68%; see table 1 for all goals). Other goals included to 'stay or get clean' (37%), to 'live a normal life' (14%) and to 'control cravings or withdrawal' (12%). Most participants (60.2%) reported one treatment goal (mean number of goals=1.49, SD=0.67). We reported demographic and clinical characteristics associated with different treatment goals in a previously published paper.[22]

The proportion of participants treated with methadone (as compared with buprenorphine-naloxone) was 79% for the goal 'stop or taper off treatment', 78% for 'stay or get clean', 84% for 'live a normal life', 86% for 'manage pain', 81% for 'control cravings or withdrawal' and 75% for 'maintain or stabilise medication dose'. The median length of time in treatment at the time of study recruitment was 3 years (IQR=5) for the goal 'stop or taper off treatment', 2 years (IQR=4.5) for 'stay or get clean', 3 years (IQR=6.2) for 'live a normal life', 4 years (IQR=8) for 'manage pain', 2 years (IQR=5.4) for 'control cravings or withdrawal' and 5 years (IQR=8) for 'maintain or stabilise medication dose'. Abstinence from opioid use at study entry was observed in 33% of participants reporting the goal to 'stop or taper off treatment', 28% for 'stay or get clean', 31% for 'live a normal life', 30% for 'manage pain', 31% for 'control cravings or withdrawal' and 45% for 'maintain or stabilise medication dose'.

Association between patients' goals in treatment and 3-month abstinence from opioid use

We examined the association between patient goals and abstinence from opioid use for 3 months following study entry, adjusting for other characteristics previously shown to be associated with ongoing opioid use (table 2). Paradoxically, participants reporting the goal 'to stay or get clean' had 27% lower odds of abstinence from opioids at 3 months (OR=0.73, 95% CI 0.59 to 0.91, p=0.005), even after adjusting for baseline abstinence from opioid use. No other patient-reported goals in treatment were significantly associated with 3-month abstinence.

Good model fit was assessed using the Hosmer-Lemeshow statistic ($\chi2$=5.93, p=0.656) and multicollinearity was not a concern (mean VIF 1.19). Using deviance residuals, we detected 14 outliers with deviance residuals greater than an absolute value of 2. We conducted a post-hoc sensitivity analysis removing outliers and found that participants who reported the goal 'to control cravings or withdrawal' also had significantly lower odds of opioid abstinence at 3 months (OR=0.73, 95% CI 0.54 to 0.99, p=0.044; online supplemental table 1). There were no other significant changes to the results upon removing outliers.

Finally, we examined the association between number of reported goals and abstinence from opioid use for 3 months (online supplemental table 2). As compared with reporting one goal in treatment, reporting two goals was not associated with opioid use (OR=0.93, 95% CI=0.75, 1.15, p=0.497), however reporting three or more goals may be associated with lower odds of abstinence from opioids (OR=0.70, 95% CI=0.49, 1.0, p=0.049).

DISCUSSION

In this mixed-methods study, we examined treatment goals reported by more than 2000 patients receiving pharmacological treatment for OUD to determine their association with the frequently measured treatment outcome, opioid use. Participants reporting the goals to 'stay or get clean' and to control cravings or withdrawal were less likely to be abstinent from opioids during the next 3 months of treatment than participants who did not report those goals. Other goals related to termination of treatment, pain or

Table 2 Multivariable model of the association between patient goals and abstinence from opioid use for 3 months following study entry

Covariate	Complete case analysis* (n=1994)†			Sensitivity analysis excluding outliers (n=1980)*‡		
	OR	95% CI	p value	OR	95% CI	p value
Control cravings/withdrawal	0.76	0.56 to 1.03	0.078	0.73	0.54 to 0.99	0.044
Maintain or stabilise medication dose	1.15	0.74 to 1.79	0.523	1.24	0.79 to 1.95	0.354
'Live a normal life'	1.02	0.77 to 1.35	0.879	0.98	0.74 to 1.31	0.902
Manage pain	1.0	0.73 to 1.36	0.976	0.96	0.70 to 1.32	0.806
'Stay or get clean'	0.73	0.59 to 0.91	0.005	0.70	0.56 to 0.87	0.001
Stop or taper off treatment	1.0	0.80 to 1.27	0.974	1.01	0.80 to 1.27	0.954

Variance inflation factor=1.19.
Hosmer-Lemeshow χ^2 5.93, p=0.656.
*Model is adjusted for age, sex, type of treatment (methadone or buprenorphine-naloxone), dose, length of time in treatment and opioid abstinence at baseline.
†Participants with missing data in any of the included covariates are excluded due to complete case analysis (missing urine drug screen data: n=36, missing sex: n=1, missing length of time in treatment: n=1).
‡Excluding 14 outliers detected using deviance residuals less than −2 from the analysis

personal or social functioning were not associated with opioid use. These findings suggest that abstinence from opioids, a commonly used treatment outcome measured in clinical trials, does not reflect what patients want out of treatment, and raises questions about the alignment between treatment outcomes and patient goals.[40]

We found that patients who identified goals related to stopping drug use or controlling OUD symptoms had worse outcomes in treatment as measured by UDS. There is a rich literature examining the apparent contradiction between abstinence-related goals and subsequent drug-taking behaviours. This is in essence the focus of motivational interviewing[41] in which clinicians help patients develop motivation through recognising discrepancies between their current situation and their goals, shifting the balance towards change.[42] One possible explanation is that patients who were experiencing worse outcomes in treatment or higher severity of illness were more likely to report goals regarding management of substance use symptoms and abstinence from drug use, thus also increasing the likelihood that they experienced ongoing opioid use. Another possibility is that participants who had achieved abstinence or had improvements in OUD withdrawal symptoms may have been less likely to identify the same goals. Nonetheless, exploring why patients wishing to abstain from opioid use are not achieving this goal is an area requiring further study. Beyond quantitatively examining factors associated with ongoing substance use, previous qualitative studies that explore patient perceptions of barriers and facilitators to achieving abstinence are illuminating and may inform future interventions and research.[43–45]

Although the majority of patients wanted to taper off or stop treatment, this goal had no association with abstinence from opioid use. One possible explanation is that participants may have been unhappy with treatment and therefore non-adherent. Factors associated with non-adherence to opioid agonist treatments have been previously studied.[46–49] There is a vast literature on factors affecting patient adherence to treatment in general and, notably, no single explanation sufficiently accounts for variation in adherence.[50] Authors in this field have suggested considering the patient's experience of illness and its meaning as important factors to study in understanding adherence to treatment.[50 51] This finding calls into question the rationale for entering and continuing pharmacological treatment while continuing to use opioids for this group of patients. Furthermore, this is a particularly important finding, given that retention in treatment is among the most consistently measured outcomes,[19] and guidance around taper and discontinuation of long-term opioid agonist treatments for OUD is limited.[4 52] Studies examining opioid agonist tapers have identified challenges and risks of poor outcomes[53 54] including withdrawal symptoms, return to drug use, pain, psychiatric symptoms, hospitalisation and death.[55 56] A previous study found that patients' interest in stopping treatment was associated with shorter duration of treatment and lack of

concern about relapse to opioid use.[57] This is concerning as one would hope patients planning to stop treatment would be reliably abstinent from opioids. What distinguishes this group of patients who wish to discontinue treatment? Whether some of these patients are mandated to be in treatment is unknown. Better understanding patients' reasons for wanting to stop or taper treatment and examining outcomes for patients who initiate an opioid agonist taper is imperative.

Other patient identified goals in treatment that were not associated with the results of their UDS, included goals around pain management, and the goal 'to live a normal life'. This suggests that clinicians and researchers may require additional tools to measure outcomes related to those patient-important treatment goals. Tools validated to assess pain in this population include the Brief Pain Inventory[58 59] and social functioning may be examined using the Maudsley Addiction Profile.[60] A more nuanced understanding of specific goals around personal and social functioning, on a population and individual level, is required in order to be able to appropriately assess and address these goals during treatment. Overall, our finding that results of UDSs are not associated with all patient goals in treatment is expected as UDS results would not be expected to be a proxy for all of the different goals. However, this study adds evidence to the notion that traditional metrics of success in opioid use disorder treatment are insufficient in isolation. It is important to note that although patient goals appear to have limited predictive value on opioid use during treatment, this does not imply that clinicians should not ask patients about their treatment goals. It is not uncommon that patients have goals that are not achieved in treatment (eg, weight loss, increased physical activity) and this does not mean that clinicians or patients should give up on these goals or should not enquire about them. Rather, we must consider how well traditional metrics of treatment success align with desired treatment outcomes for all stakeholders, especially patients, and consider additional ways to evaluate and improve treatment success based on patients' self-reported goals.

Finally, in a previous paper, we examined group differences between participants selecting each treatment goal.[22] Women were more likely to report the goal of stopping treatment. Older age, first exposure to opioids through physician prescription and unemployment were all associated with greater odds of reporting goals related to pain management.[22] These findings indicated that, unsurprisingly, patients' characteristics are associated with their treatment goals and may help to guide focussed questioning and evaluation of patients' goals in treatment.

This study has a number of potential limitations. First, this study interprets and summarises the patients' narrative when expressing their goals in treatment using qualitative methods; however, this interpretation carries limitations related to the potential influence of social desirability bias and the influence of contextual factors on patients' responses that have not been explored in this

study. Though beyond the scope of this paper, sociological approaches to qualitative analysis include critical appraisal of the circumstances of the participant and the context in which statements are expressed. Furthermore, there may be a healthy user/volunteer bias,[61] such that individuals with better outcomes in treatment may have been more likely to participate. Additionally, the goals and treatment outcomes of patients newly entering treatment may differ from those of patients who have been in treatment longer. Patients who may have successfully achieved their goal of treatment termination were not captured by this study since they would no longer be on OUD thus not recruited. The findings in this study may not generalise to settings in which opioid agonist medications take on a primarily abstinence-based role in treatment. In Canada, pharmacological treatment for OUD is provided largely in a harm-reduction model, in which retention in treatment is not contingent on abstinence from opioids or non-opioid substances. This study did not measure patient's satisfaction or perception of treatment success or perception of meeting their goals. Future studies that examine patient satisfaction in treatment may wish to determine whether perception of treatment success correlates with programme-measured outcomes such as opioid abstinence.

CONCLUSION

Patients report a number of different goals in their treatment for OUD, which are not associated with traditional goals of treatment programmes and outcomes measured in clinical settings (abstinence from opioid use measured by UDS). We found that patients who identified goals related to stopping drug use or controlling OUD symptoms were more likely to have ongoing opioid use. However, goals unrelated to drug use carried no significant association with opioid use status. Patients reporting the goal of wanting to stop treatment were no more likely to be abstinent from opioids. The patient-identified goals to manage pain or 'live a normal life' had no association with ongoing opioid use. Future studies are needed to examine outcomes related to the goals in treatment identified in our study. Are these goals being met in treatment? For example, do patients feel their pain is well managed? Do they achieve employment? Can they achieve the goal of stopping treatment without adverse consequences? As core outcome sets are developed, patient-important outcomes remain essential to consider and may help with implementing patient-centred approaches to treatment.

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Supplementary Table 1. Multivariable model of the association between patient goals and abstinence from opioid use for 3 months following study entry including all covariates.

Covariate	Complete case analysis[a] (n = 1, 994[b])			Sensitivity analysis excluding outliers (n = 1,980)[a,c]		
	OR	95% CI	*p*	OR	95% CI	*p*
Control cravings/withdrawal	0.76	0.56, 1.03	0.078	0.73	0.54, 0.99	0.044
Maintain or stabilize medication dose	1.15	0.74, 1.79	0.523	1.24	0.79, 1.95	0.354
"Live a normal life"	1.02	0.77, 1.35	0.879	0.98	0.74, 1.31	0.902
Manage pain	1.0	0.73, 1.36	0.976	0.96	0.70, 1.32	0.806
"Stay or get clean"	0.73	0.59, 0.91	0.005	0.70	0.56, 0.87	0.001
Stop or taper off treatment	1.0	0.80, 1.27	0.974	1.01	0.80, 1.27	0.954
Age in years	1.0	0.99, 1.01	0.730	1.0	0.99, 1.01	0.715
Female sex	1.13	0.93, 1.37	0.223	1.14	0.94, 1.39	0.194
Type of treatment Methadone	[ref]			[ref]		
Buprenorphine-naloxone	1.88	1.40, 2.50	< 0001	2.13	1.58, 2.86	< 0.001
Medication dose (mg/day)	1.0	0.99, 1.01	0.057	1.0	1.0. 1.0	0.015
Years in treatment	1.03	1.01, 1.04	0.013	1.03	1.01, 1.05	0.006
Opioid abstinence at baseline	5.34	4.23, 6.74	<0.001	6.15	4.83, 7.84	< 0.001

OR = Odds Ratio, CI = Confidence Interval

Variance inflation factor = 1.19

Hosmer-Lemeshow χ^2 5.93, $p = 0.656$

[a] Model is adjusted for age, sex, type of treatment (methadone or buprenorphine-naloxone), dose, length of time in treatment, and opioid abstinence at baseline.

[b] Participants with missing data in any of the included covariates are excluded due to complete case analysis (missing urine drug screen data: n = 36, missing sex: n = 1, missing length of time in treatment: n =1).

[c] Excluding 14 outliers detected using deviance residuals less than -2 from the analysis

Supplementary Table 2. Multivariable model of the association between number of self-reported goals and abstinence from opioid use for 3 months following study entry.

Covariate	OR	95% CI	*p*
	(n = 1, 994ᵇ)		
Number of goals reported			
One	[ref]		
Two	0.93	0.75, 1.15	0.497
Three or more	0.70	0.49, 1.0	0.049
Age in years	1.0	0.99, 1.01	0.600
Female sex	1.14	0.94, 1.38	0.197
Type of treatment			
Methadone	[ref]		
Buprenorphine-naloxone	1.88	1.41, 2.52	< 0.001
Medication dose (mg/day)	1.0	0.99, 1.01	0.055
Years in treatment	1.03	1.01, 1.05	0.004
Opioid abstinence at baseline	5.41	4.30, 6.82	<0.001
OR = Odds Ratio, CI = Confidence Interval			