

## BRIEF REPORT

Impact of a Brief Addiction Medicine Training Experience on Knowledge Self-assessment  
among Medical Learners

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**ABSTRACT.** *Background:* Implementation of evidence-based approaches to the treatment of  
various substance use disorders is needed to tackle the existing epidemic of substance use and  
related harms. Most clinicians, however, lack knowledge and practical experience with these  
approaches. Given this deficit, we examined the impact of an inpatient elective in addiction

medicine amongst medical trainees on addiction-related knowledge and medical management.

*Methods:* Trainees who completed an elective with a hospital-based Addiction Medicine Consult Team (AMCT) in Vancouver, Canada from May 2015 – May 2016, completed a nine-item self-evaluation scale before and immediately after the elective. *Results:* A total of 48 participants completed both pre and post AMCT elective surveys. On average, participants were 28 years old (Inter Quartile Range [IQR] = 27-29), and contributed 20 days (IQR = 13-27) of clinical service. Knowledge of addiction medicine increased significantly post elective [mean difference (MD) = 8.63, standard deviation (SD) = 18.44; P = 0.002]. The most and the least improved areas of knowledge were relapse prevention and substance use screening, respectively. *Conclusions:* Completion of a clinical elective with a hospital-based Addiction Medicine Consult Team appears to improve medical trainees' addiction-related knowledge. Further evaluation and expansion of addiction medicine education is warranted to develop the next generation of skilled addiction care providers.

**Keywords:** Substance-related disorders, medical education, program evaluation, prospective studies

## INTRODUCTION

Substance use disorders (SUD) are a major factor in the global burden of disease.<sup>1</sup> They rank fifth of the 10 leading causes of disability and death, and are a leading cause of healthcare expenditure.<sup>2</sup> Despite these poor outcomes, implementation of proven evidence-based addiction treatments has been slow. Quality of care for people with SUDs varies considerably and the latest evidence frequently does not translate into changes in clinical practice.<sup>4</sup> The main challenge in implementing systemic change is due to the lack of specialized knowledge and clinical training in addiction care that has essentially been non-existent within the medical curricula.<sup>5</sup> A multidisciplinary hospital addiction medicine consultative service plays an important role in clinical care and the treatment of SUDs.<sup>8,9</sup> Barriers to training clinicians in addiction medicine in this setting include lack of mentoring and hands-on clinical experience.<sup>10-12</sup> Experiential learning has been shown to improve both physician knowledge and attitudes towards working in various settings with people with SUDs.<sup>13,14</sup> However, the effect of academic hospital-based addiction medicine teams has not been fully characterised in the context of improving medical trainee addiction-related knowledge or self perceived ability, thus possibly impacting the quality of training, management and care for people with SUDs.<sup>15</sup> Therefore, we undertook this study to prospectively evaluate whether a dedicated training elective with specialty addiction medicine physicians improves addiction-related knowledge of medical trainees.

## METHODS

### Setting

The St. Paul's Hospital Addiction Medicine Consult Team (AMCT) in Vancouver, Canada, trains medical students, residents, as well as physicians in practice, who are already involved in the care of people with SUDs. The elective clinical rotation is focused on people with SUDs and is optional during the medical curricula. The AMCT faculty consists of nine physicians who are specialists in addiction medicine with varied backgrounds including Internal Medicine, Family Practice and Public Health. The elective's clinical rotation coordinator provides support to learners and all educational activities.

We prospectively evaluated a clinical elective rotation with the multidisciplinary AMCT. Since a lack of hands-on experience has been reported among the major barriers of addiction medicine education<sup>11, 14</sup>, experiential learning was built into AMCT's educational programme. The experiential learning involved a two to four week-long rotation – for medical students and residents – and three months long rotation for enhanced skills learners, i.e., established Family Physicians. The core learning occurred by completing inpatient Addiction Medicine consultations, providing longitudinal addiction care throughout a patients' hospital stay, and planning for primary care follow-up for addiction care.<sup>18</sup> Co-occurring physical or psychiatric comorbidities disorders were assessed within the hospital setting by respective departments or the AMCT, as appropriate. Educational aspects of clinical rotation included regular weekly didactic lectures (see appended sample schedule, emailed to all learners in advance), monthly journal clubs and grand rounds. In addition to the unique, hands-on experience with patients who had substance use disorders, the rotation offered a rapid involvement of learners in research

projects. While the emphasis of the clinical training was on direct patient care, all learners could partake in immersive research training. If interested, they selected, reviewed and presented a journal article from the team's collection of seminal addiction clinical trials on a weekly basis. Under direct supervision of Principal Investigator (PI), learners wrote case studies or acquired data from Urban Health Research Initiative's (UHRI) cohort studies of HIV-negative injection drug users, HIV-positive drug users, and street-involved youth, described elsewhere, and received statistical support from statisticians to develop analyses for publication.

## **Procedures**

Approximately 80 medical students, residents and physicians rotate through the elective annually. Learners who choose to complete the medical elective complete a brief self-assessment evaluation survey before and after their rotation with the AMCT at St Paul's hospital.

The survey was developed based on previous research with internal medicine residents in Boston, MA, and tailored to the key learning objectives of the addiction medicine rotation.<sup>19</sup> It was designed to measure learners' self-reported changes in knowledge, specific to management of SUDs in hospital. All learners who completed the elective between May 2015 – May 2016 were eligible to participate unless they: i) completed the elective more than once or ii) their elective was shorter than one week.

On the first and second-to-last-day of the elective, all learners were emailed a link to the online survey. They answered questions in the online survey by indicating their degree of agreement with nine statements (containing learning objectives), using a seven-point Likert-type scale (strongly agree-strongly disagree). Each statement started with phrase: "*I have a good knowledge of ...*" followed by specific areas of interest, e.g., "*screening patients for risky*

*substance use or SUD.*” If someone did not respond online, the site coordinator approached the person with a printed survey. The Research Ethics Board at Providence Healthcare Research Institute, University of British Columbia approved the study. All participants were informed of the study purpose, and the voluntary and confidential nature of participation, before signing informed e-consent.

The primary endpoint for our statistical comparisons was the mean difference between the assessments at the start and at the end of the elective (out of the maximum possible 63 points). T-tests calculated statistical significance of the differences.

## RESULTS

Of the total 96 trainees, 88 were invited to participate, based on the eligibility criteria, and 61 (69.31%) completed the pre-rotation self-assessment from May 2015 - May 2016. An 89% follow-up rate was achieved post-rotation (n = 54). We were able to match 48 pre and post surveys due to missing identifiers. There were no differences between the “before” and “after” sample, although slightly fewer medical students, internal medicine and family medicine physicians responded post- elective (Table one). At the start of the elective, the 48 matched participants’ self-reported knowledge averaged at 33.83 points (out of 63 possible; higher scores mean higher competency). On average, the 61 baseline responders were 28 years old, included medical students (28), residents (29), clinical fellows (2) and enhanced skills learners (2) - family medicine, respectively, who provided on average clinical service for 20 days. As shown in Table two, at the end of the elective, the 48 matched trainees reported improved knowledge in addiction medicine [mean difference (MD) = 8.63, standard deviation (SD) = 18.44; P = 0.002].

The most and the least improved areas were relapse prevention and substance use screening, respectively. The other areas improved in the following order, from highest to lowest: safe prescribing, opioid addiction, history taking, withdrawal management, nicotine addiction, signs and symptoms recognition and biology of addiction.

[TABLES 1-2 HERE]

## DISCUSSION

We found that medical trainees reported higher levels of knowledge in addiction medicine following an elective with a team of specialized addiction physicians based in a hospital. Significant improvements were observed in knowledge of all assessed areas, except for screening. That screening improved only marginally is likely due to lesser emphasis on screening patients as they are being referred to the team with a medical consequence of SUD. We did not expect major improvements in the screening for SUDs because of the nature of the clinical rotation and environment where patients are triaged to the consult team “pre-screened” already.

An important implication for healthcare education and policy is that although hands-on training in addiction medicine tends to be overlooked in medical education, yet, both emerging and established physicians appear to be responsive to this type of training, as documented in the current and previous studies.<sup>14 20</sup> Despite the traditional neglect of addiction medicine in medical curricula, our findings suggest that providing this type of experiential learning in a hospital may be a novel component in the longitudinal education of healthcare providers that could improve the knowledge base and treatment skills of physicians in training.<sup>5</sup>

We acknowledge several limitations that constrict generalizability of our findings. First, the self-assessment tool must be validated by objective measures of learning and professional clinical practice in future research.<sup>23</sup> Second, inclusion of learners from a single location may have introduced bias into the observation. Third, the self-selection of trainees for the elective with the St. Paul's hospital team may have overrepresented learners with greater interest or experience, or both. The survey was abbreviated to decrease the completion time, possibly simplifying the subject in several areas, such as question number five did not provide details on the medications that may be used to prevent relapse, which is a limit to assess the students' knowledge. Question number eight should have distinguished between SUDs and OUDs to increase the accuracy of the survey. Cannabis use disorders should be included in future surveys. Learners with longer electives had more exposure and experience in their learning, which might have influenced the increase in their knowledge compared to those who only had one or two weeks in the elective. Although the general principles of experiential learning apply to all settings, the specifics of the Canadian educational programmes may have influenced the learning process and may not be generalizable to other settings. Other sites should be encouraged to replicate our findings. Future studies should examine whether increased knowledge after a hospital-based elective translates into changes in provider behaviour and patient outcomes, using control groups of learners who receive no hands-on experiential training or who undergo rotations in other settings.

In summary, the completion of an elective with a hospital-based Addiction Medicine Consult Team appeared to improve medical trainees' knowledge. Further evaluation and expansion of addiction medicine education and training is warranted.

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## AUTHOR CONTRIBUTIONS

JK and EW designed the study and drafted the first version of the manuscript. KA and SN oversaw the data collection and survey development. CF, MM and AM contributed to study design. All authors reviewed and approved the manuscript.

## REFERENCES

1. Degenhardt L, Hall W. Extent of illicit drug use and dependence, and their contribution to the global burden of disease. *Lancet* 2012;379(9810):55-70. doi: 10.1016/S0140-6736(11)61138-0 [published Online First: 2012/01/10]
2. World Health Organization. The world health report 2002: reducing risks, promoting healthy life: World Health Organization 2002.
3. US Burden of Disease Collaborators. The state of US health, 1990-2010: burden of diseases, injuries, and risk factors. *JAMA* 2013;310(6):591-608. doi: 10.1001/jama.2013.13805 [published Online First: 2013/07/12]
4. The National Centre on Addiction and Substance Abuse at Columbia University. Addiction medicine: closing the gap between science and practice.2012.
5. Ayu AP, Schellekens AFA, Iskandar S, et al. Effectiveness and Organization of Addiction Medicine Training Across the Globe. *European Addiction Research* 2015;21(5):223-39.
6. O'Toole TP, Pollini RA, Ford DE, et al. The health encounter as a treatable moment for homeless substance-using adults: The role of homelessness, health seeking behavior, readiness for behavior change and motivation for treatment. *Addictive Behaviors* 2008;33(9):1239-43.
7. O'Toole TP, Conde-Martel A, Gibbon JL, et al. Where do people go when they first become homeless? A survey of homeless adults in the USA. *Health and Social Care in the Community* 2007;15(5):446-53.

8. Warner ML, Mooney AJ, 3rd. The hospital treatment of alcoholism and drug addiction. *Prim Care* 1993;20(1):95-105.
9. Maldonado JR, Sher Y, Das S, et al. Prospective Validation Study of the Prediction of Alcohol Withdrawal Severity Scale (PAWSS) in Medically Ill Inpatients: A New Scale for the Prediction of Complicated Alcohol Withdrawal Syndrome. *Alcohol and alcoholism (Oxford, Oxfordshire)* 2015;50(5):509-18. doi: 10.1093/alcalc/agv043 [doi]
10. Barss P, Grivna M, Al-Maskari F, et al. Strengthening public health medicine training for medical students: development and evaluation of a lifestyle curriculum. *Med Teach* 2008;30(9-10):e196-218. doi: 10.1080/01421590802334267
11. Conroy MB, Delichatsios HK, Hafler JP, et al. Impact of a preventive medicine and nutrition curriculum for medical students. *Am J Prev Med* 2004;27(1):77-80. doi: 10.1016/j.amepre.2004.03.009
12. Buckley S, Coleman J, Davison I, et al. The educational effects of portfolios on undergraduate student learning: a Best Evidence Medical Education (BEME) systematic review. BEME Guide No. 11. *Med Teach* 2009;31(4):282-98. doi: 10.1080/01421590902889897
13. Kokotailo PK, Langhough R, Neary EJ, et al. Improving pediatric residents' alcohol and other drug use clinical skills: use of an experiential curriculum. *Pediatrics* 1995;96(1):99-104.
14. Barron R, Frank E, Gitlow S. Evaluation of an Experiential Curriculum for Addiction Education Among Medical Students. *Journal of addiction medicine* 2012;6(2):131-36. doi: 10.1097/ADM.0b013e3182548abd

15. Wakeman SE, Pham-Kanter G, Baggett MV, et al. Medicine Resident Preparedness to Diagnose and Treat Substance Use Disorders: Impact of an Enhanced Curriculum. *Subst Abuse* 2015;36(4):427-33. doi: 10.1080/08897077.2014.962722
16. Wood E, Samet JH, Volkow ND. Physician education in addiction medicine. *JAMA* 2013;310(16):1673-4. doi: 10.1001/jama.2013.280377 [published Online First: 2013/10/24]
17. Wood E, Sakakibara T, McIver G, et al. A UBC, Vancouver Coastal Health and St. Paul's Hospital Strategy for Education in Addiction Medicine. *UBC Medical Journal* 2013;5(1):5-7.
18. Rieb L, Wood E. The Evolution of Addiction Medicine Education in British Columbia. *Canadian Journal of Addiction* 2014;5(3):17-20.
19. Wakeman SE, Baggett MV, Pham-Kanter G, et al. Internal Medicine Residents' Training in Substance Use Disorders: A Survey of the Quality of Instruction and Residents' Self-Perceived Preparedness to Diagnose and Treat Addiction. *Substance Abuse* 2013;34(4):363-70. doi: 10.1080/08897077.2013.797540
20. Cole B, Clark DC, Seale JP, et al. Reinventing the Reel: An Innovative Approach to Resident Skill-Building in Motivational Interviewing for Brief Intervention. *Substance Abuse* 2012;33(3):278-81. doi: 10.1080/08897077.2011.639696
21. O'Toole TP, Cabral R, Blumen JM, et al. Building high functioning clinical teams through quality improvement initiatives. *Quality in Primary Care* 2011;19(1):13-22.

22. Schmidt LA, Rieckmann T, Abraham A, et al. Advancing recovery: implementing evidence-based treatment for substance use disorders at the systems level. *Journal of studies on alcohol and drugs* 2012;73(3):413-22. [published Online First: 2012/03/30]
23. Colthart I, Bagnall G, Evans A, et al. The effectiveness of self-assessment on the identification of learner needs, learner activity, and impact on clinical practice: BEME Guide no. 10. *Med Teach* 2008;30(2):124-45. doi: 10.1080/01421590701881699
24. Strang J, Hunt C, Gerada C, et al. What difference does training make? A randomized trial with waiting-list control of general practitioners seeking advanced training in drug misuse. *Addiction* 2007;102(10):1637-47. doi: 10.1111/j.1360-0443.2007.01929.x

**Table 1 Sample characteristics**

<b>Characteristic</b>	<b>Before n (%)</b> <b>61 (69.31)</b>	<b>After n (%)</b> <b>54 (61.36)</b>
Age (median, IQR)	28 (27-29)	28 (27-29)
Length of rotation (median days, IQR)	20 (13-27)	21 (13-27)
Type of Medical Trainee		
• Medical student	28(45.9)	24(44.4)
• Resident	29(47.5)	28(63.6)
• Addiction Medicine Fellow	2(3.3)	0(0)
• Enhanced Skills Learner – Family Medicine	2(3.3)	2(3.7)
Specialty (for physicians)		
• Emergency medicine	3(4.9)	3(5.6)
• Family Medicine	11(18.0)	8(14.8)
• Internal Medicine	20(32.7)	18(33.3)
• Global Medicine	0(0)	0(0)
• Psychiatry	3(4.9)	3(5.6)
• Ophthalmology	1(1.6)	1(1.9)
• Public Health	1(1.6)	1(1.9)
• Unknown	22(36.1)	20(37.0)

*Notes:* We report characteristics of all eligible trainees who completed at least one assessment

**Table 2 Self-assessment of knowledge in addiction medicine among trainees with matched pre and post scores among medical learners undergoing rotation with a hospital addiction medicine consult team (n = 48)**

Competency <sup>§</sup>	Before n (%) 48 (78.7%)	After n (%) 48 (88.9%)	Mean	P-value
			difference M (SD)	
Substance use screening (mean)	4.08	4.69	0.60 (2.29)	0.073
History taking	4.00	4.92	0.92 (2.66)	0.020*
Signs and symptoms examining	4.00	4.71	0.71 (2.25)	0.034*
Treating withdrawal	3.79	4.58	0.79 (2.02)	0.009*
Relapse prevention	3.17	4.71	1.54 (2.55)	0.0001**
Nicotine use disorders	3.90	4.65	0.75 (2.49)	0.042*
Opioid use disorders	3.63	4.79	1.17 (2.35)	0.001*
Safe prescribing	3.27	4.75	1.48 (2.42)	0.0001**
Biology of substance use disorders	4.00	4.67	0.67 (1.77)	0.012*
<b>TOTAL</b>	<b>33.83</b>	<b>42.46</b>	<b>8.63 (18.44)</b>	<b>0.002*</b>

<sup>§</sup>Please see Appendix for the full details of competencies assessed