

CHAPTER 3

MORBIDITY

■ Hospitalizations Attributable (related) to Substance Use

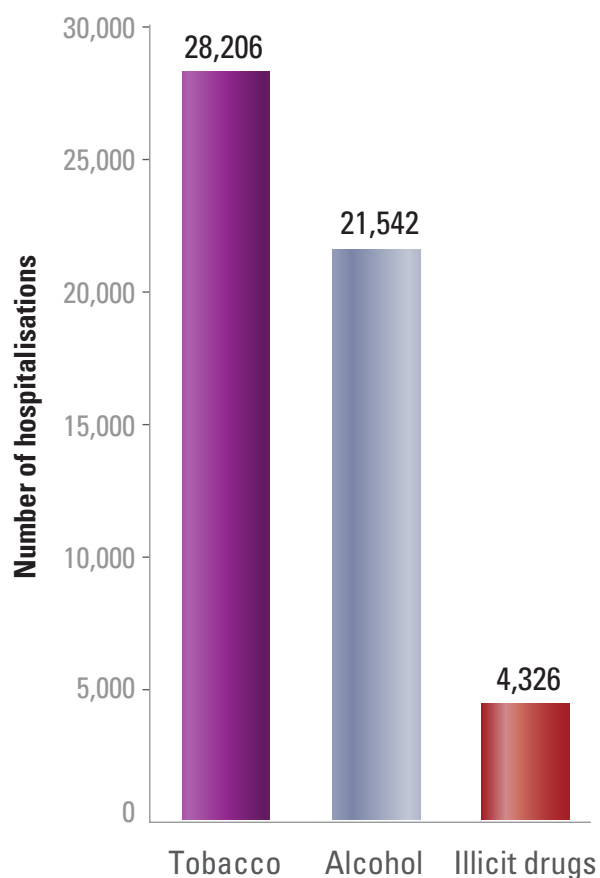
Substance use may result in serious illnesses requiring hospitalization. The most responsible diagnosis code from the Ministry of Health Discharge Abstract Database was used to calculate hospitalizations *attributable* to tobacco, alcohol and illicit drug use. All rates were standardized by age and sex using the 2001 BC population over 15 years of age as the standard.

Figure 3.1 shows hospitalizations related to tobacco use

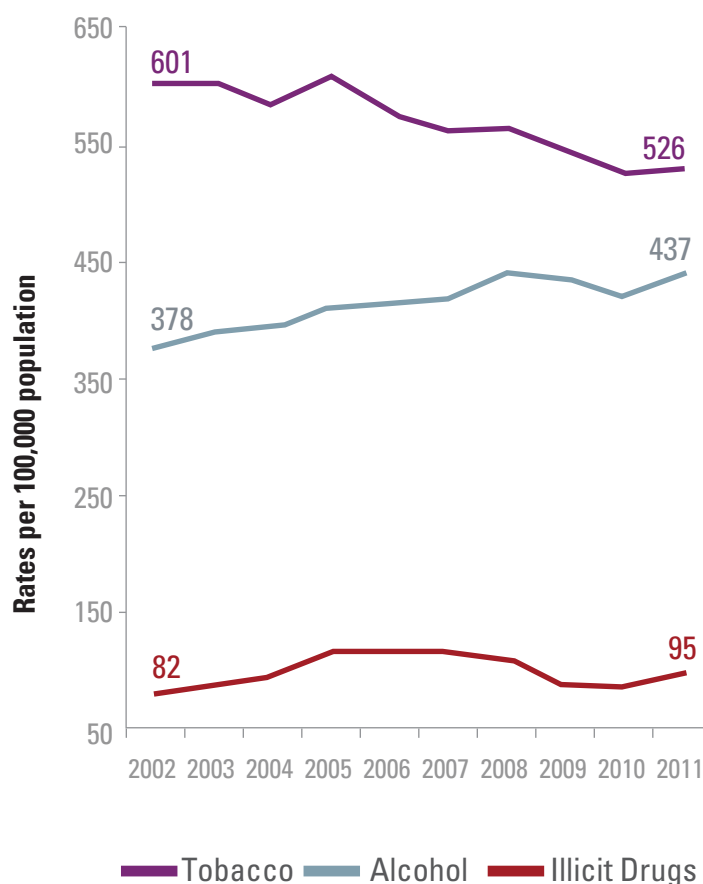
exceeded those due to alcohol and illicit drugs. The rate of tobacco hospitalizations dropped significantly, from 601 hospitalizations per 100,000 population in 2002 to 526 in 2011. However, while the rate of alcohol-related hospitalizations significantly increased, those attributable to illicit drugs did not significantly change.²⁰

Figure 3.1 Hospitalizations related to substance use in BC²⁰

a) Number of BC hospitalizations related to substance use, 2011



b) Hospitalizations rates related to substance use in BC, 2002-2011

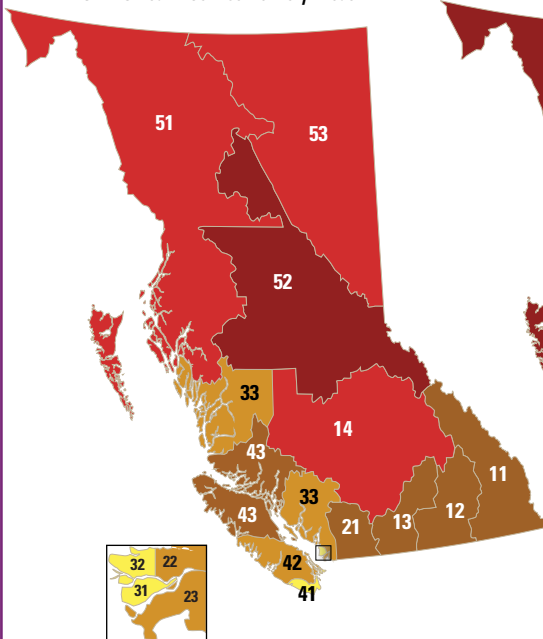


In 2011, Northern Interior HSDA had the highest hospitalization rate for tobacco and Richmond the lowest (Figure 3.2a). Similar trends exist for alcohol as seen in figure 3.2b. The highest alcohol-attributable hospitalization rate is in Northwest, while Richmond had the lowest. For illicit drug-attributable hospitalizations (Figure 3.2c), the highest rate was found in Northwest, followed by Northern Interior, Kootenay Boundary,

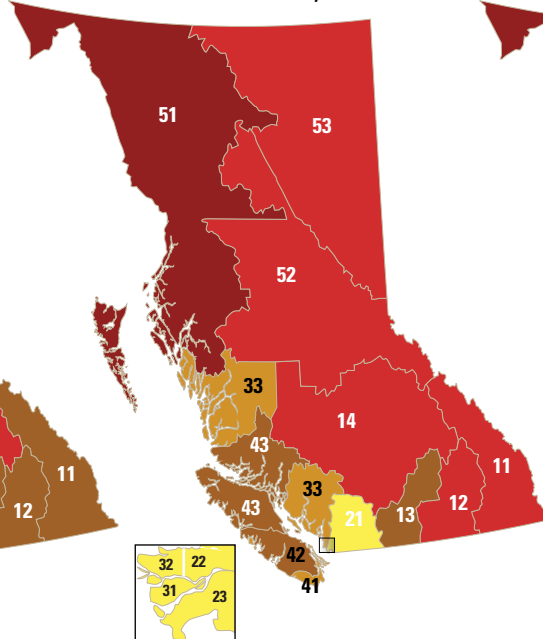
and Northeast. The lowest rates were observed in Richmond, Fraser North, and North Shore/Coast Garibaldi. These data suggest that the interior and northern regions of the province have higher rates of substance-related morbidity. Similar trends are seen in the mortality rates related to tobacco and alcohol use, but not for illicit drugs. This is further discussed in the mortality section.²⁰

Figure 3.2 Hospitalization rates attributable to substance use by HSDA in BC in 2011²⁰

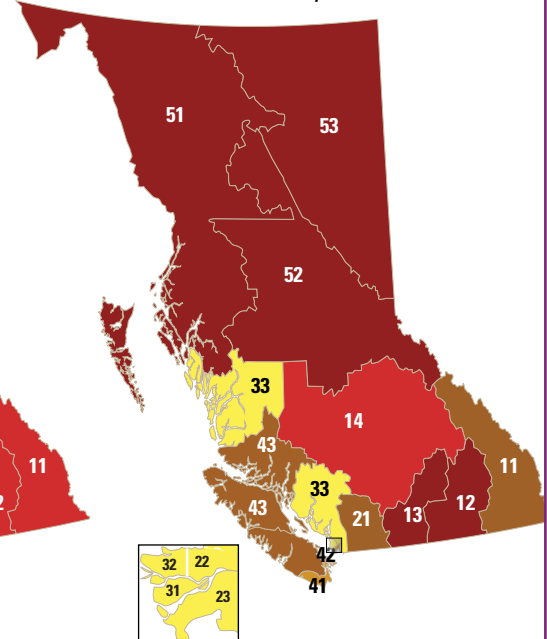
A Hospitalization Rates Attributable to Tobacco, 2011 BC Health Service Delivery Areas



B Hospitalization Rates Attributable to Alcohol, 2011 BC Health Service Delivery Areas



C Hospitalization Rates Attributable to Illicit Drugs, 2011 BC Health Service Delivery Areas



Hospitalization Rate per 100,000 Residents

> 749.99	550 - 749.99
550 - 649.99	450 - 549.99
< 450	

11 East Kootenay (569.18)	32 Vancouver (427.64)
12 Kootenay Boundary (561.58)	33 North Shore/Coast Garibaldi (457.96)
13 Okanagan (587.77)	41 South Vancouver Island (404.40)
14 Thompson Cariboo Shuswap (673.68)	42 Central Vancouver Island (527.77)
21 Fraser East (648.97)	43 North Vancouver Island (560.76)
22 Fraser North (545.67)	51 Northwest (730.15)
23 Fraser South (500.19)	52 Northern Interior (752.35)
31 Richmond (414.42)	53 Northeast (656.05)

Hospitalization Rate per 100,000 Residents

> 699.99	600 - 699.99
500 - 599.99	400 - 499.99
< 400	

11 East Kootenay (509.29)	32 Vancouver (321.60)
12 Kootenay Boundary (656.89)	33 North Shore/Coast Garibaldi (400.89)
13 Okanagan (585.67)	41 South Vancouver Island (466.37)
14 Thompson Cariboo Shuswap (613.56)	42 Central Vancouver Island (535.73)
21 Fraser East (366.51)	43 North Vancouver Island (564.61)
22 Fraser North (319.04)	51 Northwest (959.65)
23 Fraser South (334.45)	52 Northern Interior (676.65)
31 Richmond (315.43)	53 Northeast (534.88)

Hospitalization Rate per 100,000 Residents

> 119.99	105 - 119.99
90 - 104.99	75 - 89.99
< 75	

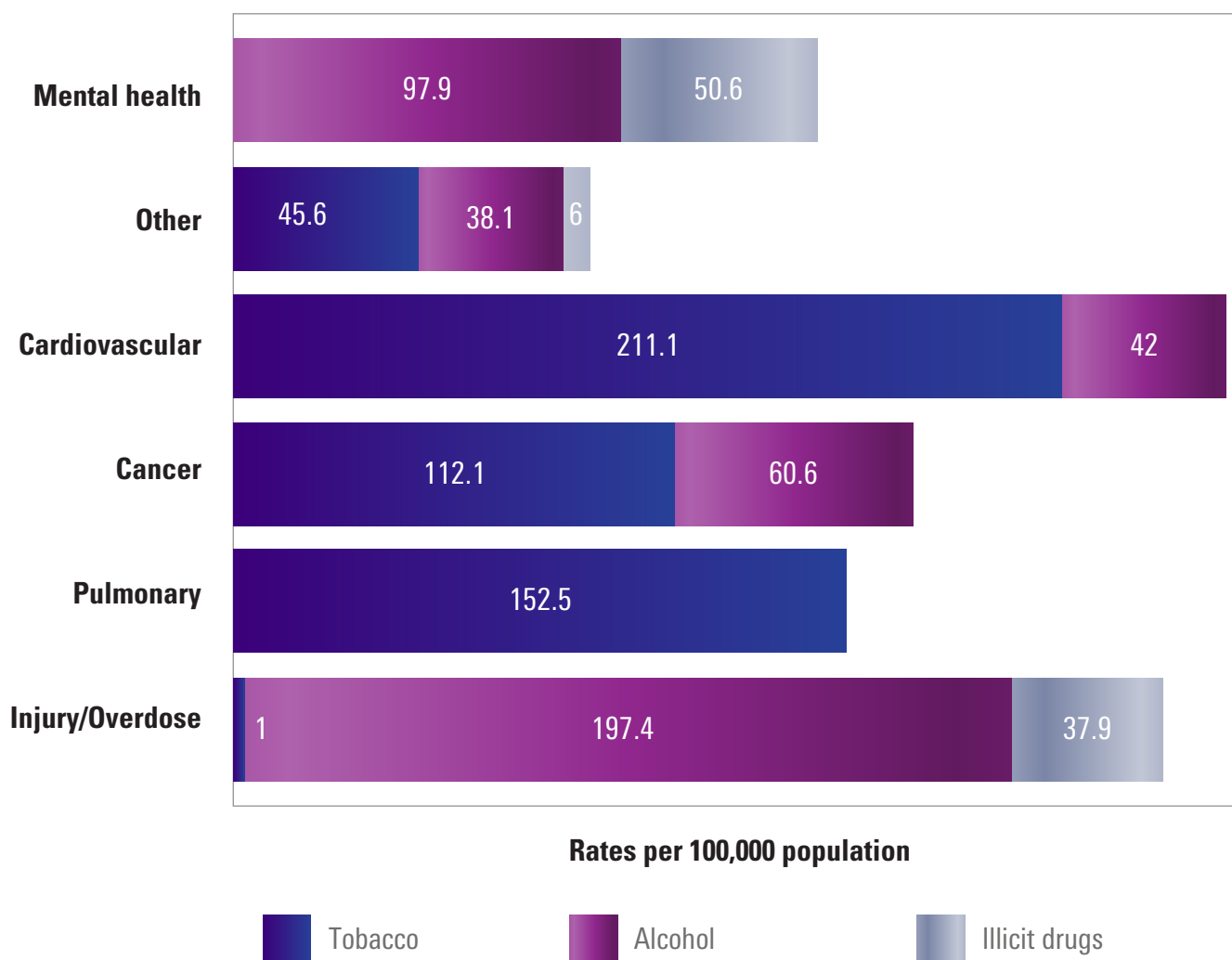
11 East Kootenay (102.90)	32 Vancouver (73.80)
12 Kootenay Boundary (131.75)	33 North Shore/Coast Garibaldi (68.04)
13 Okanagan (120.63)	41 South Vancouver Island (88.98)
14 Thompson Cariboo Shuswap (114.23)	42 Central Vancouver Island (93.75)
21 Fraser East (109.58)	43 North Vancouver Island (98.66)
22 Fraser North (57.87)	51 Northwest (171.38)
23 Fraser South (73.07)	52 Northern Interior (133.33)
31 Richmond (52.97)	53 Northeast (121.53)

In 2011, among substance-related hospitalizations, most are due to cardiovascular conditions and injury/overdose.

Figure 3.3 shows tobacco use was associated with the highest hospitalization rate by cardiovascular events, pulmonary, and cancer. Alcohol contributes most to injury/overdose, mental health, and a third of cancer hospitalizations attributable to substance use. Hospitalizations related to illicit drug use were mostly due to mental health reasons, injury/overdose, and other (e.g. HCV, HIV).²⁰

Adverse health conditions resulting from the use of tobacco and alcohol are higher in males and as they may take years to manifest, rates are higher in the 65+ age group. In contrast, illicit drug-related morbidity rates tend to be higher among males and among younger age groups; the 25-44 age group is the most affected among both genders.²⁰

Figure 3.3 Hospitalization rates attributable to substance use by condition in BC in 2011²⁰

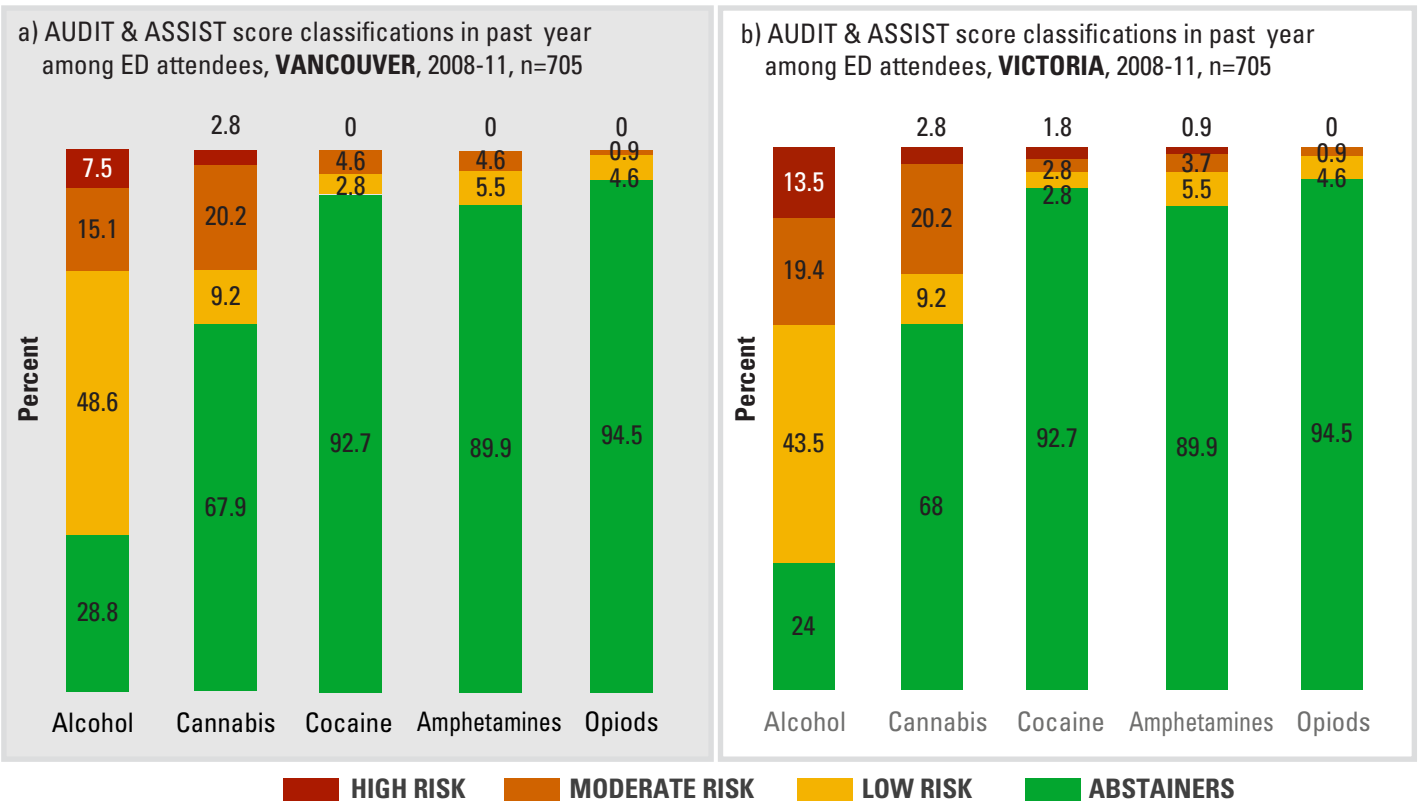


Emergency Department Attendees Reporting Substance Use

Another study within CARBC AOD Monitoring Project measures the use of alcohol and other drugs in patients who attend the emergency department (ED) at Vancouver General Hospital and Victoria's Royal Jubilee Hospital. Between 2008 and 2011, 22.6% of Vancouver and 32% of Victoria ED attendees self-reported moderate or high risk alcohol consumption in the previous year (Figure 3.4a and 3.4b). In both Vancouver and Victoria, nearly

one-quarter of ED attendees reported moderate or high risk cannabis use, about 5% reported moderate or high risk cocaine and amphetamines use, and approximately 1% in both sites reported moderate risk use of opioids in the past year, with no reports of high risk use.²⁰ It should also be noted that St Paul's Hospital is the closest to, and most used ED by residents of DTES of Vancouver.

Figure 3.4 AUDIT and ASSIST score classifications in past year among Emergency Department attendees in Vancouver and Victoria, 2008-2011²⁰



ASSIST – Alcohol Smoking and Substance Involvement Screening Test
AUDIT – Alcohol Use Disorders Identification Test

Non-fatal Overdoses

Overdoses experienced and witnessed in the last six months in the combined VIDUS and ACCESS cohorts are shown in Figure 3.5 and in the ARYS cohort in Figure 3.6. In 2013, the proportion of youth who self-reported overdose was double that of the

VIDUS/ACCESS cohorts (17.8% and 8.9% respectively); however the proportion who witnessed an overdose was similar 23% and 24% respectively. Data collection for the latter variable began in 2005.

Figure 3.5**Overdose and witnessed overdose events in the last six months among people who use illicit drugs in Vancouver (VIDUS/ACCESS cohorts)**

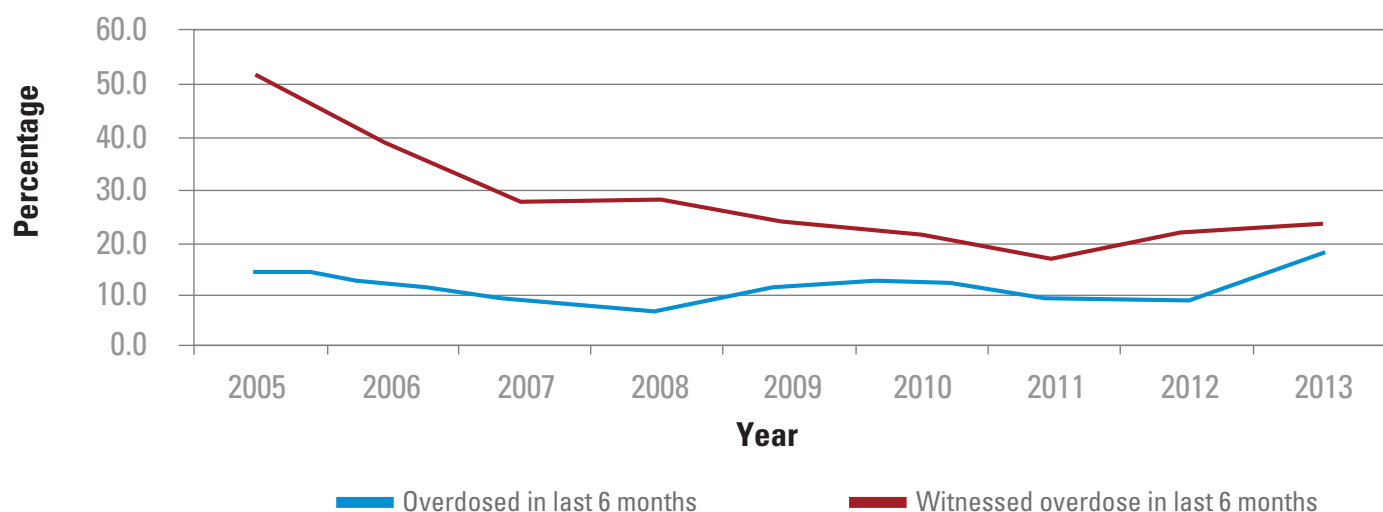
Overdose event: Overdosed by accident where you had a negative reaction from using too much drugs



(BC Centre for Excellence in HIV/AIDS, personal communication, June 10, 2014)

Figure 3.6**Overdose and witnessed overdose events in the last six months among street-involved youth who use illicit drugs in Vancouver (ARYS cohort)**

Overdose event: Overdosed by accident where you had a negative reaction from using too much drugs



(BC Centre for Excellence in HIV/AIDS, personal communication, June 10, 2014)

Self-reported overdoses experienced and witnessed were also collected in the 2013 HR client survey (Figure 3.7). The proportion of respondents who reported overdosing in the last six months was highest in VIHA (18%) and FHA (17%). More than a third of all participants reported witnessing an overdose in the previous six months; FH was highest at 50%.²¹ CARBC's High Risk Populations Survey provides self-reported overdose events in past 12 months among recreational-use adults, street-involved adults, and street-involved youth in

Vancouver and Victoria (Figure 3.8 and Figure 3.9, respectively). For both cities, overdoses among recreational-use adults are considerably higher than the other two at-risk populations surveyed. Among street-involved youth in both cities, there was a considerable decline in reported overdoses from 2011 through 2012. Available data for Victoria shows that this decline continues into 2014. The most recent data for both cities identify street-involved adults had the lowest prevalence of self-reported overdose.¹⁸

Figure 3.7 Percent of HR clients reporting overdose and witnessed overdose events in the last six months by HA, weighted by HSDA population, 2013²¹

Overdose event: Overdosed by accident i.e. where you had a negative reaction from using too much drugs

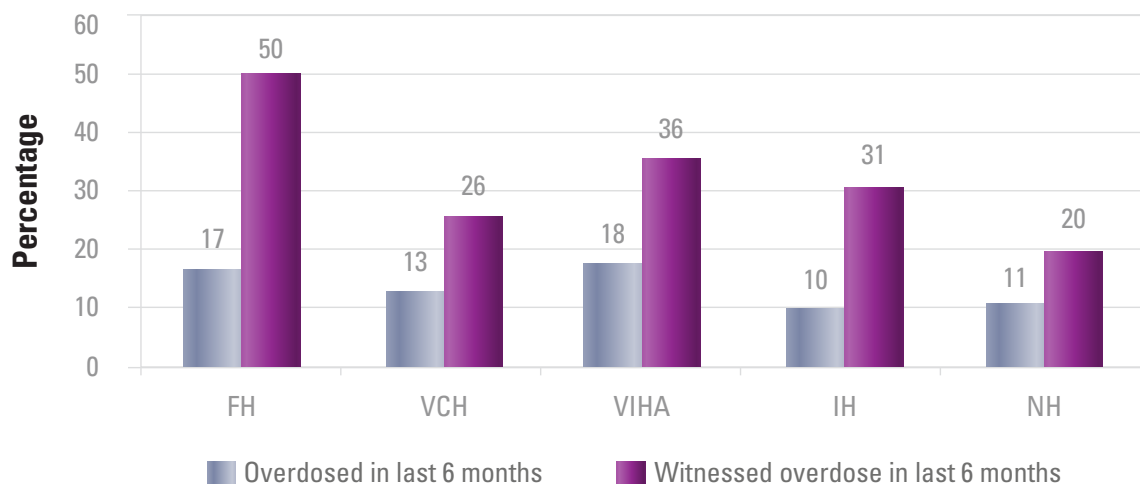
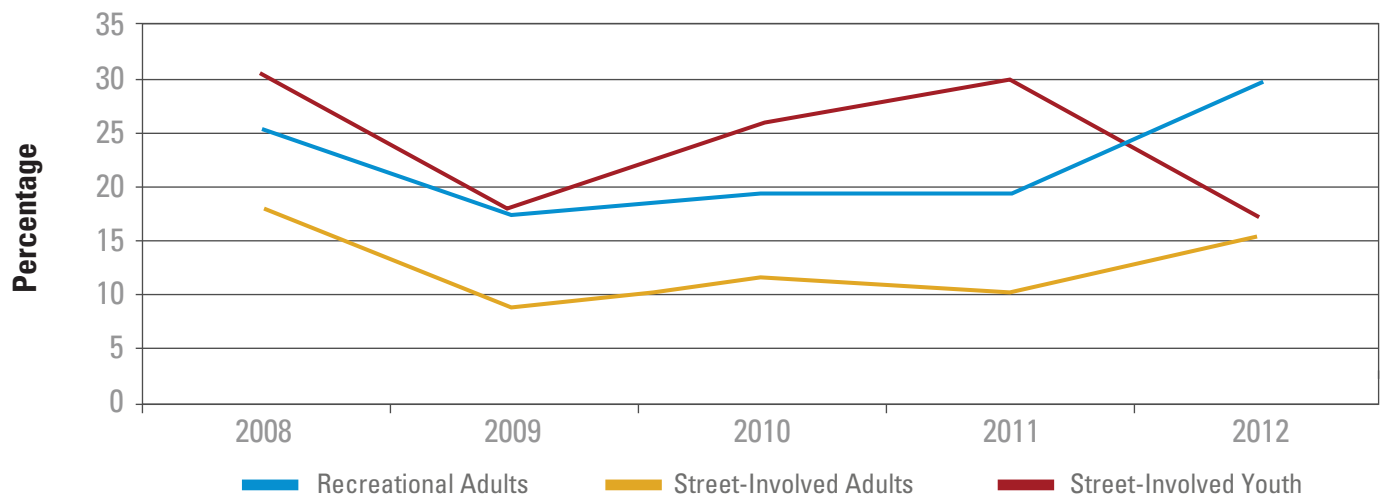


Figure 3.8 Overdose events in the last twelve months among high-risk populations in Vancouver.²⁰

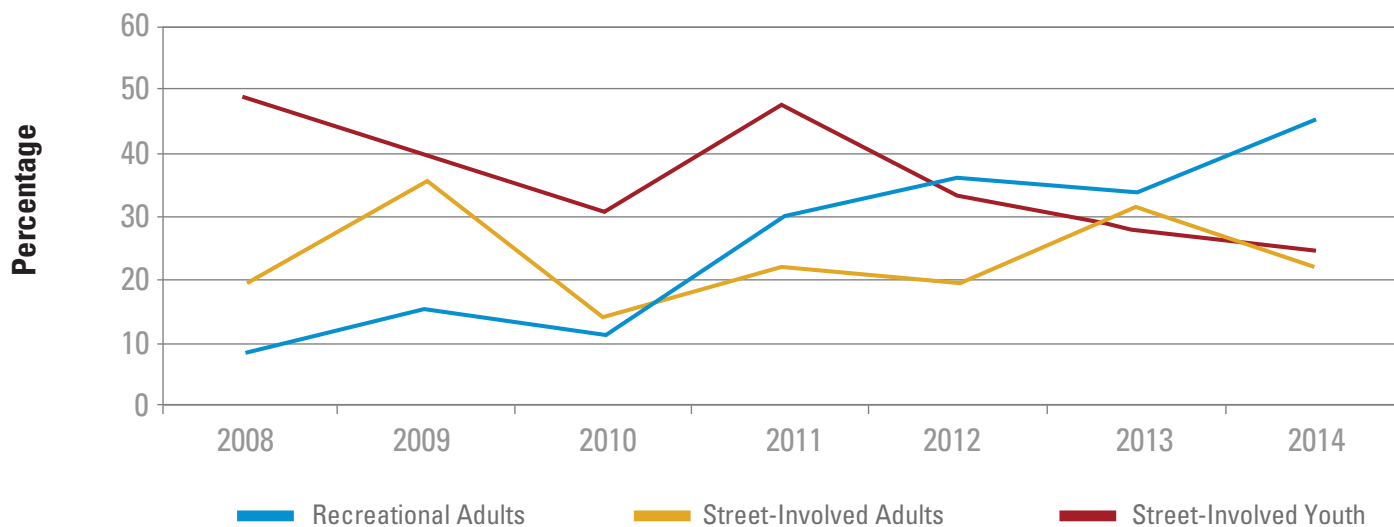
Overdose event: Overdosed on any drug i.e. where you had a negative reaction from using too much drugs including alcohol



(CARBC, personal communication, July 9, 2014)

Figure 3.9**Overdose events in the last twelve months among at-risk populations in Victoria²⁰**

Overdose event: Overdosed on any drug i.e. where you had a negative reaction from using too much drugs including alcohol



(CARBC, personal communication, July 9, 2014)

Table 3.1 summarizes the overdoses witnessed and experienced from the different data sources and the corresponding time period.

Table 3.1**Summary of Experienced and Witnessed Overdoses in BC, 2012 and 2013^{20,23}**

Region (Study Population)	Year	Experienced Overdose (Last 6 or 12 months)	Witnessed Overdose (Last 6 or 12 months)
Adult			
Vancouver (VIDUS & ACCESS)*	2013	8.9% (6 months)	22.8%
Vancouver (High risk street-involved adults)**	2012	15.2% (12 months)	-
Vancouver (High risk recreational adults)**	2012	29.8% (12 months)	-
Victoria (High risk street-involved adults)**	2013	31.2% (12 months)	-
Victoria (High risk recreational adults)**	2013	34.2% (12 months)	-
FH (HR Client Survey)	2013	17% (6 months)	50% (6 months)
VCH (HR Client Survey)	2013	13% (6 months)	26% (6 months)
VIHA (HR Client Survey)	2013	18% (6 months)	36% (6 months)
IH (HR Client Survey)	2013	10% (6 months)	31% (6 months)
NH (HR Client Survey)	2013	11% (6 months)	20% (6 months)
Youth			
Vancouver (ARYS)*	2013	17.8% (6 months)	23.7% (6 months)
Vancouver (High risk street-involved youth)**	2012	17.3% (12 months)	-
Victoria (High risk street-involved youth)**	2013	28% (12 months)	-

* BC Centre for Excellence in HIV/AIDS, personal communication, June 23, 2014

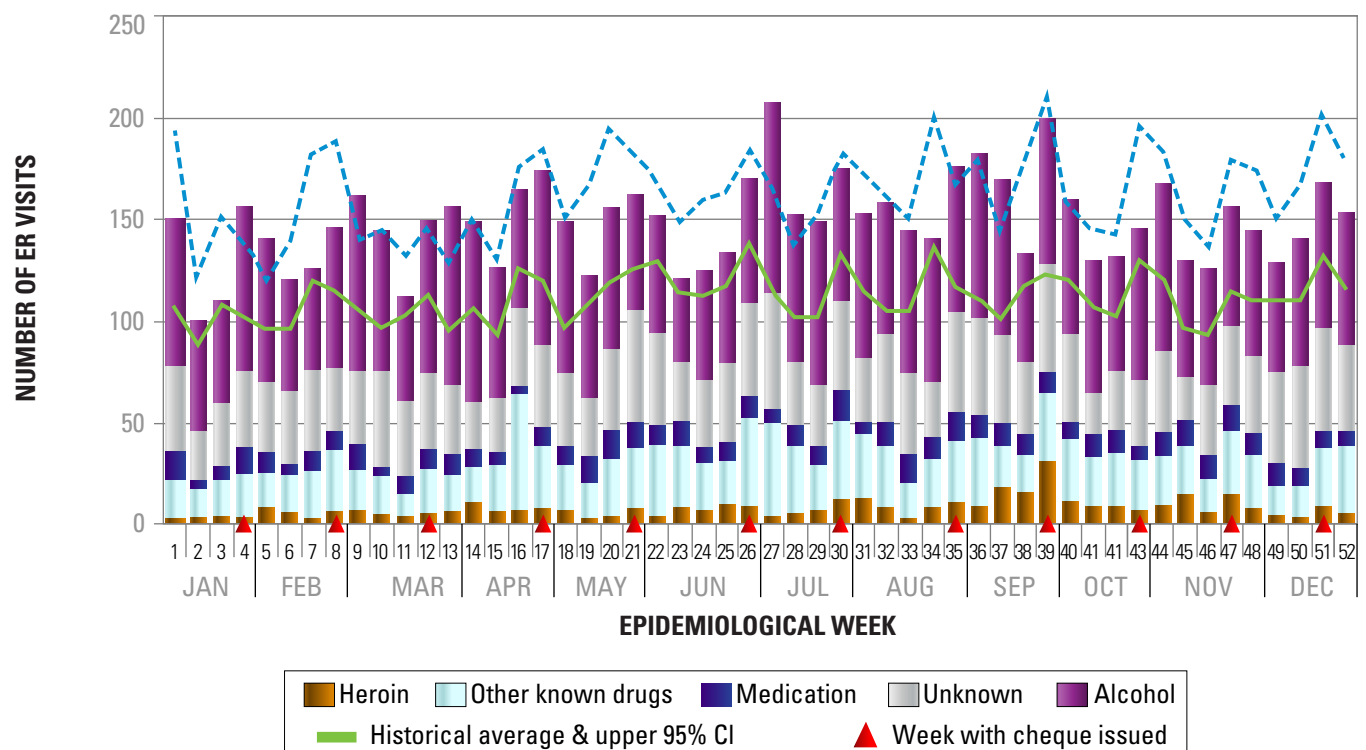
** Overdosed on any drug i.e. where you had a negative reaction from using too much drugs including alcohol

More than a quarter of adults using drugs recreationally in both Vancouver and Victoria; and street-involved youth and adults in Victoria report experiencing a negative reaction from using too much drugs including alcohol. These populations should be targeted with appropriate education to reduce the risk of serious harms of overdose.

The Public Health Surveillance Unit (PHSU) at VCH monitors injuries and overdoses using data from VCH emergency departments (EDs).⁴³ Figure 3.10 shows the number of ED visits related to overdose by substance type in the VCH region, based on the epidemiological week in 2013. This data summarizes overdose visits to the ED of 9 of 13 VCH acute care facilities. VCH experienced overall more overdose episodes in 2013 compared

to the historical average, with alcohol as the main cause for patient ED visits. Combination of heroin and other known drugs also represent about a quarter of overdose visits to ED. There is also a noticeable pattern of overdose events within the week that social assistance and disability cheques are issued; the highest monthly overdose rates occur either during this week or the following week.

Figure 3.10 Number of ED visits related to overdose by substance type and epidemiological week in VCH region in 2013, compared to historical average



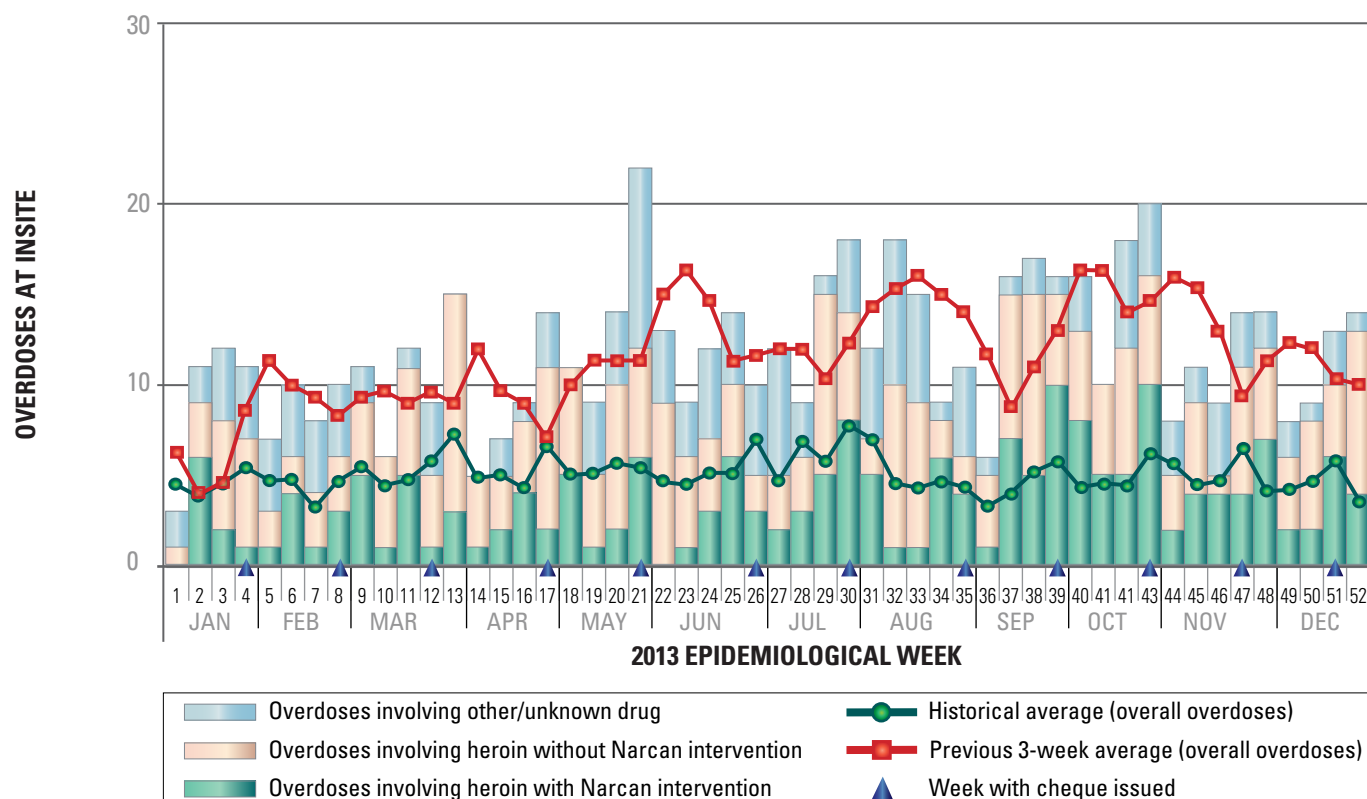
(Vancouver Coastal Health, personal communication, January 20, 2014)

Note: ER (emergency room) is synonymous with ED emergency department

The Safe Injection room at InSite also experienced more overdose events in 2013 compared to the historical average (Figure 3.11). Similar to the VCH ED data, overdoses at InSite appear to be higher in weeks that social assistance and disability cheques

are issued. These numbers reflect overdoses identified by the surveillance system, and may not represent the actual number of overdoses seen in VCH EDs and at InSite.

Figure 3.11 Number of Vancouver InSite visits resulting in an overdose by epidemiological week in 2013, compared to previous 3-week average and historical average



*Supervised injection site. *Historical data includes data since week 10 of 2004.
Data source: InSite, Vancouver Coastal Health, HIV/AIDS & Harm Reduction Programs.
Prepared by: Vancouver Coastal Health, Public Health Surveillance Unit.

(Vancouver Coastal Health, personal communication, January 20, 2014)

Standard harm reduction education to help prevent overdose events and associated harms includes the following messages:

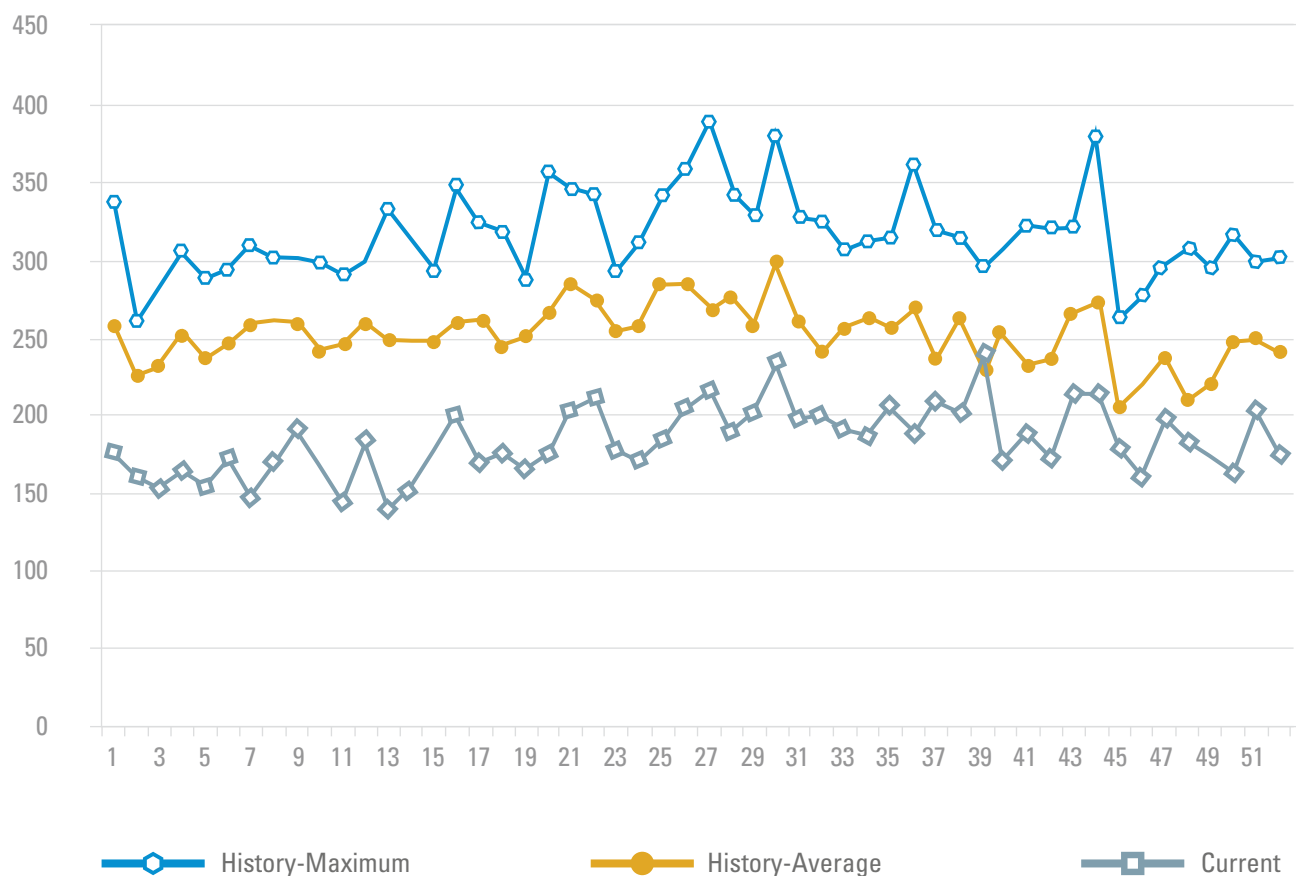
- ❑ Be aware: you never know what is in the drug or how potent it is
- ❑ Don't use alone.
- ❑ Make a plan/know how to respond in case of an overdose
- ❑ Taste [use a small amount of] the drug first
- ❑ Do not mix drugs with alcohol or other drugs
- ❑ Get overdose prevention training and carry naloxone
- ❑ Use InSite if possible
- ❑ Call 911 right away if someone overdoses
- ❑ Know your health status and your tolerance
- ❑ Be aware: using drugs while on prescribed medications can increase overdose risk
- ❑ Talk to an experienced person or a trusted healthcare provider about reducing risk
- ❑ Choose a safer route of taking drugs

BC Ambulance Ingestion Poisoning Calls

The BC Ambulance Services (BCAS) records the date, time and location of each emergency call and uses the advance medical priority dispatch system (AMPDS) to assign a dispatch code, which includes information regarding the chief complaint and response category (BC Ambulance Service, personal communication, January 3, 2014). The ingestion poisoning code is used when the call is thought to be caused by any toxic substance, such as prescribed and over the counter medication, street drug, or chemical. Figure 3.12 illustrates ingestion poisoning counts for BC in 2013. Call data is not confirmed by the responding ambulance crew; the historical average is based on 2004-2012.

Weekly ingestion poisoning counts for BC in 2013 were lower than the historic average, with the exception of week 39 where ingestion poisonings surpassed the historical average. Both FH and VIHA had counts consistently below their historic averages. For VCH, weeks 39 and 47 were higher than the region's historical averages. In comparison, the 2013 counts for IH and NH repeatedly exceeded historical averages, on 12 and 13 weeks respectively (data not shown), and also approached or surpassed historical maximums on several occasions. Ingestion poisoning counts are received by BC CDC weekly from BCAS, reported by health authority, health service delivery area and local health area and shared on the password protected DOAP website.

Figure 3.12 BC Ambulance Service ingestion poisoning counts, 2013



(BC Ambulance Service, personal communication, January 3, 2014)

Drug and Poison Information Centre - Poison Exposure Calls

The BC Drug and Poison Information Centre (DPIC) provides poison information services to the BC public and health professionals and is available 24-hours a day for over-the-phone advice. DPIC receives an average of about 70 calls a day about poison exposures.⁴⁴ The substances included in each of the six drug categories are shown in Table 3.2.

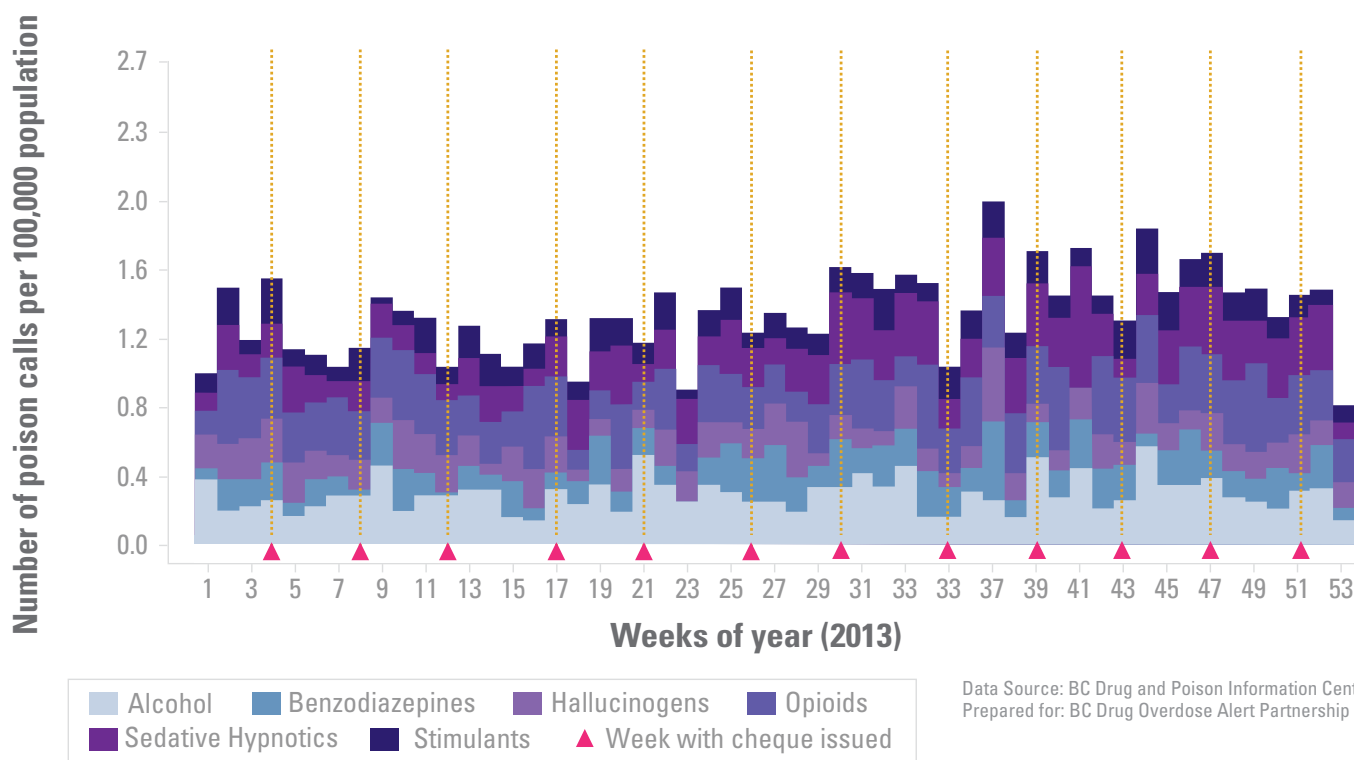
Figure 3.13 illustrates poison exposure calls to BC Drug and Poison Information Centre by substance and 2013 epidemiologic week per 100,000 population and indicates the income assistance and/or disability assistance cheque issuance week. Poison exposure information is received each week at BCCDC broken down by health authority and is another component of the DOAP data which helps to build a timely picture of harms related to substances.

Table 3.2 Substance classification in DPIC call data

Drug Category	Substances Included
Alcohol	Meant for ingestion, Not meant for ingestion, Illicitly manufactured
Benzodiazepines	No specifications
Hallucinogens	Cannabis, Ketamine, LSD, Mushrooms, Other Hallucinogens
Opioids	Heroin, Methadone, Fentanyl, Codeine, Hydromorphone, Oxycodone, Other Opioids
Sedative Hypnotics	GHS, Barbiturates, Sleeping Medications, Other Sedatives
Stimulants	Cocaine, Amphetamines, Methamphetamines, MDMA, Other Stimulants

(British Columbia Drug and Poison Information Centre, personal communication, July 28, 2014)

Figure 3.13 Number of poison exposure calls per 100,000 population by substance and epidemiological week in British Columbia, 2013



*Week 53 represents week 1 of 2014 (British Columbia Drug and Poison Information Centre, personal communication, July 28, 2014)

HealthLink BC, 8-1-1 Service

HealthLink BC 811 service is a free-of-charge health information and advice phone line that can connect public callers to registered nurses.⁴⁵ Over the phone, nurses assist with non-emergency health concerns, discuss symptoms, and recommend whether the caller should seek medical attention.⁴⁵ In 2013, there were a total of 5,414 calls related to alcohol and other drugs (Table 3.3). FH had the largest call volume, but VIHA had the highest rate of nursing service calls when adjusted for population size. In over a third of all calls the region was unknown, so it is difficult to make conclusions regarding the geographic distribution of the calls.

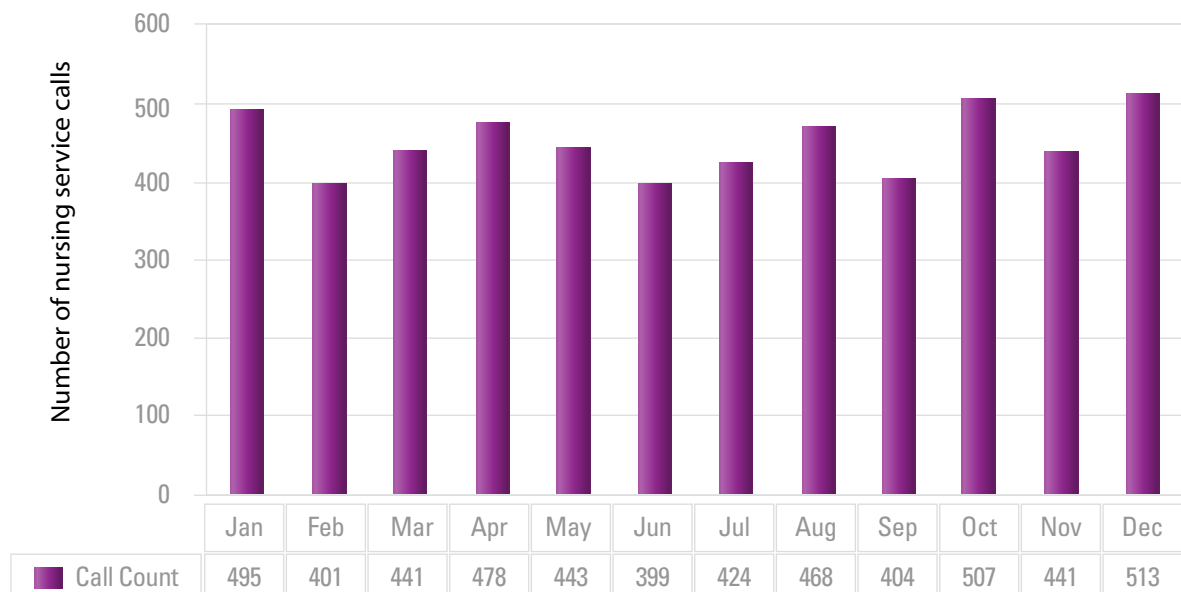
The largest call volumes for alcohol and drugs occurred between 6:00pm and 2:00am; and call volumes on Saturday and Sunday (18.8% and 19.4% of all calls respectively) were higher than the weekday average (12.4%). Figure 3.14 shows the number of calls in 2013 by month. October and January had the highest call volumes (above 500) while June had the lowest (less than 400). Caller age is recorded but this is not necessarily the person who needed information/assistance. The data do not classify the substance type related to each call.

Table 3.3 Number and rate of alcohol and drug-related nursing service calls by HA, 2013

Health Authority	Call Count	Calls per 10,000 Population
FH	1,190	17
VCH	761	10
VIHA	753	27
IH	623	4
NH	226	2
Unknown	1,861	
Total	5,414	

(HealthLink BC, personal communication, July 17, 2014)

Figure 3.14 Number of alcohol and drug-related nursing service calls by month, 2013



(HealthLink BC, personal communication, July 17, 2014)

Ambulance Naloxone Administrations

Naloxone is a pure opioid antagonist that when administered reverses life-threatening respiratory depression due to opioids to restore breathing in 2-5 minutes. In BC, emergency medical assistants at licence level 3 or higher are trained and authorized to administer naloxone. All BC Ambulance paramedics are appropriately trained and can administer naloxone. However, most firefighters are level 1 (first responder) or level 2 (Emergency medical responder) and thus are unable to administer naloxone.

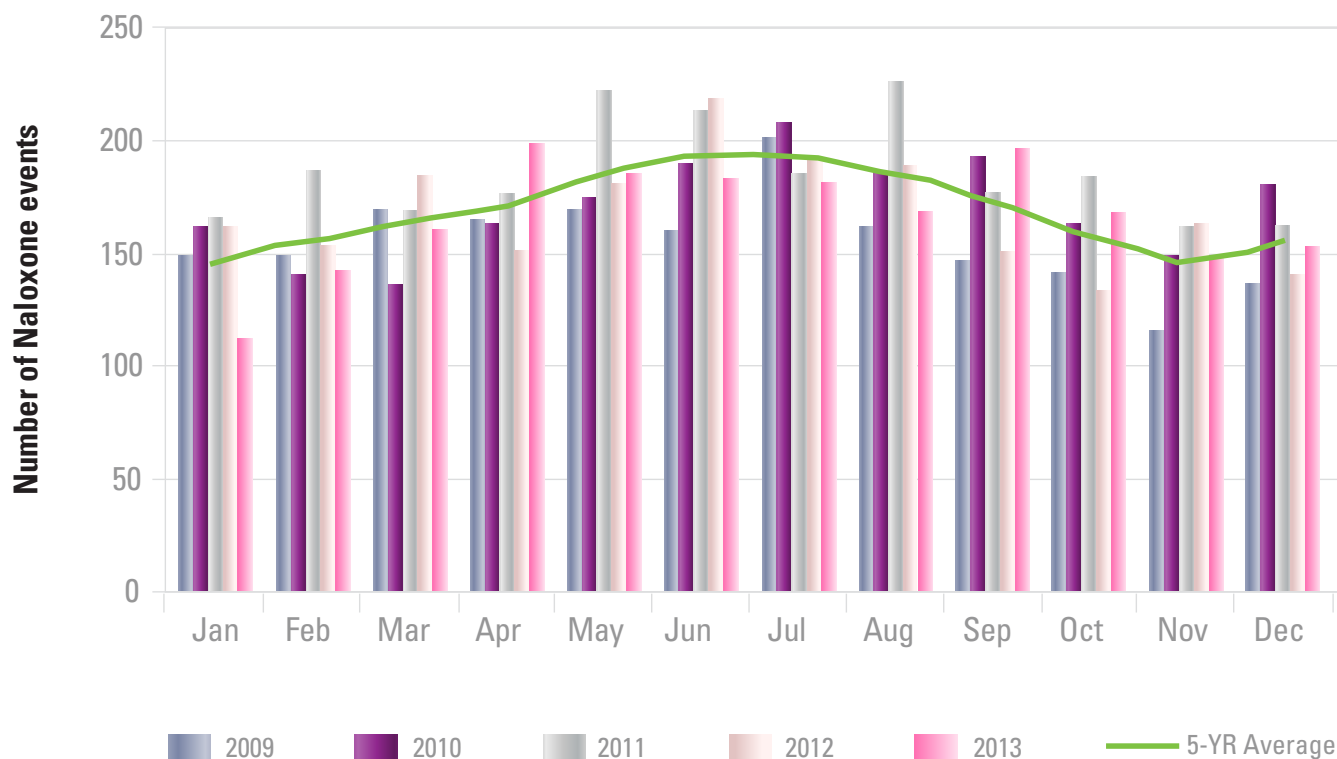
Figure 3.15 shows the number of events where naloxone was delivered by BC ambulance service crews from 2009 through 2013. If a patient received more than one dose of naloxone it was counted as a single event. These data suggest naloxone events increase in the summer months. Province-wide, the months with the highest 5-year average of naloxone events were in May (188), June (194.4), July (194.6) and August (187.2). The increase in summer months may be due to more frequent opioid use or

increased drug use in outdoor and public settings and therefore more likely to be observed and for an ambulance to be called.

Table 3.4 displays naloxone events by region, from 2009 through 2013. The overall number of naloxone events reported in 2009 is lower than those given in the subsequent four years. This may be partially attributed to the paramedic strike that lasted from April through November 2009. Ambulance administered naloxone events in BC peaked in 2011 (the year that overdose deaths due to increased heroin potency were also noted see chapter 5) with 2,242 events, and decreased subsequently reaching 2,011 in 2013. The reduction of administered naloxone follows the same trend of decreasing ingestion poisoning counts depicted in Figure 3.12.

Figure 3.16 shows the rate of ambulance administered naloxone by HA. Note that LH had the highest rate at 57.4 events per 100,000 population in 2011 while VCH had the highest rate in 2013 at 56.3 events per 100,000 people.

Figure 3.15 Number of naloxone events by month, 2009-2013



(BC Ambulance Service, personal communication May 21, 2014)

Table 3.4 Count of naloxone events by year, 2009-2013

Count of Naloxone Events by Year							
Region	2009	2010	2011	2012	2013	5-year total	5-year Average
FH	577	669	757	613	595	3211	642
Fraser East	80	126	126	124	104	560	112
Fraser North	193	216	230	190	193	1022	204
Fraser South	304	327	401	299	298	1629	326
VCH	471	559	603	594	641	2868	574
Richmond	37	27	32	40	33	169	34
Vancouver	369	454	504	489	550	2366	473
North Shore Coast Garibaldi	65	78	67	65	58	333	67
VIHA	367	351	333	339	338	1728	346
South Vancouver Island	171	186	145	146	153	801	160
Central Vancouver Island	149	116	128	141	138	672	134
North Vancouver Island	47	49	60	52	47	255	51
IH	323	348	412	351	327	1761	352
East Kootenay	17	15	25	24	16	97	19
Kootenay Boundary	24	20	28	26	23	121	24
Okanagan	196	218	261	212	204	1091	218
Thompson Cariboo Shuswap	86	95	98	89	84	452	90
NH	131	116	137	131	110	625	125
Northwest	23	15	33	25	24	120	24
Northern Interior	66	69	76	75	66	352	70
Northeast	42	32	28	31	20	153	31
(Unknown)	8	16	1	1		26	5
BC	1869	2043	2242	2028	2011	10193	2039

(BC Ambulance Service, personal communication, May 21, 2014)

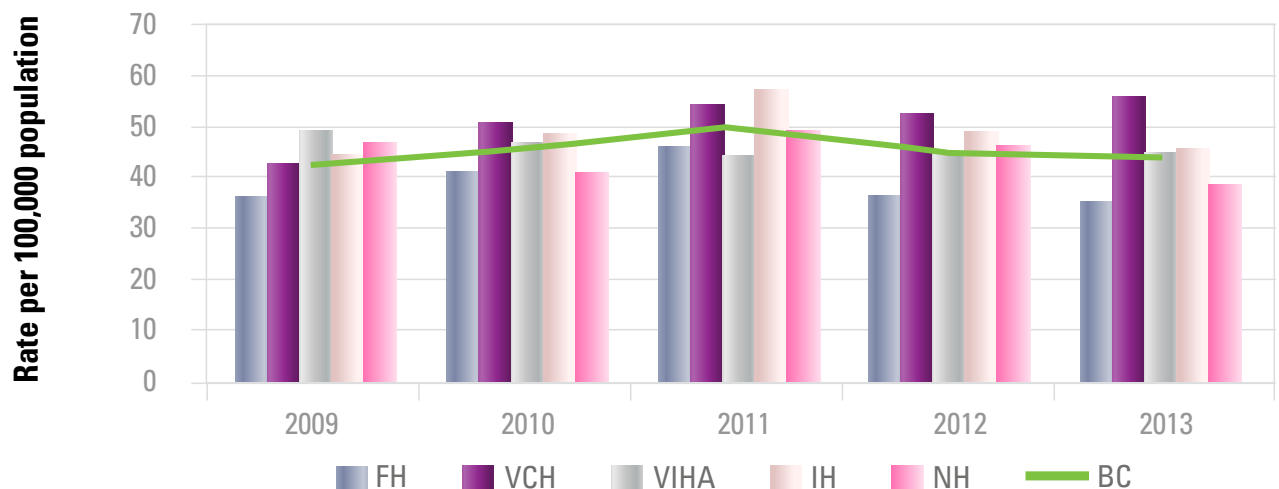
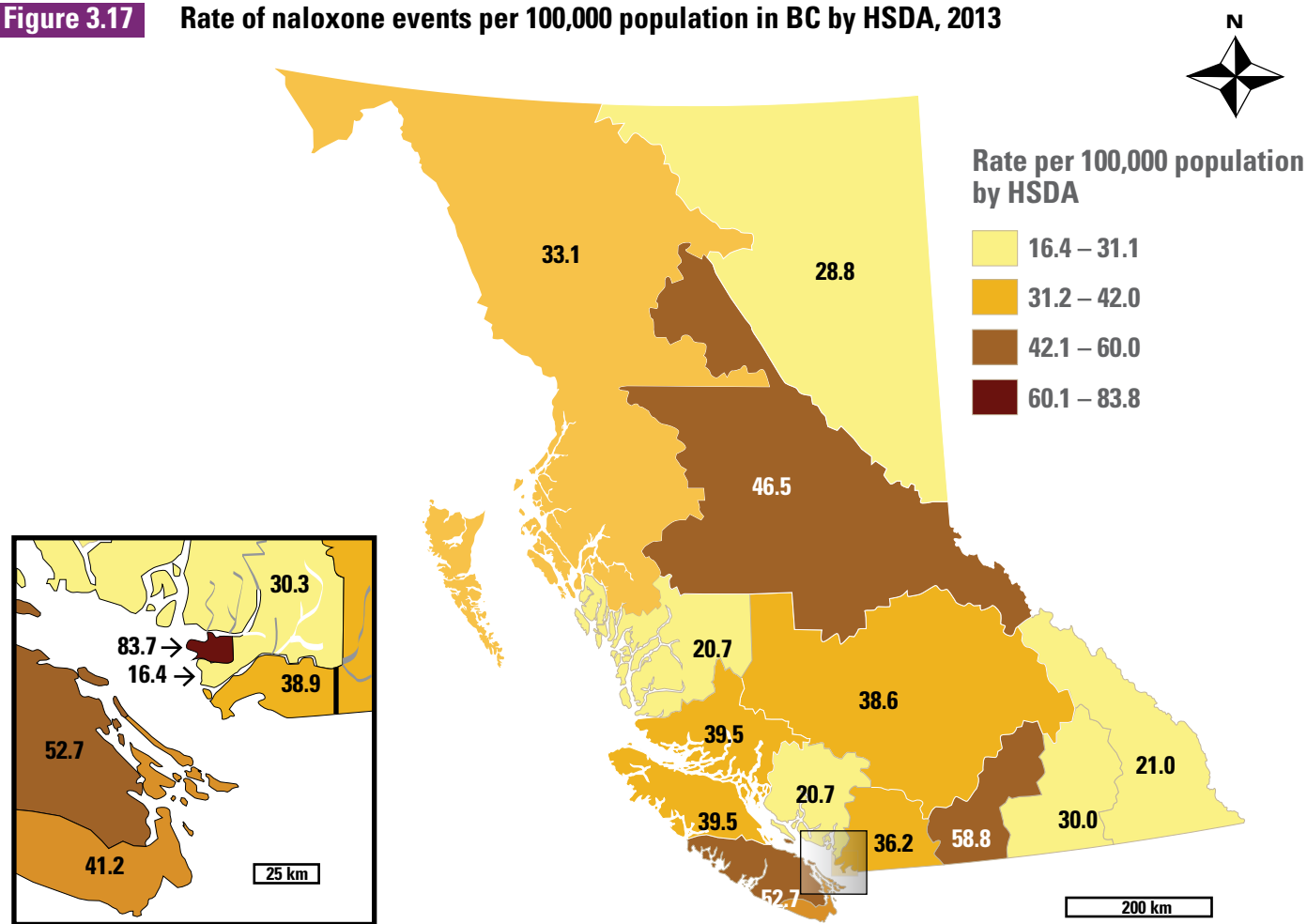
Figure 3.16 Rate of naloxone events per 100,000 population in BC by HA, 2009-2013

Figure 3.17 shows the population rate of ambulance administered naloxone by HSDA in 2013. Vancouver has the highest (83.7 per 100,000), which may reflect the prevalent drug use in the Downtown East Side and willingness to call 911. PWUD may be concerned about calling an ambulance if the police routinely

arrive; in Vancouver, the Vancouver Police Department (VPD) has a policy to only attend situations where assistance is requested by ambulance dispatch services.⁴⁶ More information on naloxone can be found in the [harm reduction chapter](#) of this report.

Figure 3.17 Rate of naloxone events per 100,000 population in BC by HSDA, 2013



HSDA	Rate	Cases	HSDA	Rate	Cases	HSDA	Rate	Cases
11 East Kootenay	21.0	16	23 Fraser South	38.9	298	43 North Vancouver Island	39.5	47
12 Kootenay Boundary	30.0	23	31 Richmond	16.4	33	51 Northwest	33.1	24
13 Okanagan	58.8	204	32 Vancouver	83.7	550	52 Northern Interior	46.5	66
14 Thompson Cariboo Shuswap	38.6	84	33 North Shore/Coast Garibaldi	20.7	58	53 Northeast	28.8	20
21 Fraser East	36.2	104	41 South Vancouver Island	41.2	153			
22 Fraser North	30.3	193	42 Central Vancouver Island	52.7	138			

Severe neutropenia (agranulocytosis) associated with levamisole in cocaine

In 2008, cases of severe neutropenia (low white blood cells) were identified in BC and Alberta associated with the use of cocaine which contained levamisole (a de-worming medication no longer available in Canada).⁴⁷ Cases of neutropenia in BC presented with bacterial or fungal infections and fever, which led to hospitalizations. A reporting system was implemented

in BC which identified 51 cases of neutropenia associated with levamisole in cocaine between 2008 and 2011. Studies of levamisole-associated neutropenia suggest a genetic predisposition to adverse- drug events. Levamisole in cocaine was also associated with necrosis of the earlobes and face.⁴⁷