PROVINCIAL OVERDOSE COHORT

The Provincial Overdose Cohort is a collection of information on people who had an overdose between January 1st, 2015 and December 31st, 2017 in BC. It was created to ensure people responding to the overdose crisis have up-to-date information on the needs of people experiencing overdoses.

When is the risk of non-fatal drug overdose higher?

Increased risk of non-fatal overdose:

- 2 weeks after hospital discharge
- Day of entering prison
- 4 weeks after release from prison
- Day starting opioids for pain and ongoing use
- Ongoing use of benzodiazepines and discontinued use of antipsychotics

Decreased risk of non-fatal overdose:

- Receiving Opioid Agonist Treatment. For example: methadone, buprenorphine or slow-relase oral morphine

Ways to decrease risk of non-fatal overdose:

1. Expand access to and increase support for stable and long-term medication for opioid use disorder
2. Improve continuity of care when transitioning between service systems
3. Ensure safe prescribing and medication monitoring processes for medications that reduce respiratory function like benzodiazepines

For more information visit: https://www.thelancet.com/journals/lanpub/article/PIIS2468-2667(21)00007-4/fulltext

Last Updated: April 26th, 2021

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BC Centre for Disease Control
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KNOWLEDGE UPDATE

Topic: Identifying time varying risk factors for non-fatal overdose

Date: April 26, 2021 **Data Source:** B.C. Provincial Overdose Cohort

Key Findings:

- People who experienced a non-fatal overdose between 2015-2017 had a higher prevalence of incarceration, hospitalisation, emergency department use, and dispensing of opioid agonist treatment (OAT), opioids for pain, benzodiazepines, and antipsychotics compared to the general population.
- Among people who experienced a non-fatal overdose, the rate of non-fatal overdose was higher on the day of admission to a provincial correctional facility, in the first four weeks following release from correctional facility, 1-2 weeks after discharge from hospital, while being dispensed benzodiazepines or opioids for pain, and following discontinuation of antipsychotics.
- The rate of non-fatal overdose was reduced while using OAT (methadone, buprenorphine, or slow-release oral morphine).

Background:

- The Provincial Overdose Cohort is a set of linked administrative datasets, including death, emergency department, hospitalization, physician billing, prescription medication dispensing, and incarceration records. The cohort was developed to better understand factors associated with overdose and to inform overdose prevention and response in British Columbia (BC).
- Some research has suggested that there are periods of time, such as following release from prison,[1] following discharge from hospital,[2] or when being dispensed certain medications such as benzodiazepines and opioids for pain,[3] where the risk of fatal overdose is heightened. Conversely, periods of time when using OAT, including methadone, buprenorphine, and slow-release oral morphine, has been shown to lower the risk of overdose death.[4]
- The focus of this analysis was to assess whether the risk of non-fatal overdose was altered during these periods of time.

Study Design and Methods:

- This analysis uses data on cases of non-fatal overdose, identified through health records, including ambulance, emergency department, hospital, physician, and

poison control hotline records. Cases were linked to prescription, provincial incarceration, hospital, and emergency department records between 2015 and 2017.

- Risk periods for each exposure were developed using the admission and discharge / release date for hospital, emergency department, and incarceration records; and the date of dispensation and number of days medications were supplied for prescription records. We examined risk periods related to incarceration, hospitalization and emergency department presentation for any reason, and medications for opioid use disorder, opioids for pain, benzodiazepines, and antipsychotics.
    - For incarceration, the risk periods were day of admission, time in prison (excluding day of admission and day of release), day of release, and post-release weeks 1-2, 3-4, 5-8, and 9-12.
    - For hospitalization and emergency department presentation, the risk periods were post-discharge weeks 1-2, 3-4, 5-8, and 9-12.
    - For medication dispensing, the risk periods were day of initiation, initiation weeks 1-2 and weeks 3-4 respectively, the rest of the medication episode, and post-discontinuation weeks 1-2, 3-4, 5-8, and 9-12 (Figure 1).

- We compared the occurrence of these exposures among people who experienced a non-fatal overdose and among a 20% random sample of the general population.

- We used conditional Poisson regression to compare the rate of non-fatal overdose during the risk periods for each exposure to the "unexposed period" (i.e., all follow-up time that was not part of a designated risk period).

- Detailed methods and further results are available at https://www.thelancet.com/journals/lanpub/article/PIIS2468-2667(21)00007-4/fulltext

Findings:

- People who experienced a non-fatal overdose were more likely to be male and younger (median age 34 vs. 44 years) than people in the 20% random sample. A higher proportion of people who had a non-fatal overdose experienced each exposure compared to people in the 20% random sample (Table 1).

- In a multivariable analysis controlling for all exposure variables and calendar year, the rate of non-fatal overdose was higher on the day of admission to prison, in the four weeks following release from prison, the two weeks following hospital discharge, the day of initiation of opioids for pain and during their ongoing use,

ongoing use of benzodiazepines and after discontinuation of antipsychotics (Table 2).

- The rate of non-fatal overdose was lower among people receiving OAT.
- The rate of non-fatal overdose increased each calendar year.

Interpretation:

- These results indicate the need for targeted overdose interventions for high-risk periods or transitions between or from institutions. For example, hospital-based interventions including initiating medications for opioid use disorder and providing take-home naloxone kits are critical interventions to consider. Currently, take-home naloxone kits are available in 86 hospital and emergency departments in BC.[5] Programs such as Unlocking the Gates currently provides support for people being released from provincial incarceration facilities in BC by offering peer mentorship and take-home naloxone kits.
- Employing peer coordinators within social and health services and assisting in developing peer support networks could support people leaving these facilities and transitioning back into the community. Engagement with people who use drugs to determine how social and medical facilities can be adapted to meet the needs people who use substances is critically important.[6]
- The protective effect of OAT provides further support for decreasing the barriers to accessing OAT and providing support to enable long-term OAT use.
- Further work is needed to examine the increased risk of non-fatal overdose on the day of incarceration and the potential reasons for this association.

Limitations:

- Non-fatal overdose events are likely understated as administrative health data does not capture overdose events that did not result in medical care.
- We did not have information on some important factors that may also contribute to time periods at heightened risk of overdose, such as transitions in housing status, access to naloxone, and residential drug treatment.

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Please cite this document as:

Keen C, Kinner S, Young J, Snow K, Zhao B, Gan W, Slaunwhite A. *Risk periods for non-fatal overdose related to incarceration, hospitalization, and dispensing of medications for opioid use disorder, opioids for pain, benzodiazepines, and antipsychotics* (Knowledge Update). Vancouver, BC: BC Centre for Disease Control; 2021.

All inferences, opinions, and conclusions drawn in this Knowledge Update are those of the authors, and do not reflect the opinions or policies of the Data Steward(s).

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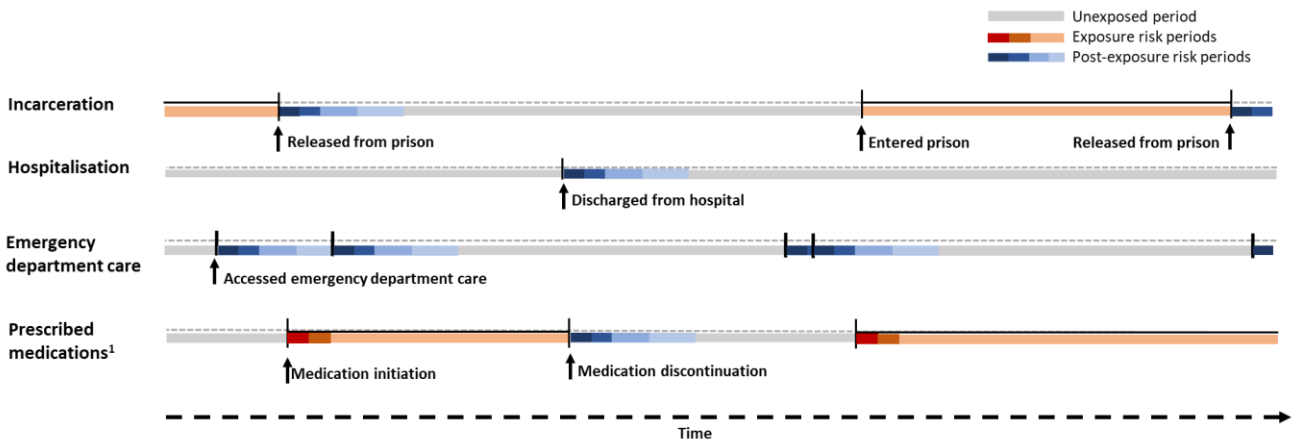

Figure 1: Risk periods related to incarceration, hospitalization, emergency department care and prescribed medications

Table 1. Exposures in non-fatal overdose cases and the general population between 2015-2017

	Non-fatal overdose cases (n=4149) N(%)	**20% random sample[a] (n=921, 346) N(%)**
Sex		
Female	1351 (33%)	465 797 (51%)
Male	2798 (67%)	455 549 (49%)
Age (years) at baseline[b]	34 (25-46)	44 (27-59)
Incarceration[c]		
Exposed	1055 (25%)	6581 (0·7%)
Not exposed	3094 (75%)	9147 65 (99.3%)
Hospitalization[c]		
Exposed	2425 (58%)	254 348 (28%)
Not exposed	1724 (42%)	666 998 (72%)
Emergency department use[c]		
Exposed	3737 (90%)	318 297 (35%)
Not exposed	412 (90%)	603 049 (65%)
OAT[c]		
Exposed	1664 (40%)	5501 (0·6%)
Not exposed	2485 (60%)	915 845 (99.4%)
Opioids for pain[c]		
Exposed	2127 (51%)	228 851 (25%)
Not exposed	2022 (49%)	692495 (75%)
Benzodiazepines[c]		
Exposed	1533 (37%)	100 904 (11%)
Not exposed	2616 (63%)	820 442 (89%)
Antipsychotics[c]		
Exposed	1697 (41%)	35 110 (4%)
Not exposed	2452 (59%)	886 236 (96%)

[a] Includes cases
[b] Median (interquartile range)
[c] At least once during the study period

Table 1: Association between exposure risk periods and non-fatal overdose

	Non-fatal overdose[1]	Univariable analysis	Multivariable analysis[2]
	N	IRR (95%CI)	AIRR (95%CI)
Incarceration			
Unexposed	3785	1 (Ref)	1 (Ref)
Day of admission	11	3·03 (1·66-5·52)	2·76 (1·51-5·04)
In prison	22	0·11 (0·07-0·12)	0·12 (0·08-0·19)
Day of release	5	1·40 (0·57-3·37)	1·45 (0·60-3·51)
Post-release weeks 1-2	126	2·91 (2·36-3·58)	2·92 (2·37-3·61)
Post-release weeks 3-4	56	1·41 (1·06-1·87)	1·34 (1·01-1·78)
Post-release weeks 5-8	80	1·22 (0·96-1·56)	1·15 (0·90-1·46)
Post-release weeks 9-12	64	1·20 (0·92-1·56)	1·15 (0·88-1·50)
Hospitalization			
Unexposed	3632	1 (Ref)	1 (Ref)
Post-discharge weeks 1-2	140	1·59 (1·33-1·90)	1·35 (1·11-1·63)
Post-discharge weeks 3-4	104	1·25 (1·02-1·54)	1·16 (0·90-1·38)
Post-discharge weeks 5-8	149	1·04 (0·88-1·24)	0·97 (0·81-1·16)
Post-discharge weeks 9-12	124	1·01 (0·84-1·21)	0·96 (0·80-1·17)
Emergency department			
Unexposed	2814	1 (Ref)	1 (Ref)
Post-contact weeks 1-2	413	1·37 (1·22-1·54)	1·10 (0·97-1·24)
Post-contact weeks 3-4	287	1·22 (1·08-1·39)	1·06 (0·93-1·21)
Post-contact weeks 5-8	365	1·03 (0·91-1·15)	0·93 (0·82-1·05)
Post-contact weeks 9-12	270	0·99 (0·87-1·13)	0·94 (0·92-1·07)
OAT			
Unexposed	3460	1 (Ref)	1 (Ref)
Day of initiation	12	1·80 (1·02-3·20)	1·57 (0·88-2·79)
Initiation weeks 1-2	182	0·40 (0·32-0·51)	0·33 (0·26-0·42)
Initiation week 3-4	16	0·43 (0·26-0·72)	0·41 (0·25-0·67)
Rest of OAT episode	154	0·40 (0·32-0·50)	0·40 (0·33-0·50)
Post-discontinuation weeks 1-2	91	1·23 (0·98-1·55)	0·96 (0·76-1·21)
Post-discontinuation weeks 3-4	71	1·33 (1·03-1·70)	1·10 (0·85-1·41)
Post-discontinuation weeks 5-8	99	1·26 (1·01-1·56)	1·08 (0·87-1·34)
Post-discontinuation weeks 9-12	64	1·06 (0·82-1·34)	0·94 (0·73-1·23)
Opioids for pain			
Unexposed	3454	1 (Ref)	1 (Ref)
Day of initiation	13	2·37 (1·37-4·12)	1·94 (1·11-3·77)
Initiation weeks 1-2	153	1·49 (1·17-1·90)	1·25 (0·97-1·60)
Initiation weeks 3-4	23	1·21 (0·79-1·87)	1·12 (0·73-1·72)
Rest of opioid episode	165	1·33 (1·05-1·68)	1·30 (1·02-1·65)
Post-discontinuation week 1-2	81	1·15 (0·91-1·45)	1·08 (0·85-1·36)

Post-discontinuation weeks 3-4	68	1·09 (0·85-1·40)	1·06 (0·83-1·37)
Post-discontinuation weeks 5-8	116	1·16 (0·95-1·41)	1·16 (0·95-1·41)
Post-discontinuation weeks 9-12	76	0·89 (0·70-1·13)	0·91 (0·72-1·15)
Benzodiazepines			
Unexposed	3545	1 (Ref)	1 (Ref)
Day of initiation	20	5·84 (3·73-9·15)	5·19 (3·28-8·21)
Initiation weeks 1-2	154	1·98 (1·55-2·53)	1·76 (1·37-2·27)
Initiation weeks 3-4	32	2·08 (1·44-3·00)	2·05 (1·41-2·96)
Rest of benzodiazepine episode	150	1·54 (1·21-1·95)	1·65 (1·29-2·10)
Post-discontinuation week 1-2	52	1·18 (0·88-1·57)	1·12 (0·83-1·49)
Post-discontinuation weeks 3-4	53	1·34 (1·01-1·78)	1·27 (0·96-1·70)
Post-discontinuation weeks 5-8	86	1·31 (1·04-1·64)	1·27 (1·01-1·60)
Post-discontinuation weeks 9-12	57	1·01 (0·77-1·32)	0·99 (0·75-1·30)
Antipsychotics			
Unexposed	3358	1 (Ref)	1 (Ref)
Day of initiation	7	1·77 (0·84-3·74)	1·29 (0·61-2·77)
Initiation weeks 1-2	245	1·32 (1·07-1·63)	1·20 (0·97-1·64)
Initiation weeks 3-4	38	1·17 (0·84-1·64)	1·17 (0·83-1·64)
Rest of antipsychotics episode	229	1·04 (0·86-1·26)	1·09 (0·90-1·32)
Post-discontinuation week 1-2	52	1·08 (0·81-1·44)	1·01 (0·75-1·35)
Post-discontinuation weeks 3-4	66	1·66 (1·29-2·15)	1·58 (1·22-2·05)
Post-discontinuation weeks 5-8	83	1·35 (1·08-1·71)	1·28 (1·02-1·62)
Post-discontinuation weeks 9-12	71	1·42 (1·11-1·81)	1·37 (1·07-1·80)
Calendar year			
2015	1104	1 (Ref)	1 (Ref)
2016	1441	1·37 (1·27-1·48)	1·41 (1·30-1·53)
2017	1604	1·60 (1·48-1·73)	1·72 (1·59-1·87)

[1]Counting first overdose only,
[2]all exposure variables included
IRR: incidence rate ratio; AIRR: adjusted incidence rate ratio; 95%CI: 95% confidence interval; OAT: opioid agonist treatment