

# Long-term treatment outcomes in a First Nations high school population with opioid use disorder

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## Abstract

**Objective** To assess for long-term positive effects of buprenorphine treatment (BT) on opioid use disorder (OUD) at a Nishnawbe Aski Nation high school clinic.

**Design** Postgraduation telephone survey of high school students between March 2017 and January 2018.

**Setting** Dennis Franklin Cromarty High School in Thunder Bay, Ont.

**Participants** All 44 students who had received BT in the high school clinic during its operation from 2011 to 2013 were eligible to participate.

**Main outcome measures** Current substance use, BT status, and social and employment status.

**Results** Thirty-eight of the 44 students who had received BT in the high school clinic were located and approached; 32 consented to participate in the survey. A descriptive analysis of the surveyed indicators was undertaken. Almost two-thirds ( $n=20$ , 62.5%) of the cohort had graduated from high school, more than one-third ( $n=12$ , 37.5%) were employed full time, and most ( $n=29$ , 90.6%) rated their health as “good” or “OK.” A greater percentage of participants who continued taking BT after high school ( $n=19$ , 61.3%) were employed full time ( $n=8$ , 42.1% vs  $n=4$ , 33.3%) and were abstinent from alcohol ( $n=12$ , 63.2% vs  $n=4$ , 33.3%). Participants still taking BT were significantly more likely to have obtained addiction counseling in the past year than those participants not in treatment ( $n=9$ , 47.4% vs  $n=1$ , 8.3%;  $P=.0464$ ).

**Conclusion** The study results suggest that offering OUD treatment to youth in the form of BT in a high school clinic might be an effective strategy for promoting positive long-term health and social outcomes. Clinical treatment guidelines currently recommend long-term opioid agonist treatment as the treatment of choice for OUD in the general population; they should consider adding youth to the population that might also benefit.

## Editor's key points

- ▶ Little research has been done on opioid use disorder in adolescents. This study offered an opportunity to better understand the effect of an innovative high school buprenorphine treatment (BT) program for Indigenous youth.
- ▶ There was a trend toward higher graduation rates, full-time employment, and a sense of well-being among the participants who had received BT while in high school.
- ▶ There was a trend toward better outcomes for those who were still taking BT at the time of the survey; they reported less alcohol use and were more likely to be employed full time, and they were significantly more likely to have engaged in formal substance use counseling in the past year.
- ▶ Participants commented that the proximity of the clinic had made participating in treatment possible. They described improved relationships with their family members and feeling encouraged by their student peers who were going through the treatment program at the school clinic.

### Points de repère du rédacteur

► Les recherches sur le trouble lié à l'utilisation d'opioïdes chez les adolescents sont peu nombreuses. Cette étude a offert la possibilité de mieux comprendre les effets d'un programme de traitement novateur à la buprénorphine (TB) destiné à de jeunes Autochtones du niveau secondaire.

► Les participants qui avaient suivi un TB pendant leurs études secondaires avaient tendance à avoir des taux de diplomation plus élevés, à occuper un emploi à temps plein et à ressentir un sentiment de bien-être.

► Les résultats avaient tendance à être meilleurs chez ceux qui suivaient encore un TB au moment du sondage; ils ont signalé une moins grande consommation d'alcool, et ils étaient plus susceptibles d'avoir un emploi à plein temps. Il était significativement plus probable qu'ils aient participé à un counseling formel sur la consommation de substances durant l'année précédente.

► Les répondants ont indiqué que la proximité de la clinique avait rendu possible leur participation au traitement. Ils ont décrit une amélioration des relations avec les membres de leur famille, et ils se sont dits encouragés par leurs pairs étudiants qui suivaient le programme de traitement à la clinique de l'école.

# Résultats d'un traitement à long terme du trouble lié à l'utilisation d'opioïdes dans la population d'une école secondaire au sein d'une Première Nation

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## Résumé

**Objectif** Évaluer les effets positifs à long terme d'un traitement à la buprénorphine (TB) sur le trouble lié à l'utilisation d'opioïdes (TUO) à la clinique de l'école secondaire de la Nation Nishnawbe Aski.

**Type d'étude** Sondage téléphonique après l'obtention de leur diplôme auprès des étudiants de l'école secondaire, entre mars 2017 et janvier 2018.

**Contexte** École secondaire Dennis Franklin Cromarty à Thunder Bay (Ontario).

**Participants** Les 44 étudiants qui ont suivi un TB à la clinique de l'école secondaire durant sa période d'activité, entre 2011 et 2013, et qui étaient admissibles à participer.

**Principaux paramètres à l'étude** Consommation actuelle de substances, participation à un TB, et situation sociale et d'emploi.

**Résultats** Parmi les 44 étudiants qui ont reçu un TB à la clinique de l'école secondaire, 38 ont été localisés et rejoints, et 32 ont consenti à participer au sondage. Une analyse descriptive des indicateurs prévus dans le sondage a été entreprise. Près des deux tiers ( $n = 20, 62,5\%$ ) de la cohorte avaient reçu leur diplôme d'études secondaires, plus du tiers ( $n = 12, 37,5\%$ ) occupaient un emploi à temps plein, et la plupart ( $n = 29, 90,6\%$ ) évaluaient leur santé comme étant « bonne » ou « acceptable ». Un pourcentage plus élevé des participants qui ont continué à suivre un TB après leurs études secondaires ( $n = 19, 61,3\%$ ) était employé à plein temps ( $n = 8, 42,1\%$  c.  $n = 4, 33,3\%$ ) et ne consommait pas d'alcool ( $n = 12, 63,2\%$  c.  $n = 4, 33,3\%$ ). Il était significativement plus probable que les participants qui suivaient encore un TB aient reçu du counseling sur les dépendances durant l'année précédente par rapport à ceux qui ne recevaient plus le traitement ( $n = 9, 47,4\%$  c.  $n = 1, 8,3\%$ ;  $p = ,0464$ ).

**Conclusion** Les résultats de l'étude font valoir que l'offre d'un traitement contre le TUO à des jeunes sous la forme d'un TB à la clinique de l'école secondaire pourrait être une stratégie efficace pour promouvoir une bonne santé à long terme et des résultats sociaux favorables. Les lignes directrices sur le traitement clinique recommandent actuellement un traitement à long terme aux agonistes opioïdes comme traitement à privilégier pour le TUO dans la population générale; il y aurait lieu d'envisager d'ajouter à cette population les jeunes qui pourraient aussi en bénéficier.

Opioid use disorder (OUD) is a serious and prevalent problem in Canada, and the people of First Nations communities in Ontario have been affected profoundly,<sup>1</sup> with First Nations communities having higher rates of substance use and overdose compared with the general population. Youth in First Nations communities have high levels of prescription drug abuse,<sup>2</sup> and in the Nishnawbe Aski Nation, which represents 49 First Nations communities in northern Ontario, it has been estimated that twice as many high school students have OUD as the mainstream average (unpublished data, Nishnawbe Aski Nation Annual Report, 2011).

Efforts have been made in the past several years to facilitate opioid agonist treatment (OAT) in the several dozen communities that comprise the Nishnawbe Aski Nation. However, clinicians and community members have been reluctant to start young patients on long-term opioid agonist maintenance because adolescents generally have a shorter duration of OUD and there has been little research to guide clinicians on long-term OAT in youth. One study of a 2-week tapering regimen versus 12-week buprenorphine treatment (BT) with tapering found that the latter group used opioids less.<sup>3</sup> Another retrospective study found positive outcomes for youth taking long-term BT.<sup>4</sup> A Cochrane Collaboration review of OAT in youth concluded that there was an urgent need for further research comparing maintenance treatment with detoxification and psychosocial treatment with long-term follow-up.<sup>5</sup>

We sought to better understand the long-term outcomes of a cohort of high school students who were offered short-term buprenorphine detoxification and, later, maintenance BT at the school health clinic of Dennis Franklin Cromarty (DFC) High School, located in Thunder Bay, Ont.

## — Methods —

### Intervention

A telephone survey was administered to students who were in the DFC High School BT program regarding current self-reported OUD treatment, employment, substance use, and health status. The study was conducted between March 2017 and January 2018.

### Description of the BT program

The BT program ran between 2011 and 2013. The student health clinic at DFC High School initiated 44 unique students into 5 separate cycles of 25- to 30-day formal “detox” programs using a tapering schedule of the opioid agonist buprenorphine. In the first 2 cycles students were completely tapered off of buprenorphine but by the third cycle an option was added to remain on low-dose buprenorphine maintenance if tapering had been accompanied by relapse. Students in the last

3 cycles accepted the option to remain on low-dose buprenorphine maintenance and students in the first 2 cycles who had relapsed were permitted to return to the clinic to restart BT maintenance. Six students repeated a subsequent detox cycle. Group counseling sessions were made available, and each student had an individual relapse prevention plan. Health clinic staff helped to coordinate care with the students’ home communities for vacations and summer breaks so that medication delivery was not interrupted.

### Participants

All 44 students who had received BT from the high school between 2011 and 2013 were eligible for participation. Dennis Franklin Cromarty High School is attended by First Nations students and is administered by the Northern Nishnawbe Education Council, which serves 23 remote reserve communities in northwestern Ontario.<sup>6</sup> Students frequently fly in from their communities and are billeted to board with host families or extended relatives during the school year. This high school community has experienced much devastation, including the death of 7 youth (6 of whom attended DFC High School) in Thunder Bay between 2000 and 2011, which led to a coroner’s inquest by the Ontario government.<sup>7</sup> The coroner listed acute alcohol intoxication as a cause of death in 4 of the 7 cases and drowning in 5 of the 7 cases. Many of the participants in the BT program were survivors of suicide attempts, had high rates of mental health issues, and came from families with a member who had a substance use disorder.<sup>8</sup>

### Survey development

The structured survey collected information on current treatment status, drug use, alcohol use, housing, employment, and health care status and use. The structured interview format was developed by adapting the Addiction Severity Index and the Alcohol Use Disorders Identification Test, which are both validated instruments.<sup>9,10</sup> The questions were adapted in consultation between 2 of the authors (A.S. and M.M.K.) and the Applied Health Research Centre at St Michael’s Hospital in Toronto, Ont. Questions were chosen for their relevance to current drug use, employment status, and self-reported health status. Efforts were made for the survey to take no more than 30 minutes to minimize disruption to participants’ lives and to maximize willingness to participate. Survey questions and answers were entered into Qualtrics.

### Survey administration

The high school addictions and community service worker (T.P.) contacted the 44 eligible students via telephone and e-mail and invited them to participate in a 30-minute telephone survey on their current BT status, employment, drug use, health indicators, and social

situation. If the students agreed to participate they were asked to give formal verbal consent by telephone. The survey could be administered at a later scheduled time if more convenient. Surveys were administered primarily over the telephone, as many students had graduated and moved back to their home communities. Participants were also given the option to have the survey administered in person by the same addictions service worker in the school's health clinic.

### Analysis

We ran a descriptive analysis of the surveyed health indicators to describe the current health and social situations of this cohort and to see if there were differences between those who were still taking BT compared with those who had discontinued BT.

Statistical analyses were carried out using GraphPad InStat statistical software, version 3.10. The Fisher exact test was performed using the Yates continuity correction and a 2-sided *P* value.

### Ethics

Research ethics approval was obtained from Women's College Hospital at the University of Toronto. Permission and approval was obtained from the DFC High School board and the Northern Nishnawbe Education Council. Two co-authors of this study (M.K. and C.C.) are the medical directors for the opioid addiction treatment program at DFC High School. One co-author (T.P.) is the addictions and community service worker at the high school and another co-author (C.M.) is the school nurse. The students were initially approached to participate in the study by the school's addictions counselor because it was believed that the students and community would accept a trusted support person. There was no compensation offered to students for their participation. A script for obtaining consent from the participants included a clear and explicit description of the counselor's departure from her usual role and was approved by the Research Ethics Board of Women's College Hospital.

## — Results —

We were able to locate 38 of the potential 44 students (**Table 1**); 32 students agreed to participate in the structured survey. The mean (SD) participant age was 24 (2.0) years (range 20 to 29) and most participants were female (*n*=21, 65.6%; **Table 2**). Twenty of 32 students (62.5%) had completed high school. Twenty-two participants (68.7%) described cohabitating with a long-term partner and 19 participants (59.4%) had at least 1 child. Twelve (37.5%) participants were employed full time. Twelve (37.5%) participants identified receiving government income assistance as their main source of income.

Most participants indicated that they had stopped and restarted BT more than once, with 23 participants

**Table 1. Participant characteristics at the time of buprenorphine treatment program initiation: *N* = 44.**

CHARACTERISTIC	VALUE
Mean age, y	18.5
Sex, n (%)	
• Female	29 (65.9)
• Male	15 (34.1)
Using opioids* regularly, n (%)	44 (100.0)
• Regular intravenous use	37 (84.1)
• Regular inhalation use	42 (95.5)
• Regular oral use	10 (22.7)

\*Oxycodone was used exclusively.

**Table 2. Participant characteristics at time of study participation: *N* = 32.**

CHARACTERISTIC	VALUE
Mean (SD) age, y	24 (2.0)
Sex, n (%)	
• Female	21 (65.6)
• Male	11 (34.4)
Currently taking BT, n (%)	19 (59.4)
Completed high school, n (%)	20 (62.5)
Cohabitates with a long-term partner, n (%)	22 (68.7)
Has ≥ 1 children, n (%)	19 (59.4)
Employed full time, n (%)	12 (37.5)
Had ≥ 1 ED visit in the past y, n (%)	6 (18.8)
Health self-rating as "good" or "OK" in the past 30 d, n (%)	29 (90.6)
Mood self-rating as "happy" or "OK" in the past 30 d, n (%)	26 (81.3)
Alcohol use in the past 30 d, n (%)	15 (46.9)
Alcohol use in the past 30 d: ≥ 2 drinks/d, n (%)	11 (34.4)
Daily cannabis use in the past 30 d, n (%)	7 (21.9)
Opioid use in the past 30 d, n (%)	3 (9.4)

BT—buprenorphine treatment, ED—emergency department.

(71.9%) saying that they had had 2 or 3 distinct treatment periods with buprenorphine, with a mean of 47 months taking BT. In the past 30 days, 3 participants (9.4%) had used opioids at least once, 11 (34.4%) had consumed 2 or more alcoholic drinks per day, and 7 (21.9%) described daily cannabis use. Only 1 participant (3.1%), who was not taking BT, described active daily opioid use as being a barrier to obtaining employment, and none of the participants identified mental or physical illness as being a barrier to obtaining employment. Most participants (*n*=29, 90.6%) rated their health as being "good" or "OK" during the past month.

Nineteen participants (59.4%) reported that they were still taking BT. Participants who were still taking BT at the time of the survey had a mean cumulative treatment length of 54 months versus 35 months for those not currently taking BT. For those who had discontinued treatment, the top reason ( $n=9$ , 28.1%) identified was that they no longer believed they needed treatment. No participants identified treatment access or geography as a barrier. A greater percentage of participants still taking BT were employed full time (42.1% vs 33.3% for those not taking BT) and abstinent from alcohol (63.2% vs 33.3% for those not still taking BT). While there were trends toward more employment stability and greater alcohol abstinence in those who were still undergoing treatment, the only difference that achieved statistical significance was that those still undergoing treatment were more likely to have received formal substance use counseling in the past year ( $P=.0464$ ; **Table 3**).

## — Discussion —

Little research has been done on OUD in adolescents and in Indigenous youth living in remote communities. Our research offered an opportunity to better understand the potential effects of an innovative high school BT program on the participants' lives.

One study comparing adolescents who used opioids with adolescents with cannabis or alcohol use disorders

found that the adolescents using opioids were more likely to have dropped out of school, have greater substance use severity, have polysubstance use, have injection drug use, share needles, and were more depressed than those using cannabis or alcohol.<sup>11</sup> Yet, our survey found a relatively high graduation rate, full-time employment rate, and sense of well-being among the participants who had received BT while in high school. Although participants reported stopping and starting BT, the mean cumulative time taking BT was 47 months. There was a trend toward better outcomes for those who were still taking BT at the time of the survey; they reported less alcohol use and more full-time employment, and were significantly more likely to have engaged in formal substance use counseling in the past year. There also appeared to be a trend of having at least 1 child, which might also be associated with stability and more external supports.

The school counselor undertook 3 in-depth interviews of program participants, who commented on the convenience of the treatment program being at school, preventing school absences; and that the proximity of the clinic made participating in treatment possible. They described improved relationships with their family members and feeling encouraged by their student peers who were going through the treatment program at the school clinic.

Given the strong evidence for the effectiveness of OAT in adults,<sup>12</sup> the initial studies showing better outcomes for youth taking OAT,<sup>3,4</sup> and the results of our survey, it would seem reasonable to consider OAT for youth with OUD.

**Table 3. Description by current treatment status:  $N = 31$ .**

CHARACTERISTIC	CURRENTLY TAKING BT*	
	YES	NO
Participant count, n (%)	19 (61.3)	12 (38.7)
Mean age, y	25	24
Completed high school, n (%)	12 (63.2)	8 (66.7)
Employed full time, n (%)	8 (42.1)	4 (33.3)
Has $\geq 1$ children, n (%)	13 (68.4)	5 (41.7)
Has a family doctor, n (%)	13 (68.4)	4 (33.3)
Has received formal substance use counseling in the past y, <sup>†</sup> n (%)	9 (47.4)	1 (8.3)
Any alcohol in the past 30 d, n (%)	7 (36.8)	8 (66.7)
$\geq 2$ drinks/d of alcohol in the past 30 d, n (%)	5 (26.3)	6 (50.0)
Daily cannabis use in the past 30 d ( $\geq 1$ joint), n (%)	5 (26.3)	4 (33.3)
Any cocaine use in the past 30 d, n (%)	3 (15.8)	3 (25.0)
Any recreational opioid use in the past 30 d, n (%)	2 (10.5)	1 (8.3)
Mean cumulative treatment, mo	54	35

BT—buprenorphine treatment.  
 \*One participant did not specify whether he or she was taking BT.  
 † $P=.0464$ .

## Limitations

The survey sample size was small, as this was a small, finite program. All data were based on self-reported health status, employment status, and drug use, and we did not have objective data to verify self-reports. While steps were taken to ensure that participants understood that the addiction service worker (T.P.), with whom they had a pre-existing therapeutic relationship, was administering the survey in a departure from her usual role, it is possible that their responses might have been affected by this previous connection.

## Conclusion

Our study results suggest that providing BT to youth with OUD while they are in high school might be an effective strategy for improving their long-term health and social outcomes. While further research is needed, BT should be viewed as a viable treatment option for youth with OUD.

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### Contributors

All authors contributed to the concept and design of the study; data gathering, analysis, and interpretation; and preparing the manuscript for submission.

### Competing interests

None declared

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