

OVERDOSE PREVENTION SITES: SCIENTIFIC EVIDENCE FROM BRITISH COLUMBIA, CANADA

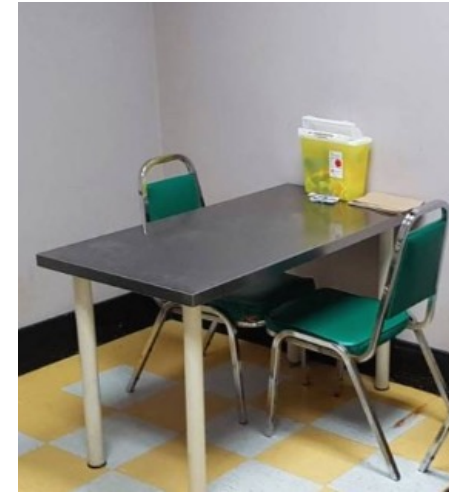
Mary Clare Kennedy, PhD

Canada Research Chair in Substance Use Policy and Practice Research
Assistant Professor, School of Social Work, University of British Columbia - Okanagan
Research Scientist, British Columbia Centre on Substance Use

Vermont Opioid Settlement Advisory Committee Meeting
August 22, 2023

DISCLOSURES

- I have no conflicts to declare



OBJECTIVES OF OVERDOSE PREVENTION SITES (OPS)

- **Reduce overdose-related morbidity and mortality.**
- **Reduce risk for transmission of infectious diseases.**
- **Increase contact with addiction treatment and other health and social services.**
- **Reduce public disorder.**



INSITE

- North America's first sanctioned OPS
 - Established in Vancouver in 2003
- Federally sanctioned
- Large purpose-built site
- 13 drug consumption booths
- Nurses supervise drug use & provide care for other health needs
- Addiction counsellors available to refer clients to addiction treatment & other services
- Subject to rigorous scientific evaluation

Findings from the Evaluation of the Vancouver Supervised Injecting Facility



OVERDOSE MORTALITY

- Marshall et al., *The Lancet*, 2011:

Reduction in overdose mortality after the opening of North America's first medically supervised safer injecting facility: a retrospective population-based study



Brandon D L Marshall, M-J Milloy, Evan Wood, Julio S G Montaner, Thomas Kerr

Summary

Background Overdose from illicit drugs is a leading cause of premature mortality in North America. Internationally, more than 65 supervised injecting facilities (SIFs), where drug users can inject pre-obtained illicit drugs, have been opened as part of various strategies to reduce the harms associated with drug use. We sought to determine whether the opening of an SIF in Vancouver, BC, Canada, was associated with a reduction in overdose mortality.

Lancet 2011; 377: 1429-37

Published Online

April 18, 2011

DOI:10.1016/S0140-

6736(10)62353-7

- Coroner records (Jan. 2001 – Dec. 2005).

	ODs occurring in blocks within 500 m of the SIF*		ODs occurring in blocks farther than 500 m of the SIF*	
	Pre-SIF	Post-SIF	Pre-SIF	Post-SIF
Number of overdoses	56	33	113	88
Person-years at risk	22 066	19 991	1 479 792	1 271 246
Overdose rate (95% CI)*	253.8 (187.3–320.3)	165.1 (108.8–221.4)	7.6 (6.2–9.0)	6.9 (5.5–8.4)
Rate difference (95% CI)*	88.7 (1.6–175.8); p=0.048	..	0.7 (-1.3–2.7); p=0.490	..
Percentage reduction (95% CI)	35.0% (0.0%–57.7%)	..	9.3% (-19.8% to 31.4%)	..

SIF=supervised injection facility. Pre-SIF period=Jan 1, 2001, to Sept 20, 2003. Post-SIF period=Sept 21, 2003, to Dec 31, 2005. *Expressed in units of per 100 000 person-years

Table 2: Overdose mortality rate in Vancouver between Jan 1, 2001, and Dec 31, 2005 (n=290), stratified by proximity to the SIF

Overdose deaths declined by 35% in the area around Insite (compared to 9% in the rest of Vancouver).

ALL-CAUSE MORTALITY

- Kennedy et al., *PLOS Medicine*, 2019:



The image shows a screenshot of a research article title page from PLOS Medicine. The page features the PLOS Medicine logo at the top left, followed by a horizontal purple line. Below the line, the text 'RESEARCH ARTICLE' is centered. The main title, 'Supervised injection facility use and all-cause mortality among people who inject drugs in Vancouver, Canada: A cohort study', is prominently displayed. Below the title, the authors' names are listed: Mary Clare Kennedy^{1,2*}, Kanna Hayashi^{1,3}, M-J Milloy^{1,2}, Evan Wood^{1,2}, and Thomas Kerr^{1,2}. Each name is accompanied by a small circular icon. At the bottom left of the article preview, there is a small icon of a red bookmark. The bottom right of the preview contains the email address bccsu-mck@bccsu.ubc.ca.

PLOS | MEDICINE

RESEARCH ARTICLE

Supervised injection facility use and all-cause mortality among people who inject drugs in Vancouver, Canada: A cohort study

Mary Clare Kennedy^{1,2*}, Kanna Hayashi^{1,3}, M-J Milloy^{1,2}, Evan Wood^{1,2}, Thomas Kerr^{1,2}

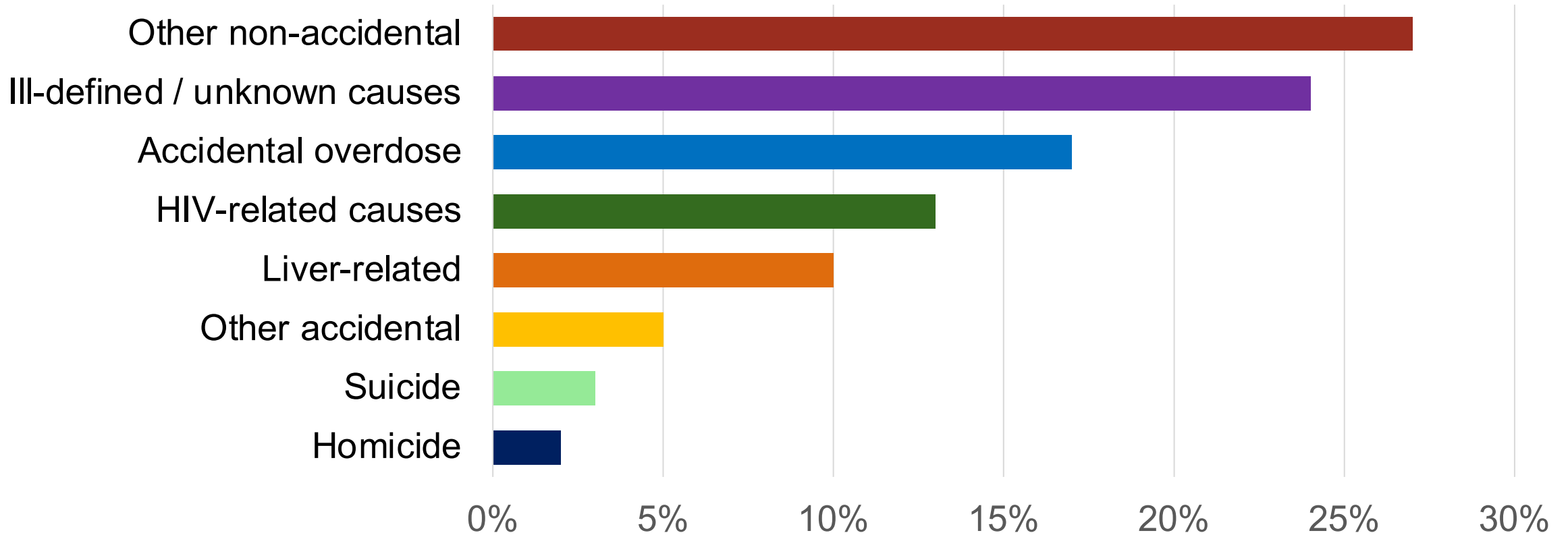
1 British Columbia Centre on Substance Use, St. Paul's Hospital, Vancouver, British Columbia, Canada, 2 Department of Medicine, University of British Columbia, St. Paul's Hospital, Vancouver, British Columbia, Canada, 3 Faculty of Health Sciences, Simon Fraser University, Burnaby, British Columbia, Canada

* bccsu-mck@bccsu.ubc.ca

- 811 people who inject drugs in Vancouver followed for an average of 6 years between 2006 and 2017.

- **112/811 (14%) study participants died during follow up:**

Causes of death



Multivariable extended Cox regression analysis of factors associated with all-cause mortality

Variable	Adjusted Hazard Ratio	95% Confidence Interval
Age	1.05*	1.01 – 1.09
Sex	1.62	0.89 – 2.96
Unstable housing	1.39	0.79 – 2.42
≥Weekly OPS use	0.46*	0.26 – 0.80
≥Daily cocaine injection	1.47	0.78 – 2.76
Enrolled in addiction treatment	0.66	0.41 – 1.08

* $p < 0.05$. Model also adjusted for HIV seropositivity, public injection, incarceration & calendar year.

Frequent OPS users were 54% less likely to die from any cause.

SYRINGE SHARING

- Kerr et al., *The Lancet*, 2005:

Safer injection facility use and syringe sharing in injection drug users

Thomas Kerr, Mark Tyndall, Kathy Li, Julio Montaner, Evan Wood

Lancet 2005; 366: 316–18

Published online
March 18, 2005

<http://image.thelancet.com/extras/04let9110web.pdf>

See [Comment](#) page 271

British Columbia Centre for
Excellence in HIV/AIDS,
St Paul's Hospital,

Safer injection facilities provide medical supervision for illicit drug injections. We aimed to examine factors associated with syringe sharing in a community-recruited cohort of illicit injection drug users in a setting where such a facility had recently opened. Between Dec 1, 2003, and June 1, 2004, of 431 active injection drug users 49 (11·4%, 95% CI 8·5–14·3) reported syringe sharing in the past 6 months. In logistic regression analyses, use of the facility was independently associated with reduced syringe sharing (adjusted odds ratio 0·30, 0·11–0·82, $p=0\cdot02$) after adjustment for relevant sociodemographic and drug-use characteristics. These findings could help inform discussions about the merits of such facilities.

- 431 people who inject drugs in Vancouver (Dec. 2003 - Jun. 2004).

	Adjusted odds ratio (95% CI)	p
Age (per year older)	0.95 (0.92–0.98)	0.01
Use of safer injection facility	0.30 (0.11–0.82)	0.02
Need for help injecting	2.95 (1.57–5.55)	0.01
Binge drug use	2.04 (1.02–4.08)	0.04
Intercept (constant)	(–0.79)	0.19

Model adjusted for all variables shown.

Table: Multivariate logistic regression of factors associated with syringe sharing

- Frequent Insite users were 70% less likely to report syringe sharing.

OTHER DRUG USE PRACTICES

- Stolz et al., *Journal of Public Health*, 2005:

Journal of Public Health Advance Access published January 17, 2007

Journal of Public Health | pp. 1 of 5 | doi:10.1093/pubmed/fdl090

Changes in injecting practices associated with the use of a medically supervised safer injection facility

**Jo-Anne Stoltz¹, Evan Wood^{1,2}, Will Small¹, Kathy Li¹, Mark Tyndall^{1,2},
Julio Montaner^{1,2}, Thomas Kerr¹**

¹Clinical Activities, British Columbia Centre of Excellence in HIV/AIDS and ²Faculty of Medicine, University of British Columbia, Vancouver, Canada
Address correspondence to Jo-Anne Stoltz, E-mail: jstoltz@cfenet.ubc.ca

- 760 people who inject drugs in Vancouver who used Insite (July 2004 - June 2005).

Table 2 Univariate and stratified* multivariate logistic regression models of changes in injection practices associated with consistent safer injection facility (SIF) use

Variable	Adjusted* odds ratio (AOR)		
	OR	(95% CI)	P value
a) Reuse syringes less often (Yes versus no)	2.04	(1.38–3.01)	<0.001
b) Less rushed during injection (Yes versus no)	2.79	(2.03–3.85)	<0.001
c) Less injecting outdoors (Yes versus no)	2.73	(1.93–3.87)	<0.001
d) Use clean water for injecting (Yes versus no)	2.99	(2.13–4.18)	<0.001
e) Cook/filter drugs prior to injection (Yes versus no)	2.76	(1.84–4.15)	<0.001
f) Tie off prior to injection (Yes versus no)	2.63	(1.58–4.37)	<0.001
g) Safer syringe disposal (Yes versus no)	2.13	(1.47–3.09)	<0.001
h) Easier to get vein first time (Yes versus no)	2.66	(1.83–3.86)	<0.001
i) Injection in a clean place (Yes versus no)	2.85	(2.09–3.87)	<0.001

Frequent Insite use was associated with positive changes in injecting practices, including: less reuse of syringes, less rushed injecting, less public injecting, use of sterile water for injecting, cooking/filtering drugs, injecting in a clean place, and safe syringe disposal.

UPTAKE OF ADDICTION TREATMENT

- DeBeck et al., *Drug and Alcohol Dependence*, 2011:



Contents lists available at ScienceDirect

Drug and Alcohol Dependence

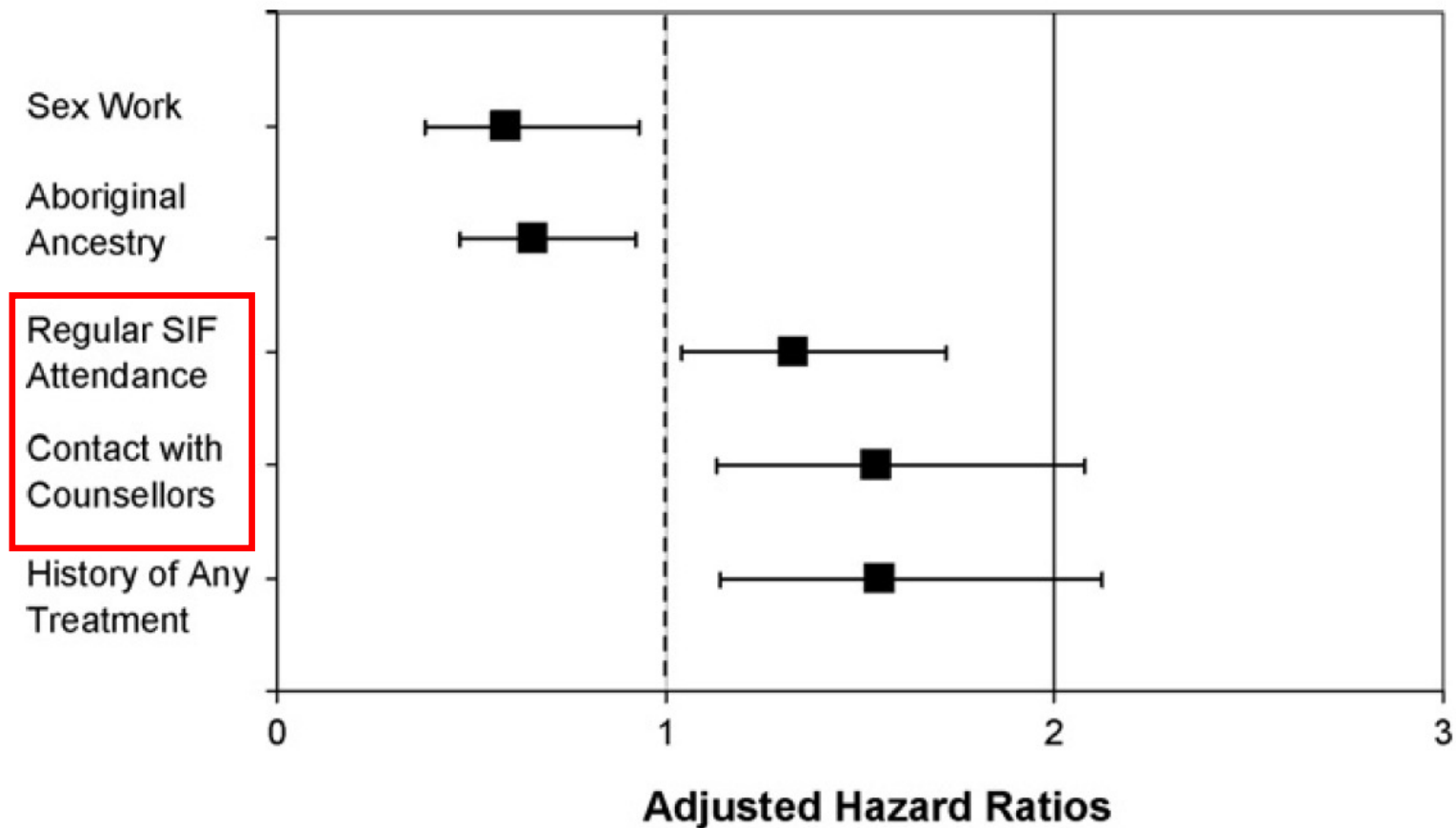
journal homepage: www.elsevier.com/locate/drugalcddep


ELSEVIER

Injection drug use cessation and use of North America's first medically supervised safer injecting facility

Kora DeBeck^a, Thomas Kerr^{a,b}, Lorna Bird^c, Ruth Zhang^a, David Marsh^{d,e,f}, Mark Tyndall^{a,g}, Julio Montaner^{a,b}, Evan Wood^{a,b,*}

- 902 people who inject drugs in Vancouver who used Insite (Dec 2003 - June 2006).



- **Frequent Insite use and contact with addiction counselor at Insite associated with initiation of addiction treatment.**
- **Initiation of addiction treatment associated with injection drug use cessation.**

HOSPITALIZATION FOR INJECTION-RELATED INFECTIONS

- Lloyd-Smith et al., *BMC Public Health*, 2010:

Lloyd-Smith et al. *BMC Public Health* 2010, **10**:327
<http://www.biomedcentral.com/1471-2458/10/327>

 BMC
Public Health

RESEARCH ARTICLE **Open Access**

Determinants of hospitalization for a cutaneous injection-related infection among injection drug users: a cohort study

Elisa Lloyd-Smith^{1,2}, Evan Wood^{1,2,3}, Ruth Zhang^{1,2}, Mark W Tyndall^{1,2}, Sam Sheps², Julio SG Montaner^{1,2,3} and Thomas Kerr^{*1,2,3}

- 1083 people who inject drugs in Vancouver who used Insite (Jan. 2004 – Jan. 2008).
- 49% of hospitalizations were for injection-related infections.

HOSPITALIZATION FOR INJECTION-RELATED INFECTIONS

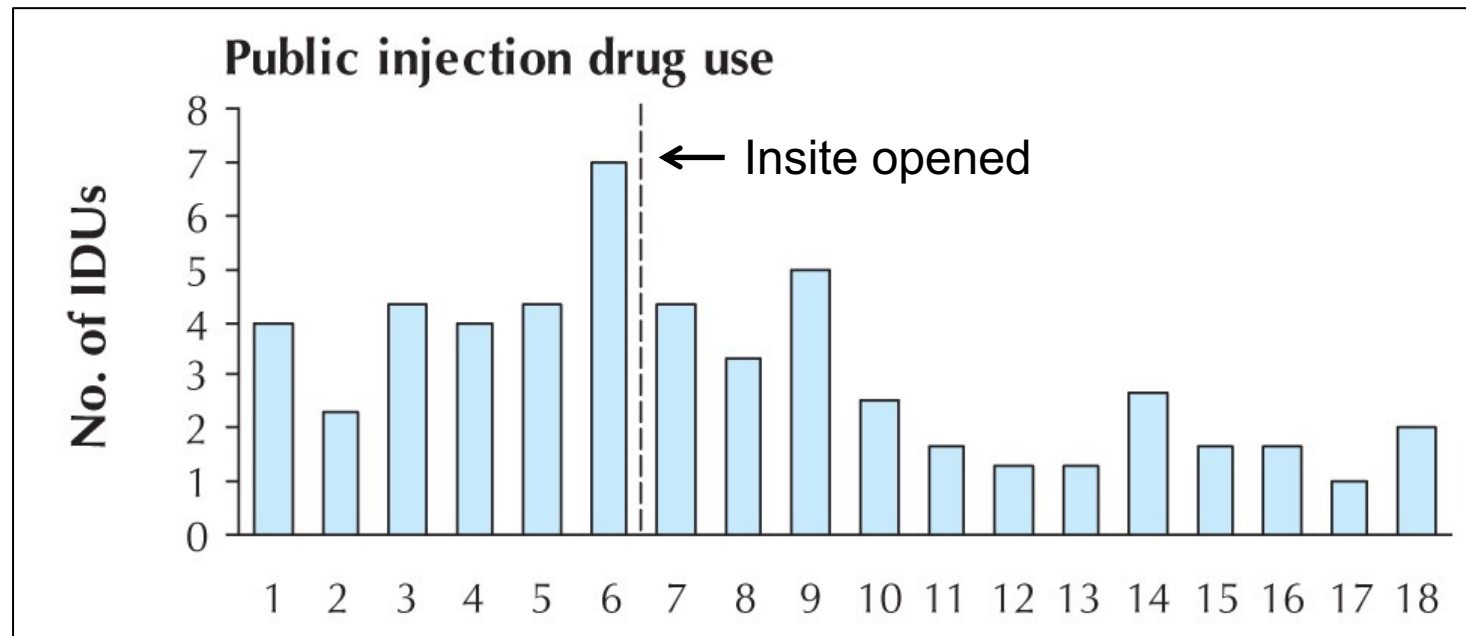
- **Referral to hospital by Insite nurses was associated with shorter duration of hospitalization for injection-related infections:**
 - Length of stay in hospital among those **referred by Insite nurses**: 4 days [IQR: 2-37].
 - Length of stay in hospital among those **self-referring**: 12 days [IQR: 5-33].
- **Each referral from the OPS = cost savings of ~\$6,000.**

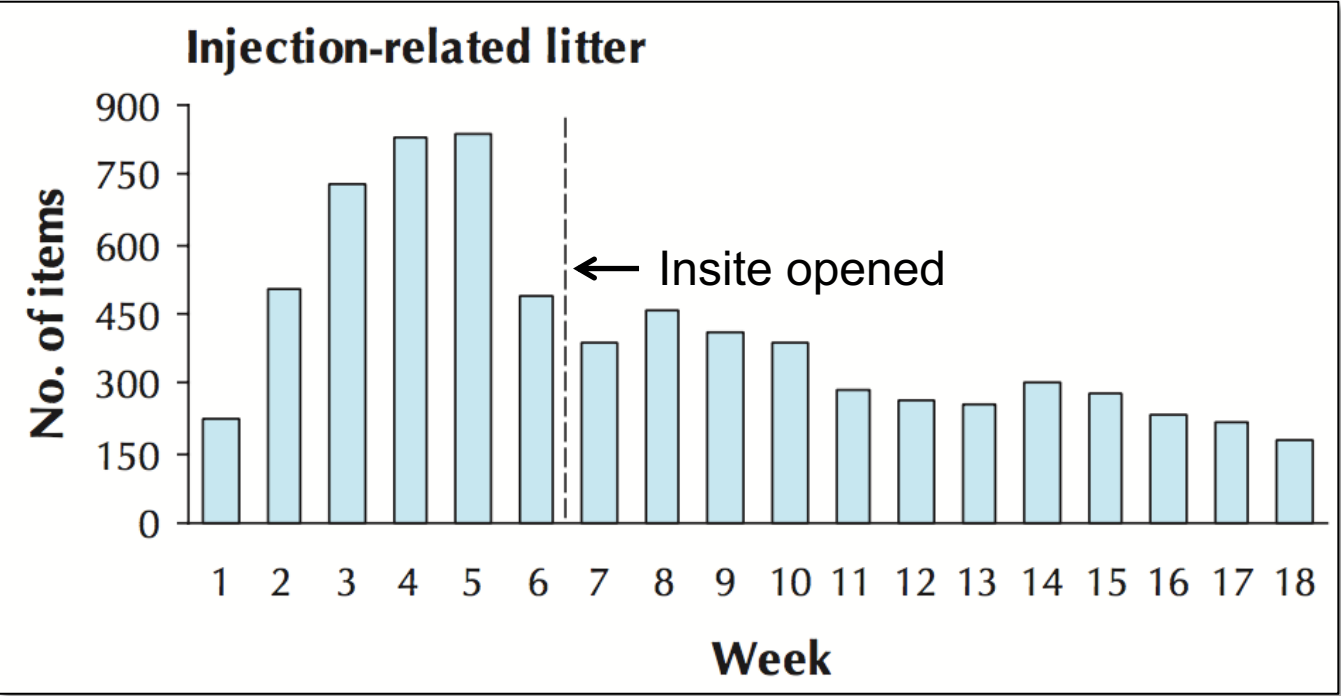
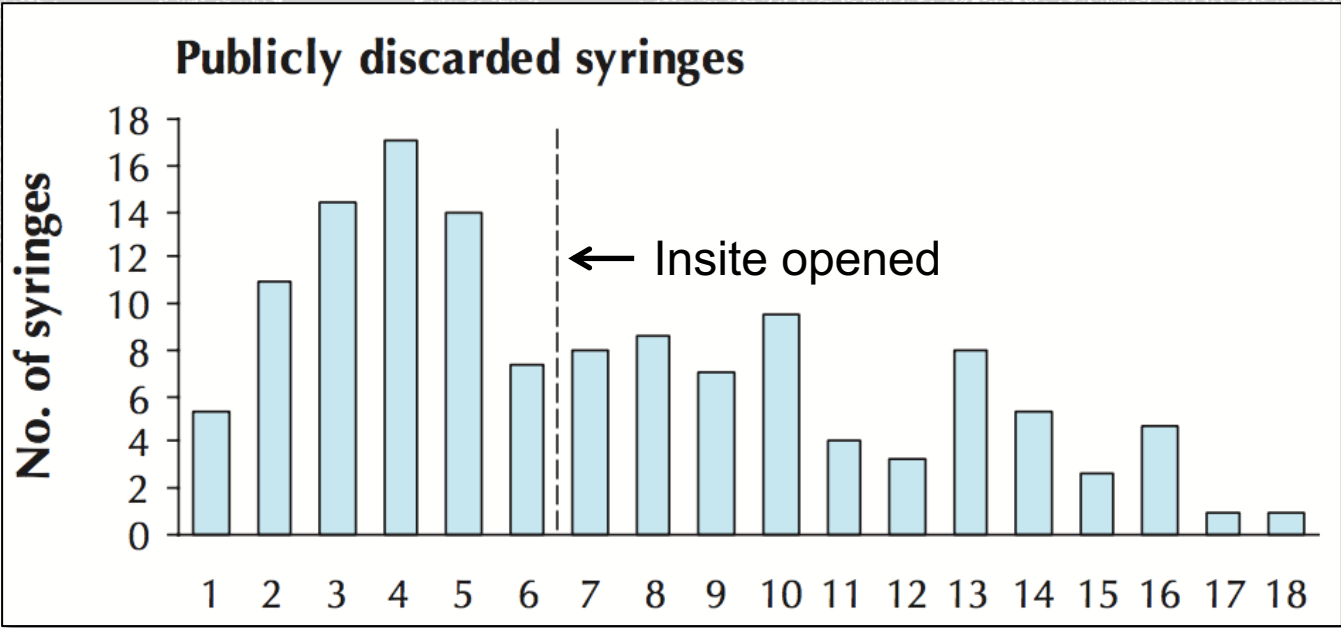
PUBLIC ORDER OUTCOMES

Changes in public order after the opening of a medically supervised safer injecting facility for illicit injection drug users

Evan Wood, Thomas Kerr, Will Small, Kathy Li, David C. Marsh, Julio S.G. Montaner, Mark W. Tyndall

Wood et al., *Canadian Medical Association Journal*, 2004:





ARE THERE NEGATIVE IMPACTS?

- ✘ No negative changes in local drug use patterns ([Kerr et al., BMJ, 2008](#))
- ✘ No increases in initiation into injection drug use ([Kerr et al., AJP, 2007](#))
- ✘ No increases in drug-related crime ([Wood et al., SATPP, 2006](#); [Myer & Belisle, JDI, 2018](#))

Impact of a medically supervised safer injection facility on community drug use patterns: a before and after study

Thomas Kerr, Jo-Anne Stoltz, Mark Tyndall, Kathy Li, Ruth Zhang, Julio Montaner, Evan Wood

Abstract

HIV infection and overdose despite an array of

Circumstances of First Injection Among Illicit Drug Users Accessing a Medically Supervised Safer Injection Facility

Thomas Kerr, PhD, Mark W. Tyndall, MD, ScD, Ruth Zhang, MSc, Calvin Lai, MMath, Julio S. G. Montaner, MD, and Evan Wood, PhD

length of injecting career and circumstances surrounding initiation into injection drug use among a cohort of users of a safer injecting facility in Vancouver, British Columbia. The Vancouver safer injecting facility—known as Insite—opened in September 2003 as part of a 3-year pilot study.

The Scientific Evaluation of Supervised Injecting (SEOSI) cohort has been described previously.¹² In brief, the SEOSI participants were a representative sample of users of the Insite safer injecting facility derived through random recruitment at the Insite facility. During study visits, blood

TABLE 1—Circumstances of Initiation Into Injection Drug Use Among Users of Vancouver's Safer Injecting Facility (N = 1065): The Scientific Evaluation of Supervised Injecting cohort, 2003–2005

Variable	No. (%)
Median age, y (range)	39 (19–64)
Years of injecting (interquartile range)	15.9 (8.6–25.9)
Gender	
Male	753 (70.7)
Female	312 (29.3)

Substance Abuse Treatment, Prevention, and Policy



Short Report

Open Access

Impact of a medically supervised safer injecting facility on drug dealing and other drug-related crime

Evan Wood*^{1,2}, Mark W Tyndall^{1,2}, Calvin Lai¹, Julio SG Montaner^{1,2} and Thomas Kerr^{1,2}

Highs and Lows: An Interrupted Time-Series Evaluation of the Impact of North America's Only Supervised Injection Facility on Crime

Andrew J. Myer¹ and Linsey Belisle²

Abstract

North America is currently experiencing an opioid crisis. One proposed solution to combat problems associated with injection drug use is the use of supervised injection facilities. These facilities provide

ARE OPS COST EFFECTIVE?

Pinkerton,
Addiction, 2010

Addiction 
RESEARCH REPORT doi:10.1111/j.1360-0443.2010.02977.x

Is Vancouver Canada's supervised injection facility cost-saving?

Steven D. Pinkerton

Insite prevents approximately 83.5 HIV infections per year, yielding \$17.6 million in future HIV-related medical care cost savings.



SUPREME COURT OF CANADA

CITATION: Canada (Attorney General) v. PHS Community Services Society, 2011 SCC 44 **DATE:** 20110930
DOCKET: 33556

BETWEEN:

Attorney General of Canada and Minister of Health for Canada

Appellants / Respondents on cross-appeal
and

**PHS Community Services Society, Dean Edward Wilson, Shelly Tomic
and Attorney General of British Columbia**

Respondents

Vancouver Area Network of Drug Users (VANDU)

Respondent / Appellant on cross-appeal

- and -

**Attorney General of Quebec, Dr. Peter AIDS Foundation,
Vancouver Coastal Health Authority, Canadian Civil Liberties Association,
Canadian HIV/AIDS Legal Network, International Harm Reduction
Association,**

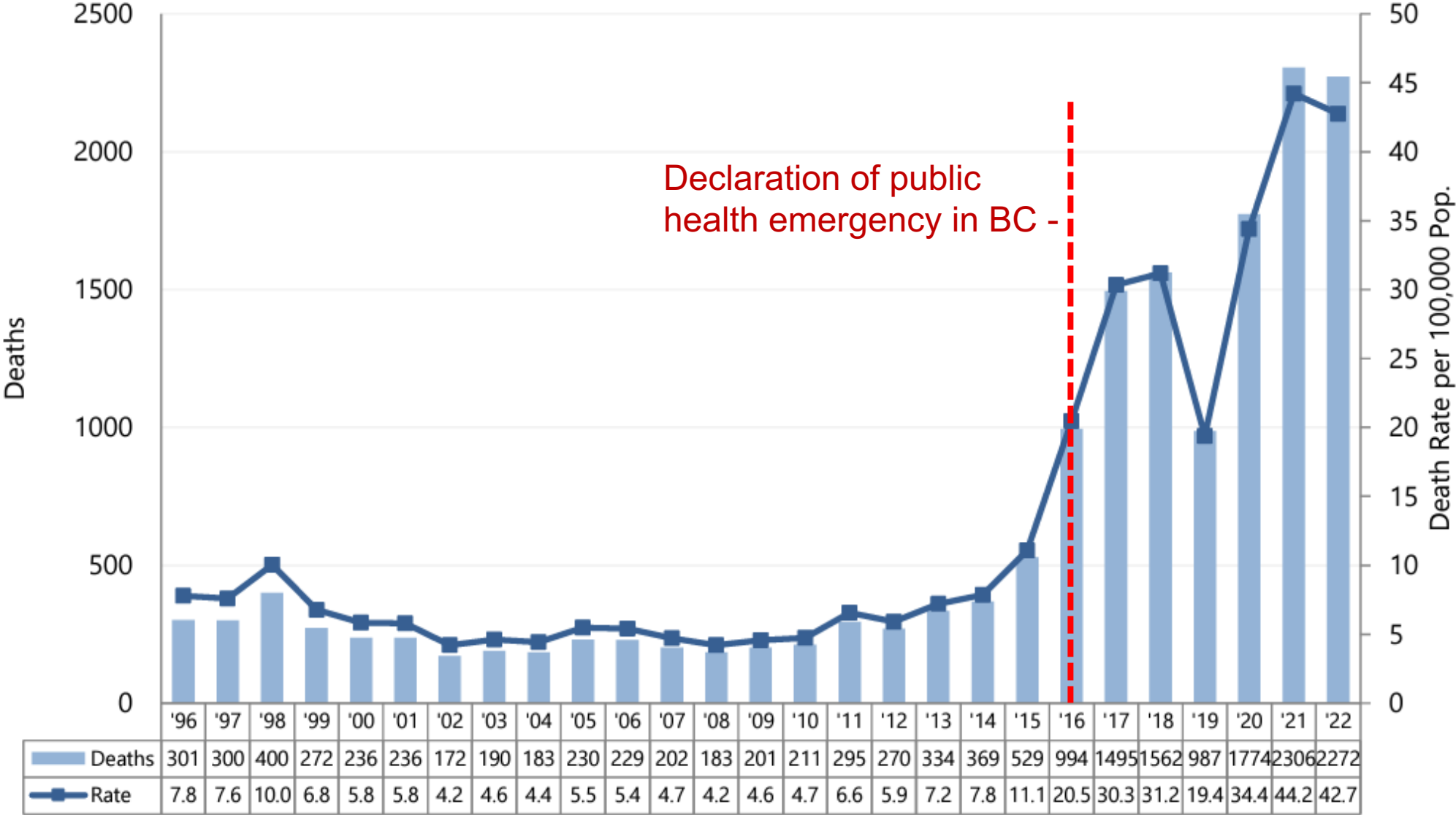
CACTUS Montréal, Canadian Nurses Association,

Registered Nurses' Association of Ontario,

Association of Registered Nurses of British Columbia.

“...Insite has been proven to save lives with no discernable negative impact on the public safety and health objectives of Canada...”

Illicit Drug Toxicity Deaths in BC (1996 – 2022)



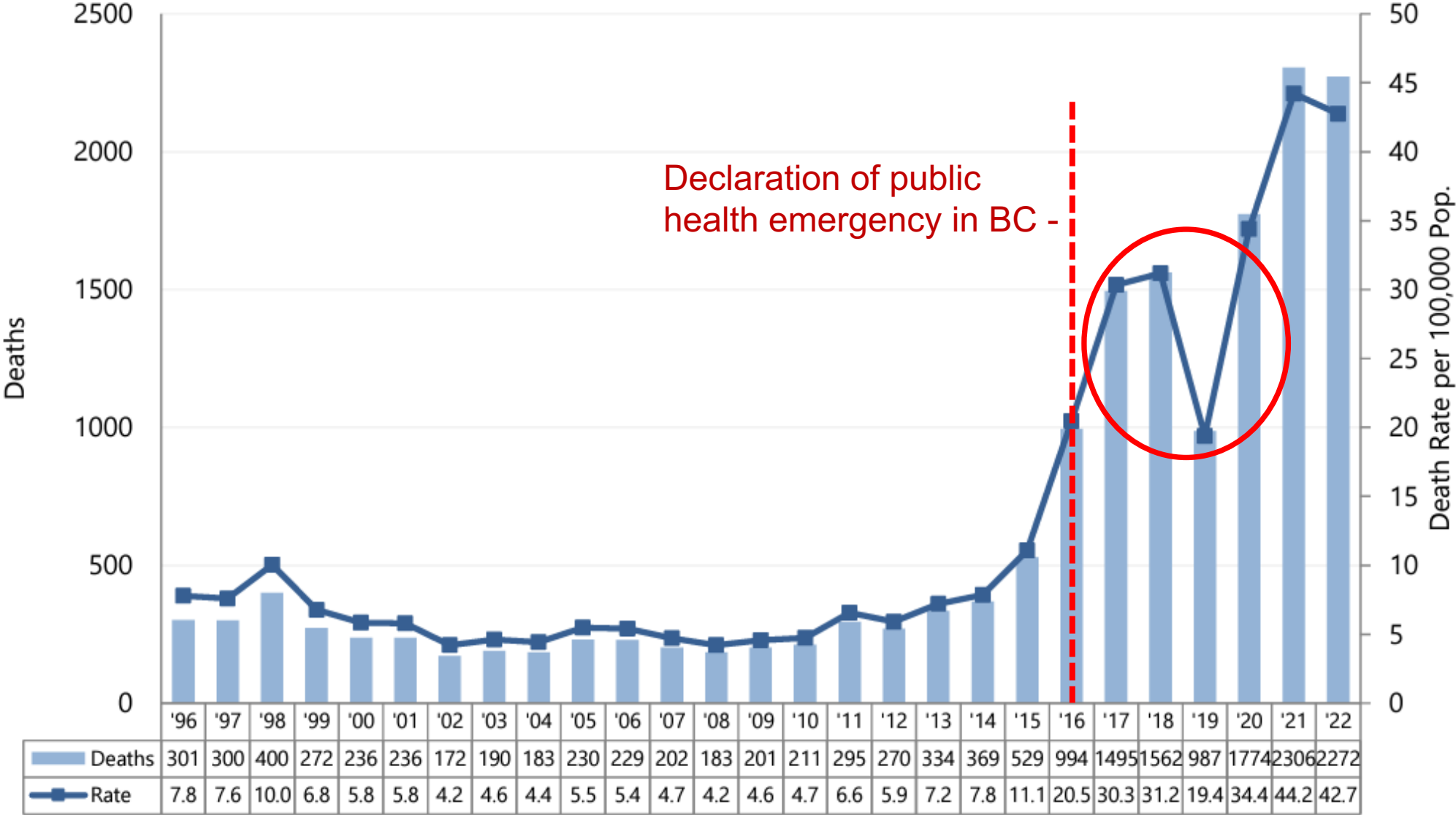
Map of overdose prevention sites in BC

**22 new OPS opened
in BC between
December 2016 and
December 2017**

(Irvine et al., *Addiction*, 2019).



Illicit Drug Toxicity Deaths in BC (1996 – 2022)



Modelling the combined impact of interventions in averting deaths during a synthetic-opioid overdose epidemic

Michael A. Irvine^{1,2} , Margot Kuo^{2,3}, Jane A. Buxton^{2,3}, Robert Balshaw⁴ , Michael Otterstatter²,
Laura Macdougall², M-J. Milloy⁵ , Aamir Bharmal⁶, Bonnie Henry⁷, Mark Tyndall^{2,3},
Daniel Coombs^{1*}  & Mark Gilbert^{2,3*}

- Using counterfactual mathematical simulation modelling, estimated the # of overdose deaths averted in BC by scaling up access to: **(1) overdose prevention sites; (2) take-home naloxone; and (3) opioid agonist therapy.**
- Estimated that, in combination, these interventions **averted 3030 overdose deaths between Apr. 2016 and Dec. 2017.**
 - Overdose deaths in BC would have been 2.5 times as high in the absence of these interventions.**

Received: 13 January 2021

Accepted: 20 September 2021




DOI: 10.1111/add.15717

RESEARCH REPORT

ADDICTION

SSA

Health impacts of a scale-up of supervised injection services in a Canadian setting: an interrupted time series analysis

Mary Clare Kennedy^{1,2}  | Kanna Hayashi^{1,3}  | M-J Milloy^{1,2}  |
Miranda Compton⁴ | Thomas Kerr^{1,2}

¹British Columbia Centre on Substance Use,
Vancouver, BC, Canada

²Department of Medicine, University of British
Columbia, St Paul's Hospital, Vancouver, BC,
Canada

³Faculty of Health Sciences, Simon Fraser
University, Burnaby, BC, Canada

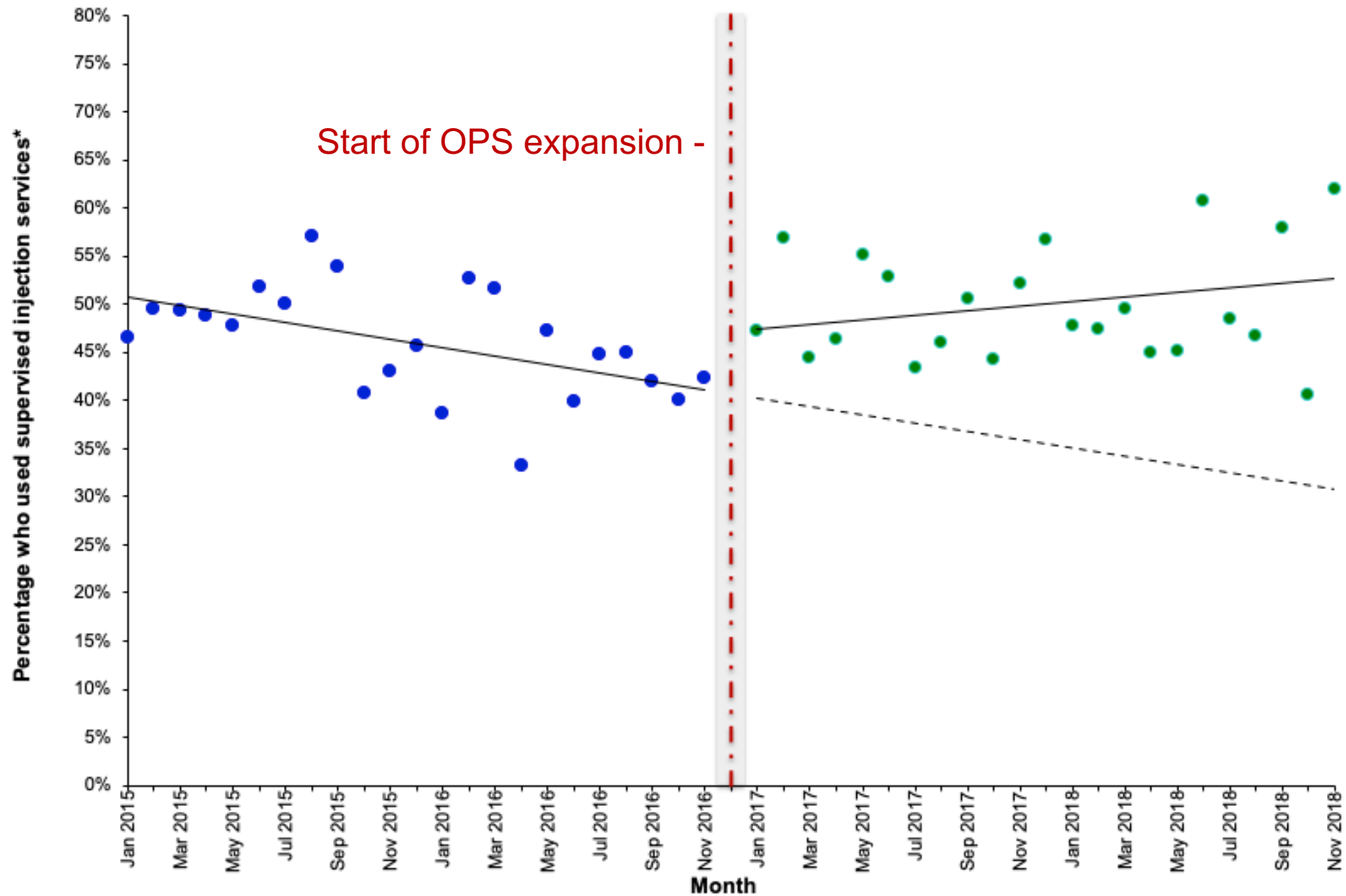
⁴Vancouver Coastal Health, Vancouver, BC,

Abstract

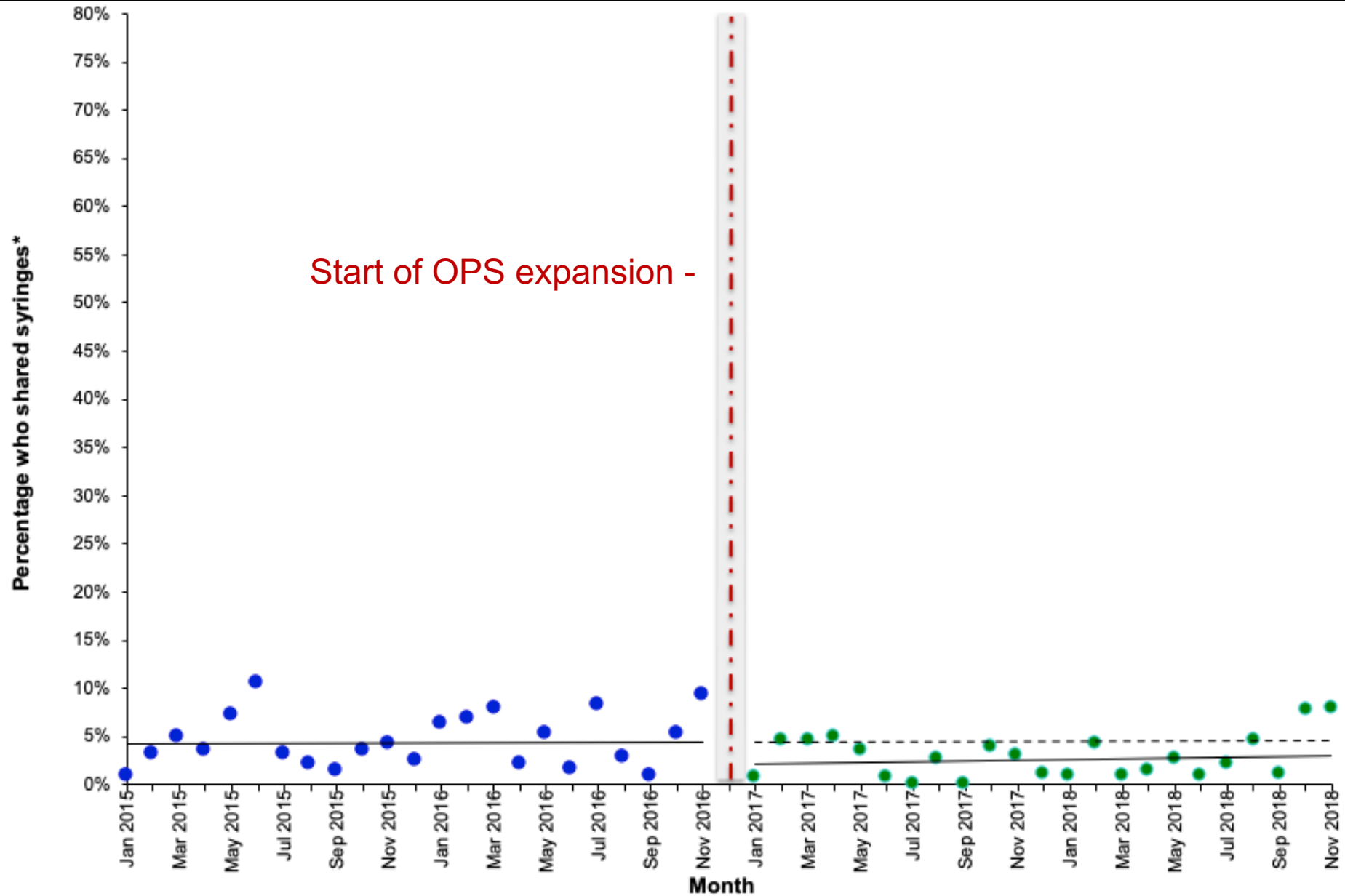
Background and Aims: In response to a dramatic rise in overdose deaths due to injection drug use, there was a rapid scale-up of low-threshold supervised injection services (SIS), termed 'overdose prevention sites' (OPS), in Vancouver, Canada in December 2016. We measured the potential impact of this intervention on SIS use and related health outcomes among people who inject drugs (PWID).

- 945 people who inject drugs in Vancouver (Jan. 2015 – November 2018).

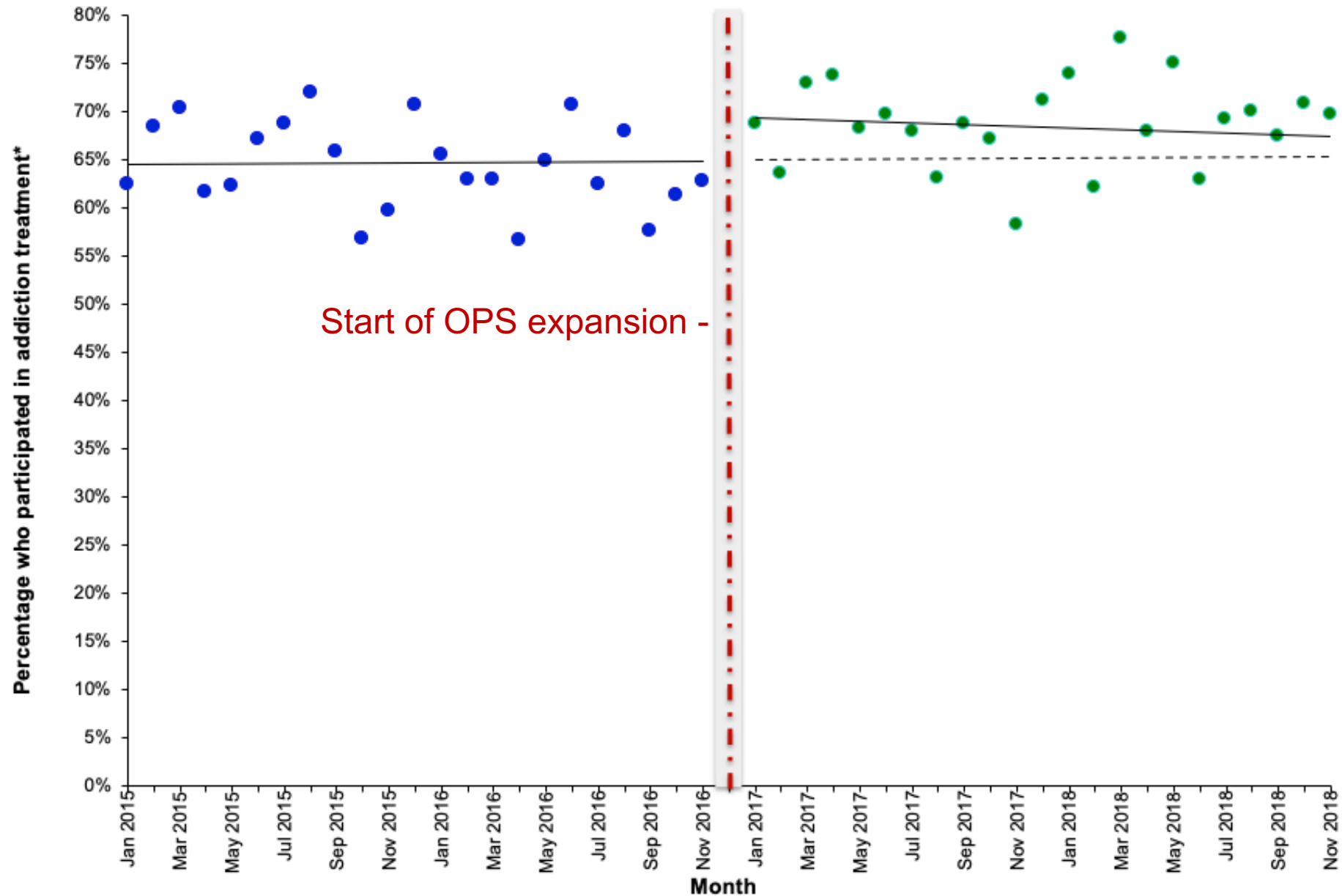
OVERDOSE PREVENTION SITE USE



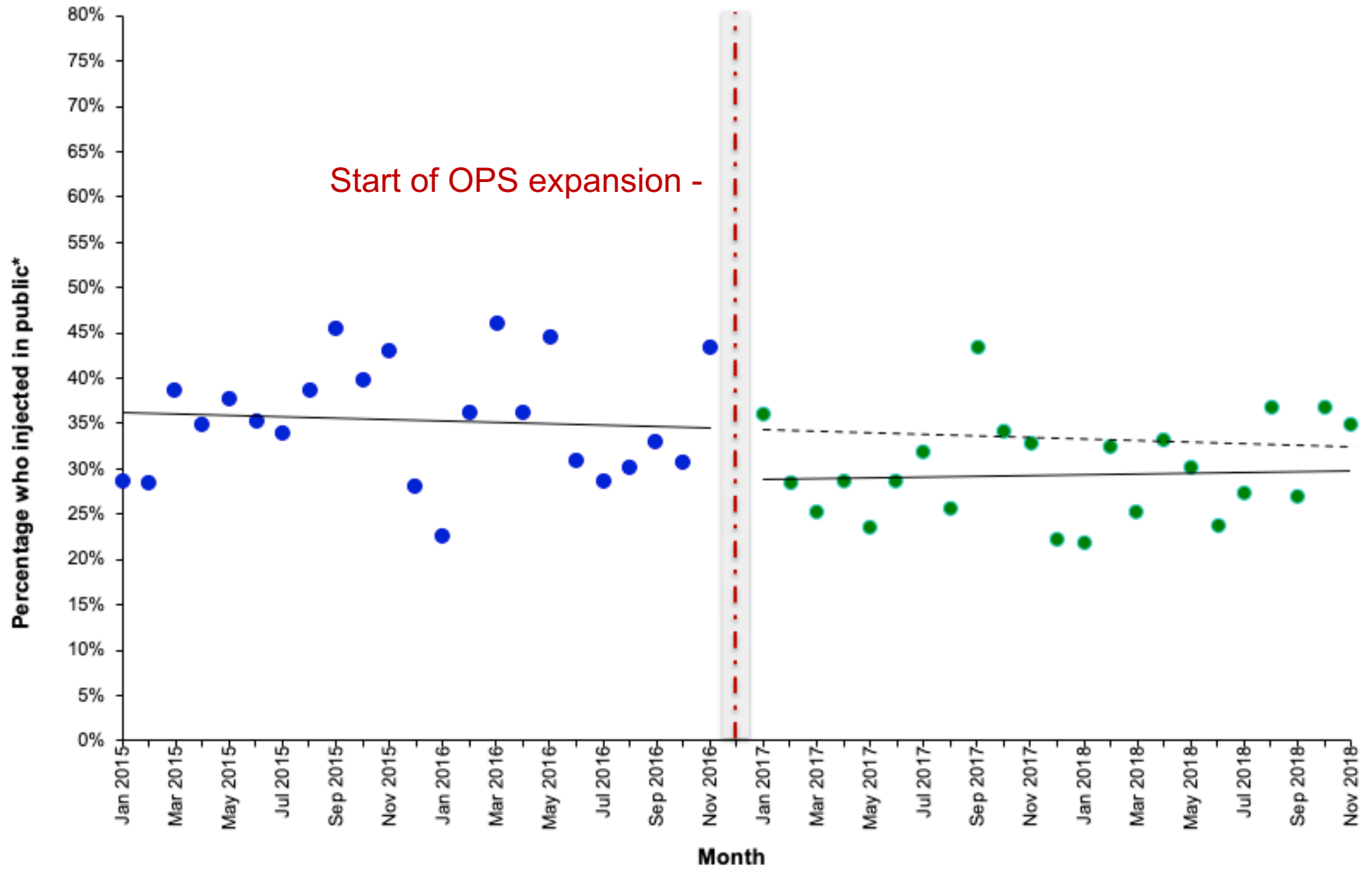
SYRINGE SHARING



PARTICIPATION IN ADDICTION TREATMENT



PUBLIC INJECTION



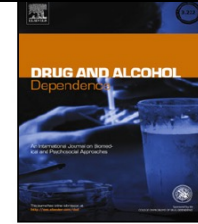


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Contents lists available at [ScienceDirect](https://www.sciencedirect.com)

Drug and Alcohol Dependence

journal homepage: www.elsevier.com/locate/drugalcdep



Review

Supervised injection services: What has been demonstrated? A systematic literature review[☆]

Chloé Potier^{a,b,*}, Vincent Laprêvotte^{c,d}, Françoise Dubois-Arber
Benjamin Rolland^{a,b}

REVIEW ARTICLE

Supervised Injection Facilities as Harm Reduction: A Systematic Review

Timothy W. Levensgood, MPH,¹ Grace H. Yoon, MS,¹ Melissa J. Davoust, MSc,¹
Shannon N. Ogden, MPH,¹ Brandon D.L. Marshall, PhD,² Sean R. Cahill, PhD,^{1,3}
Angela R. Bazzi, PhD^{4,5}

Curr HIV/AIDS Rep
DOI 10.1007/s11904-017-0363-y

THE SCIENCE OF PREVENTION (JD STEKLER AND J BAETEN, SECTION EDITORS)

Public Health and Public Order Outcomes Associated with Supervised Drug Consumption Facilities: a Systematic Review

Mary Clare Kennedy^{1,2} • Mohammad Karamouzian^{1,3} • Thomas Kerr^{1,4}

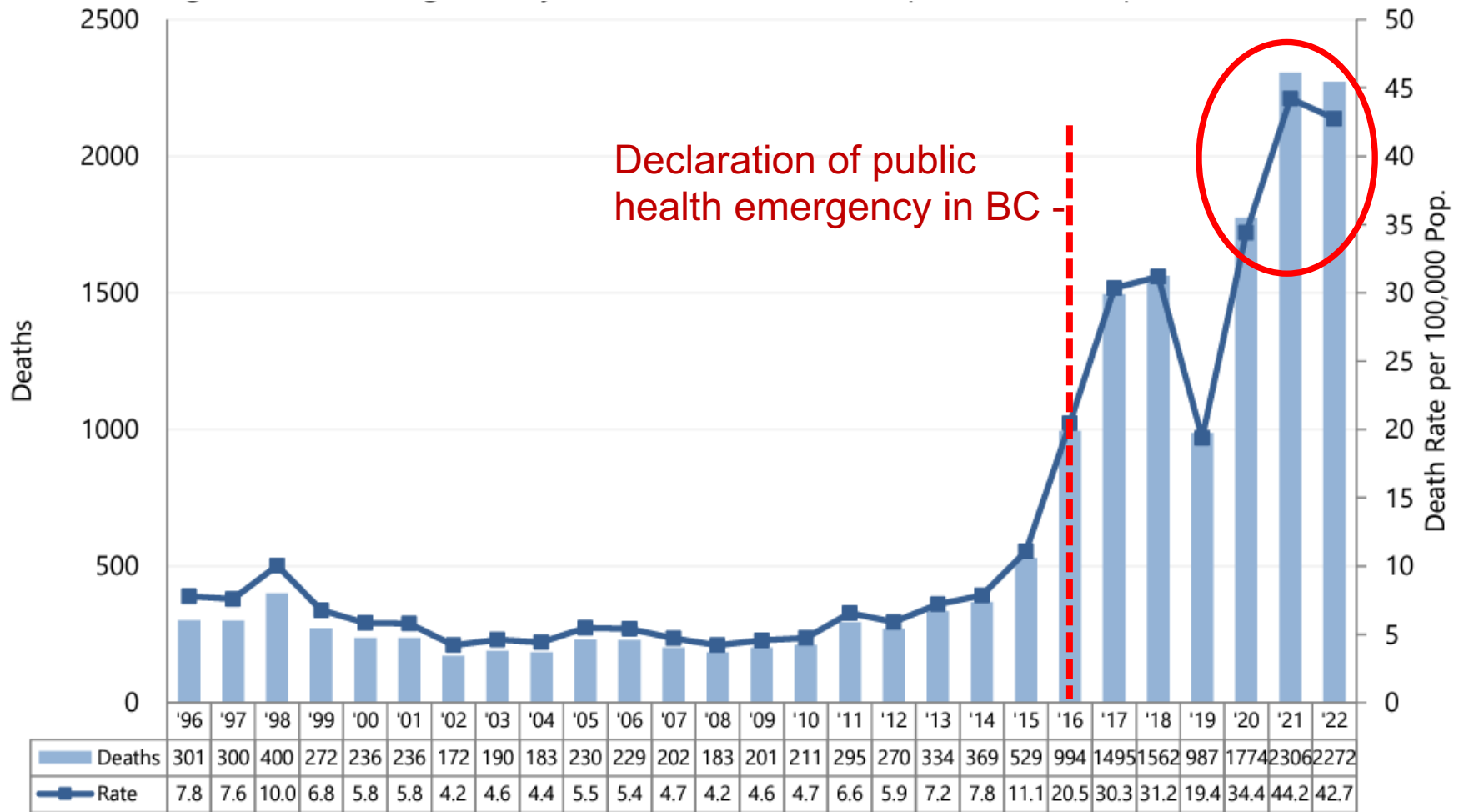
Potier et al., *Drug and Alcohol Dependence*, 2014

Kennedy et al., *Current HIV/AIDS Reports*, 2017

Levensgood et al., *American Journal of Preventive Medicine*, 2021

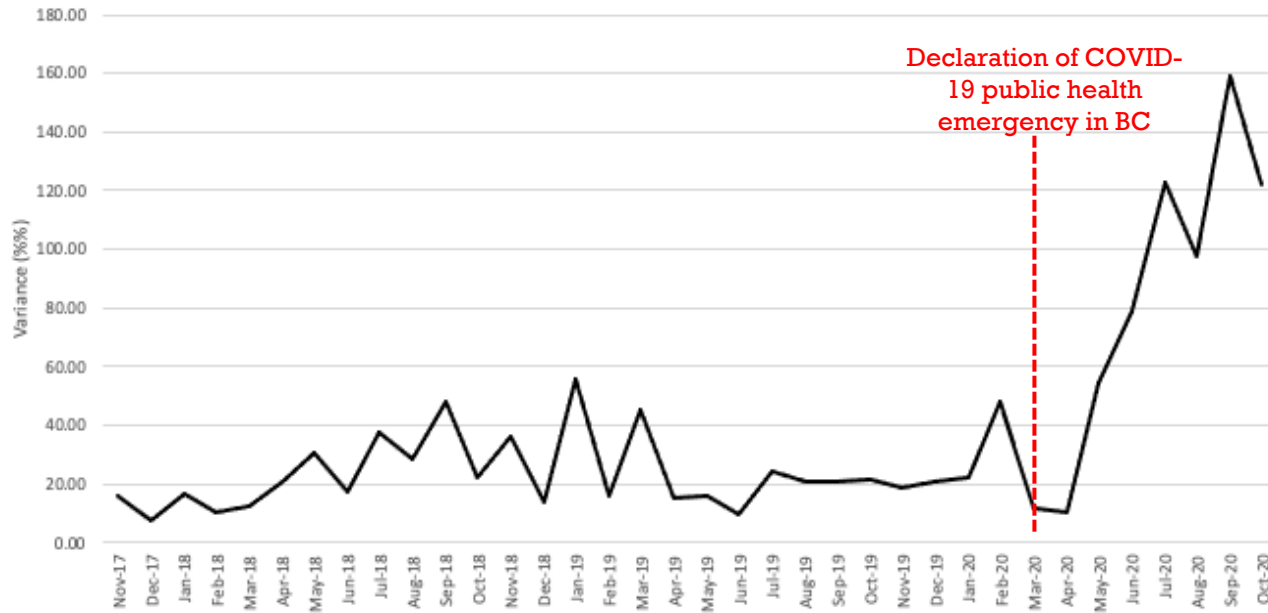
WHY DOES THE OVERDOSE CRISIS IN BC CONTINUE?

Illicit Drug Toxicity Deaths in BC (1996 – 2022)

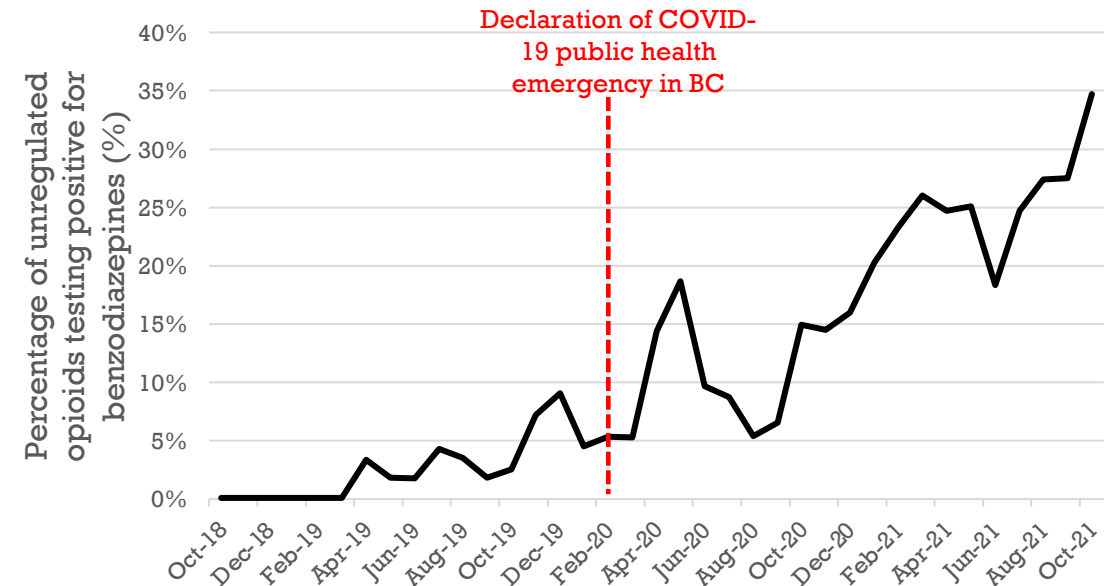


COVID-19-related border closures affected the illegal, unregulated drug supply

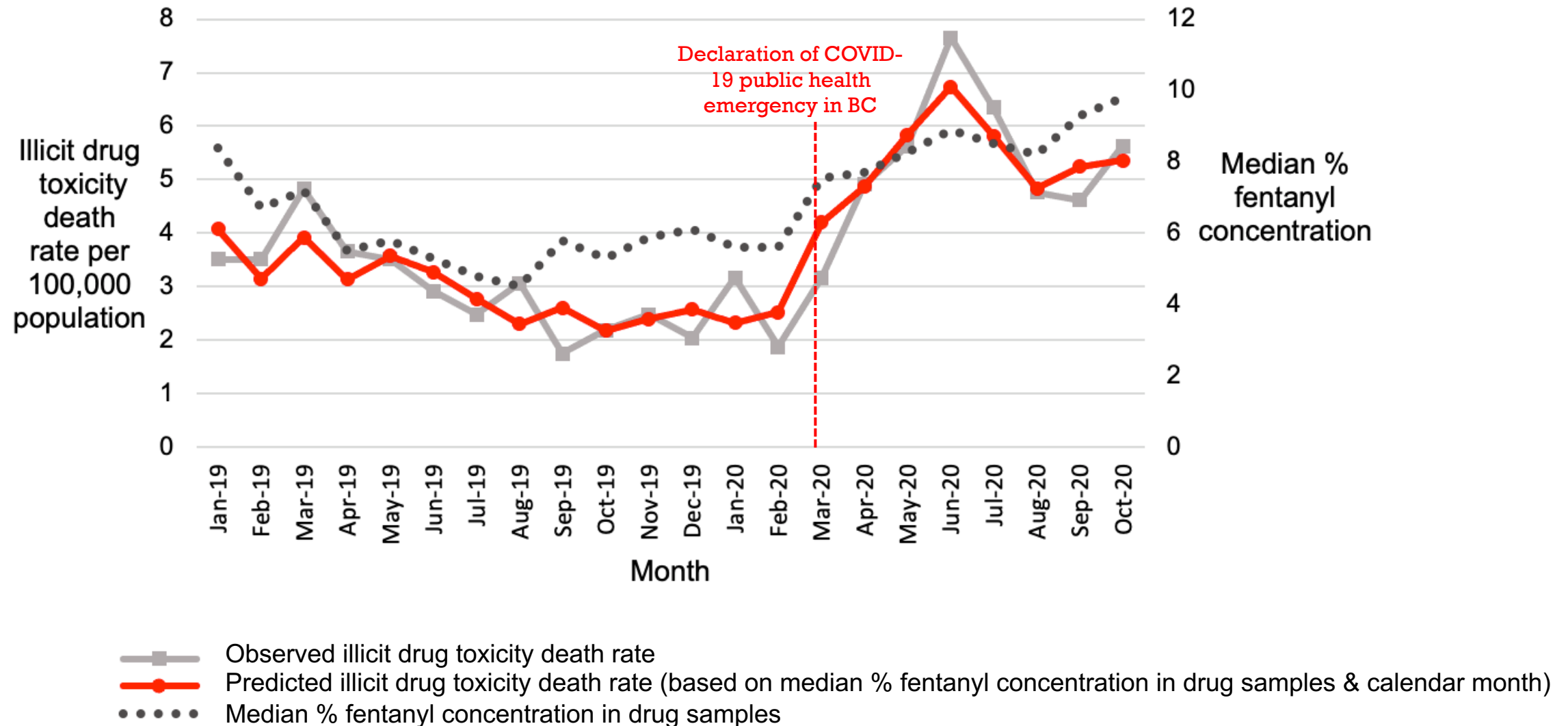
Fentanyl concentration in opioids, Vancouver, BC



Opioids containing benzodiazepines, Vancouver, BC



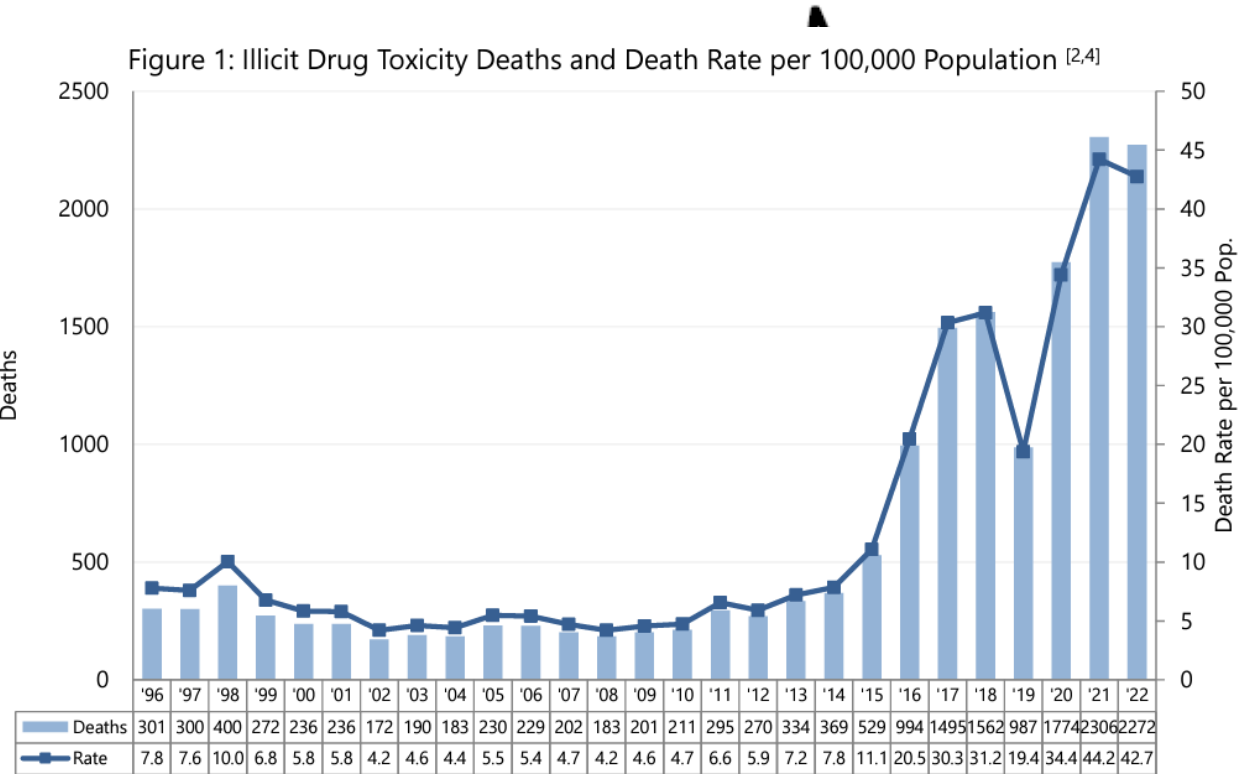
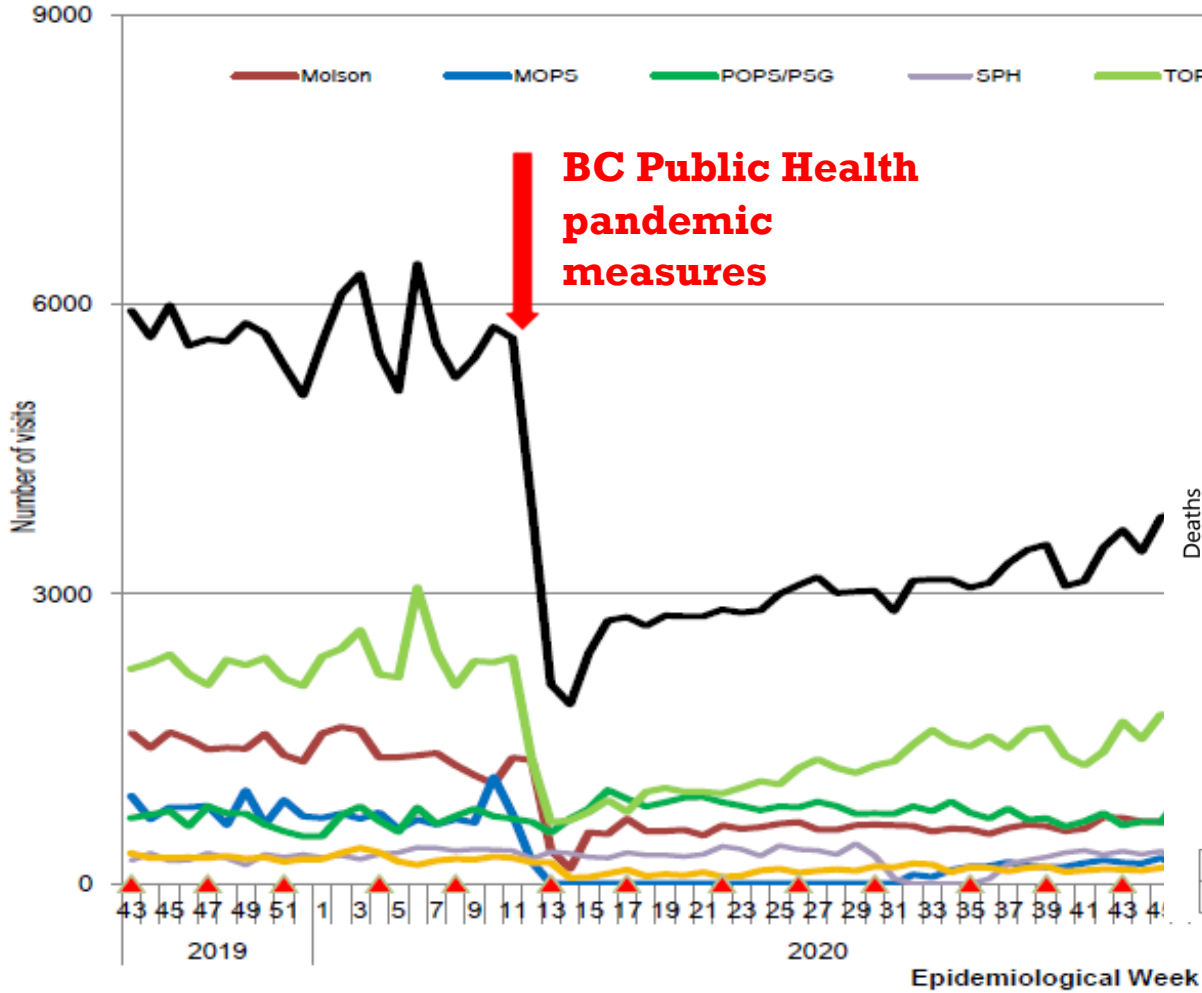
WHY DOES FENTANYL CONCENTRATION MATTER?



GAPS IN ACCESS TO EVIDENCE-BASED INTERVENTIONS

- Gaps in OPS coverage and access
 - Service density inadequate in many areas
 - Many communities in BC continue to lack access
 - Access to existing OPS disrupted after onset of COVID

VCH Overdose Prevention Sites Visit Volume by Epidemiological Week and Sites, 2019/2021*



GAPS IN ACCESS TO EVIDENCE-BASED INTERVENTIONS

- Gaps in OPS coverage and access
 - Service density inadequate in many areas
 - Many communities in BC continue to lack access
 - Access to existing OPS disrupted after onset of COVID

However, evidence to suggest that overdose death rates in BC would likely be much higher if existing OPS were not operating:

- Between Jan. 1, 2017 and May 31, 2023:
 - 11,549 overdose deaths in BC.
 - 25,530 overdoses responded to and survived at OPS in BC (BC Government, 2023).

CONCLUSIONS

Over 40 peer-reviewed studies from BC and 3 systematic reviews of international scientific literature indicate that OPS:

- ✓ Reduce overdose morbidity and mortality
- ✓ Reduce risks for infectious disease transmission
- ✓ Increase access to healthcare
- ✓ Improve public order
- ✓ Are cost-effective
- ✓ Are not associated with negative consequences (e.g., crime, increased community drug use)

While not a panacea, OPS play a useful role in a continuum of services for people who use drugs.

Questions?

Thank you to study participants, co-authors, collaborators, and funders.

- **Contact:** bccsu-mck@bccsu.ubc.ca



BRITISH COLUMBIA CENTRE ON SUBSTANCE USE

400-1045 Howe St
Vancouver BC
V6Z 2A9
www.bccsu.ca



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