



Topic: Estimated impact of overdose prevention sites, take-home naloxone, and opioid agonist therapies on preventing illicit drug-related deaths in B.C., Jan. 2012- Dec. 2017

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Purpose: To summarize the results of a mathematical modelling project that assessed the impact of the combined interventions of Take Home Naloxone (THN), Overdose Prevention Sites (OPS)¹, and Opioid Agonist Therapy (OAT) on the number of opioid and fentanyl-related deaths averted in B.C. and within each regional health authority.

Background:

- The BC Centre for Disease Control (BCCDC), in partnership with the Institute of Applied Mathematics, University of British Columbia (UBC), has developed a mathematical model that uses simulations to estimate the impact of different interventions on preventing overdose deaths in B.C.
- This model is based on multiple data sources including:
 - data for opioid- and fentanyl-related deaths;
 - ambulance-attended overdoses;
 - number of people accessing opioid agonist therapy;
 - THN program data;
 - overdose prevention services (including supervised consumption sites);
 - estimates of the number of people who use illicit drugs in BC;
 - LifeLabs fentanyl contaminant urinalysis; and,
 - other research data.
- The first phase was published in [*The Lancet Public Health*](#) and examined the THN program prior to scale-up of THN and other interventions.
- This second phase focuses on the combined interventions of THN, OPS, and OAT within each regional health authority and the whole province up until the end of 2017.
- Once the model including these interventions was built, the number of death events² averted was estimated by simulating the effects of removing each intervention separately or in combination.

Key Findings:

- Scaling up distribution of THN, establishing OPS sites, and improving access to OAT in B.C. have been effective interventions in preventing overdose deaths.

¹ For the purpose of this study, two supervised consumption service sites (SCS) were included within the OPS category.

² In this update, “death events” is used instead of “deaths” as the methodology estimates how many deaths were averted for the entire population, where a single individual may have had multiple death events averted.



- There were 2,177 overdose deaths between April 2016 (declaration of public health emergency) and December, 31st, 2017 in B.C., and our model estimates 3,030 overdose death events were averted during this period.
- Over one-half (60%; range 59% – 63%) of all potential overdose-related deaths were averted due to these interventions during that same period.

Detailed Findings:

- There were 2,177 overdose deaths provincially from April 2016 – December, 31st, 2017 (post-declaration of public health emergency).
- In response, 127,600 THN kits were distributed and 3,794 non-fatal overdoses were observed at OPS sites in the same period, with 23 sites¹ operational by December 2017.
- The probability of death following an overdose rose from 7.5% (7.3 – 7.9) in 2015 to 10.7% (10.4 – 11.3) in 2017 as a potential consequence of more potent illegal synthetic opioids being distributed, which correlates with observations of carfentanil use.
- Provincially from April 2016 to December 2017 (post-declaration of public health emergency) 3,030 (2,900 – 3,240) death events were averted from the combined impact of all interventions. In isolation³:
 - 1,560 (1,470 – 1,720) were averted due to THN;
 - 230 (160 – 350) were averted due to OPS; and,
 - 600 (520 – 740) were averted due to OAT.
- The following overdose deaths were observed and estimated to be averted between April 2016 and December 2017 in each health authority:

	REGION				
	Vancouver Coastal Health	Fraser Health	Vancouver Island Health	Northern Health	Interior Health
OBSERVED	646	725	351	93	362
INTERVENTION					
THN	410 (360-490)	450 (400-540)	390 (350-450)	40 (20-70)	270 (240-330)
OPS (INCLUDING SCS)	150 (110-210)	30 (0-130)	30 (0-90)	3 (0-40)	3 (0-60)
OAT	170 (130 - 240)	250 (200 - 330)	80 (50 - 120)	20 (0 - 60)	80 (50 - 130)
COMBINED³	970 (910-1070)	890 (830 - 1000)	660 (620 - 730)	70 (50-110)	440 (410 - 500)

³ Counterfactual modelling was used to estimate the impact of each intervention in isolation, as well as the combined impact of all interventions working together. As a consequence of this method, the combined impact is greater than the sum of the individual interventions.

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References

Irvine MA, Buxton JA, Otterstatter M, Balshaw R, Gustafson R, Tyndall M, Kendall P, Kerr T, Gilbert M, Coombs D. Distribution of take-home opioid antagonist kits during a synthetic opioid epidemic in British Columbia, Canada: a modelling study. *The Lancet Public Health*. 2018 May 1;3(5):e218-25.

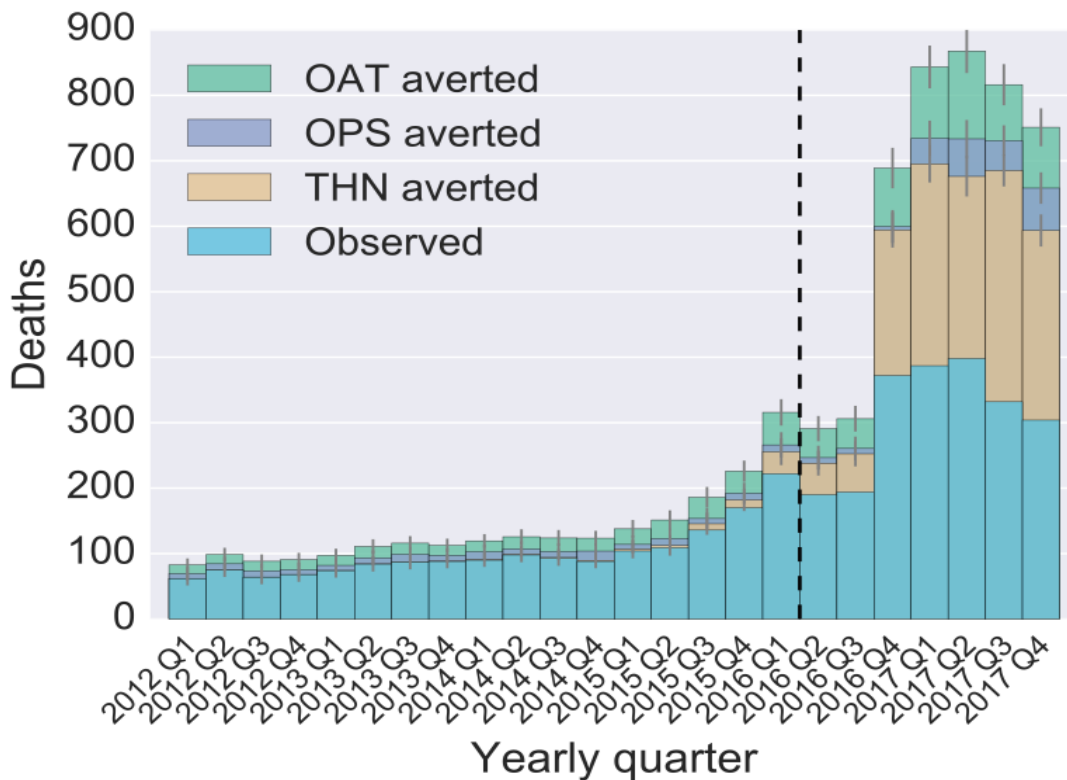


Figure 1: Estimated impact of THN OPS and OAT on the total number of deaths averted in the province from January 2012-December 2017. Blue indicates the total number of illicit-drug overdose deaths observed, with deaths averted for each intervention in isolation displayed as separate colours. Dashed line represents when the provincial public health emergency was declared.