

**DECREASING HIV INFECTIONS AMONG
PEOPLE WHO USE DRUGS BY INJECTION IN BRITISH COLUMBIA:**
Potential explanations and recommendations
for further action

Report from the Office of the Provincial Health Officer

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March 2011



Office of the
Provincial Health Officer

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INTRODUCTION

People who use drugs by injection (IDU) are a priority population for HIV prevention, care, treatment and support in BC. HIV infections among IDU have been identified since the beginning of the HIV epidemic in BC, and slowly increased in number during the late 1980s and early 1990s. In 1992, the number of new positive tests in IDU began to increase dramatically, indicating an outbreak of HIV among IDU was underway, rising to a peak in 1994-1996. While initially centred on IDU living in Vancouver's Downtown Eastside (DTES) neighbourhood, HIV quickly spread to affect IDU in all parts of the province.

Factors at multiple levels contribute to the HIV epidemic among IDU in BC. At the most immediate level, the likelihood of HIV infection among IDU is related to the exchange of blood through sharing of injection drug use equipment such as syringes and other drug paraphernalia (including pipes used for smoking crack cocaine), and to sexual risk factors for HIV acquisition. At the individual level, mental health issues, including drug dependence, and limited access to harm reduction supplies are key vulnerabilities for HIV infection. At a social and population level, issues such as poverty, homelessness, societal attitudes regarding substance use, access to appropriate health services, and stigma are key determinants of HIV infection in this population. As a result, provincial and regional HIV prevention and control strategies for IDU emphasize the importance of strategies that target determinants at these multiple levels, often under the framework of a blood-borne pathogens approach (with the objective of reducing both HIV and hepatitis C).¹⁻⁷

In BC, the provincial response to the epidemic of HIV among IDU has been multi-pronged and sustained (Table 1), including

- distribution of harm reduction supplies such as sterile needles and condoms to IDU;
- research studies for tracking the epidemic and risk behaviours among IDU;
- innovations such as supervised injection (Insite, Dr. Peter Centre) and research trials of prescribed opioids;
- expansion of mental health and substance use services, including opioid (e.g., methadone) maintenance treatment;
- provision of HIV primary and specialist care, including the provision of Highly Active Antiretroviral Therapy (HAART);
- maximally assisted/directly observed therapy programs for HAART;
- initiatives to reduce poverty and homelessness;
- outreach programs (e.g., street outreach, Corrections); and
- initiatives to increase HIV testing.

In 2008, a substantial decrease in new positive HIV tests among IDU was identified in provincial HIV surveillance data: from 118 new positive HIV tests in 2007 to 61 new positive tests in 2008 (Figure 1).⁸ In 2009, the number of new positive tests among IDU had increased slightly to 64, but this is still low compared to earlier years. During the same time period, trends in new positive HIV tests among other exposure categories, including men who have sex with men (MSM) and individuals acquiring HIV through heterosexual contact did not show the same decrease. A review by the BC Centre for Disease Control did not find any changes in the reporting of new positive HIV tests, laboratory testing protocols, or handling of surveillance data, which would explain the decrease in new positive HIV tests among IDU.

IDU comprised 17 per cent of the estimated annual number of new HIV infections in Canada in 2008, and the recent trend for annual numbers of new positive HIV tests among IDU nationally has been stable.⁹ However, by region, recent trends in new positive tests among IDU vary, from decreasing trends in Québec¹⁰ and Alberta¹¹ to stable trends in Ontario¹² and increasing trends in Saskatchewan.¹³ To the south in Washington State, trends in new positive HIV tests among IDU are decreasing.¹⁴ While findings from other jurisdictions can provide important insights into factors underlying HIV trends in IDU in BC, this regional variation emphasizes the importance of looking at BC-specific data in order to understand regional influences on the dynamics of HIV transmission among IDU. By doing so, we may be able to shed light on potential explanations for the decrease in new positive HIV tests among IDU in BC and inform future strategies for HIV prevention in this population.

ABOUT THIS REPORT

In 2009, an expert working group was convened to review the recent decrease in new positive HIV tests in IDU in BC. This working group included medical health officers and program leads for HIV-related services in regional health authorities; provincial leads for HIV and hepatitis C surveillance, laboratory testing and harm reduction programs; lead researchers and experts in the field of substance use, harm reduction and HIV among IDU, and in the treatment of HIV using HAART; and representatives from the IDU community.

The working group was tasked with reviewing relevant data from multiple sources in order to identify potential explanations for the observed decrease in new positive HIV tests in IDU, discuss the implications of these explanations for future transmission of HIV among IDU, and make recommendations for actions to continue to prevent further infections in this population.

This report summarizes the discussion of this expert working group. Part 1 analyzes the trends in HIV and hepatitis C (HCV) infections in IDU in BC. Part 2 reviews the potential hypotheses for what factors might underlie these trends and evidence where it is available to support or refute each hypothesis. The report concludes by summarizing the opinions of the working group on the most likely explanations for the decrease in new positive HIV tests among IDU, reviewing the current understanding of the nature of addiction and rationale for alternatives to enforcement-based drug policies, and recommending future actions to prevent further transmission of blood-borne infections, including HIV, among IDU in BC.

PART 1 – WHAT ARE THE TRENDS?

1.1 Further Analysis of Trends in HIV Infection in People Who Use Drugs by Injection

New positive HIV tests in IDU: To look at these trends in more detail, we conducted a review of new positive HIV tests in IDU in BC (including MSM who are also IDU)ⁱ and found the following:

- There is substantial variability in new positive HIV tests in BC by quarter, which may contribute to overall decreases observed for a single calendar year. However, the number of new positive

ⁱ In routine surveillance reports, new positive tests in MSM-IDU are included with MSM. For the analyses in this report, MSM-IDU were included with IDU (hence numbers will differ from annual HIV surveillance reports). Between 2000 and 2009, the number of new positive tests in MSM-IDU ranged from 6-18 per year.

HIV tests in IDU in 2008-2009 appears to be lower than prior to 2008 (Figures 2, 3). The recent decrease in new positive HIV tests in IDU may have begun in June to December (Quarter 3 to Quarter 4) of 2007.

- Since 2003, a decrease was observed in all five regional health authorities, although it was most evident in Vancouver Coastal Health, Fraser Health, and Vancouver Island Health Authority (Figure 4). In Vancouver Coastal and Fraser Health, the number of new positive HIV tests in IDU had been decreasing during the years leading up to 2008.
- A decrease between 2000 and 2009 was observed in all ethnic groups (data not shown) and in both males and females (Figure 5). The decrease was most apparent in IDU between 20-39 years of age (Figure 6).

HIV incidence in IDU: New positive HIV tests are at best a proxy for new HIV infections, as a person can be tested and diagnosed with HIV a long time after they are infected. Two sources of data suggest that the observed decrease in new positive HIV tests represents a true decrease in HIV infections among IDU (i.e., a decrease in HIV incidence):

- The measured incidence of HIV among participants in the Vancouver Injection Drug Users Study (VIDUS)—an ongoing longitudinal open cohort of over 1,300 IDU in Vancouver’s DTES—decreased in 2008 compared to 2007.¹⁵
- Preliminary estimates of the number of incident HIV infections in IDU (using estimation methods based on surveillance, laboratory and research data) have suggested a decrease in 2008 in BC compared to previous years (data not shown).

HIV prevalence in IDU: A recent change in HIV incidence would not be expected to affect estimates of HIV prevalence (the number of IDU who are living with HIV infection). The Public Health Agency of Canada estimates that in 2008 there were 3,760 HIV-positive IDU in BC (range 2,820-4,700).¹⁶ Current estimates of HIV prevalence in BC among IDU range from 13 per cent to 22 per cent around the province.^{17,18}

1.2 Analysis of Trends in Hepatitis C Infection in People Who Use Drugs by Injection

The main route of ongoing hepatitis C (HCV) transmission is through injection drug use; unlike HIV, sexual transmission of HCV is rare. As HCV is more easily transmitted through injection drug use than HIV, it has a higher prevalence in IDU populations. Half of the individuals identified with both HIV and HCV infections in BC were diagnosed with HCV a median 3.5 years prior to HIV diagnosis.¹⁹ Thus, HCV incidence may be an indicator for potential risk of HIV transmission through injection drug use, and is relevant to consider in understanding trends in HIV infection among IDU.

Since 1992, approximately 67,000 newly identified cases of HCV in BC have been reported in the integrated Public Health Information System (iPHIS). The Provincial Public Health Reference Laboratory performs 95 per cent of anti-HCV (HCV antibody) testing and has positive and negative anti-HCV results from >900,000 individuals since 1992. This longitudinal dataset allows identification of individuals who had a negative and subsequent positive result (seroconversion). The ability to detect new HCV cases and seroconversion depends on volume and frequency of testing. Anti-HCV testing increased in BC from 64,000 individuals tested in 1998 to >120,000 in 2009 (Figure 7). Overall, females were tested more frequently than males, but males were more likely to test positive.

New reports of HCV: Newly identified cases of HCV may be people who were remotely infected and tested due to remote (i.e. distant-past) risk behaviour, for insurance purposes, or due to symptoms of chronic infection; or they may be people who were newly infected and tested due to ongoing risk factors or symptoms of acute infection. Reported HCV cases peaked in 1996-1998 following notification of blood product recipients by the Provincial Health Officer to get tested for HCV. Since 1998, there has been a steady decline in reported cases, from 4,353 cases in 2000 to 2,444 in 2009 (Figure 8). The rates of HCV identified in 16 BC health service delivery areas (HSDAs) differ, related in part to HCV prevalence but also to referral to and accessibility of HCV testing. In 2009, Richmond and North Shore/Coast Garibaldi HSDAs had HCV diagnosis rates <40/100,000, and Central and Northern Vancouver Island, Fraser East and Northern Interior HSDAs had rates >75/100,000.⁸

HCV seroconversions: As only about 25 per cent of people acutely infected with HCV exhibit symptoms, incident infections may be missed. Therefore, acute HCV infections are more completely identified in laboratory data through seroconversions.

- *HCV seroconversions (within no specified time interval)* have increased over time due to the impact of increased testing on the detection of seroconversion. The greatest number of seroconversions was identified in Fraser Health, followed by Vancouver Coastal, Vancouver Island, Interior and Northern Health Authorities. Since 2007, the number of seroconversions has decreased in all health authorities except Vancouver Coastal (Figure 9). HCV seroconversion (no specified time interval) in those over 30 years of age is higher among females; but in those less than 30 years of age it is higher among males.
- *HCV seroconversions (within 24 months)* are more likely to represent recent HCV infection compared to seroconversions at any time. HCV seroconversions within 24 months have remained relatively stable since about 2004, despite the increase in testing (Figures 7, 10). A slight increase was noted in 2006; however, 2009 had the fewest cases since 2000. Seroconversions within 24 months were higher in males until 2006, but since 2007 they have been higher in females (Figure 11).

Other estimates of HCV incidence: A decrease in both HCV and HIV incidence was observed in the VIDUS cohort in 2008 (i.e., among IDU in the DTES).¹⁵ Although VIDUS is an open cohort of people who inject drugs, HCV prevalence is >90 per cent; therefore, few participants are susceptible to HCV. Similarly, those with HIV risk behaviours may already be infected with HIV.

HCV prevalence in people who use drugs by injection: Current estimates of the prevalence of HCV in BC among IDU range from 62-74 per cent in Victoria to 83-88 per cent in the DTES.^{17, 20, 21}

1.3 Summary of Trends

The recent decrease in new positive HIV tests in IDU in BC started in mid-2007, and while there has been fluctuation by quarter, the number in 2008-2009 remains low compared to earlier years. This decrease was observed around the province in all health authorities, and appears to be more prominent among IDU between the ages of 20-39 years. This decrease likely reflects a true decrease in HIV incidence among IDU in the province.

HCV is transmitted primarily through injection drug use in BC, and data on HCV infections may provide a good indicator for potential risk of HIV transmission among IDU. Despite a steady increase in provincial anti-HCV testing over time, the number of new HCV reports has decreased over time and is lower in

2008-2009 compared to earlier years, and the number of seroconversions within 24 months is stable or possibly decreasing. Assuming that the majority of HCV infections are among IDU, these data suggest that the number of new HCV infections among IDU may also be decreasing.

PART 2 – WHAT MIGHT EXPLAIN THESE TRENDS?

2.1 Increased Uptake of Highly Active Antiretroviral Treatment Among People Who Use Drugs by Injection

In addition to improving clinical outcomes, Highly Active Antiretroviral Therapy (HAART) has been demonstrated to reduce blood viral load levels to undetectable levels and reduce the viral load in genital secretions (relevant to injection-related and sexual transmission of HIV, respectively). This is known to reduce an individual's risk of HIV transmission. For example, maternal HAART therapy substantially reduces the risk of mother-to-child transmission, and HAART use by an HIV-positive partner decreases HIV transmission in HIV sero-discordant couples.

More recently, it has been proposed that increasing appropriate access to HAART may lead to population-level prevention of HIV.²² Mathematical models using BC data have suggested that increasing HAART uptake at a population level may reduce community viral load levels and result in an overall population decrease in HIV incidence.²³ This hypothesis is part of the rationale for the current provincial initiative STOP HIV/AIDS (Seek and Treat for the Optimal Prevention of HIV & AIDS), which aims to increase diagnosis of HIV, and to increase access and timely uptake of and adherence to HAART among medically eligible HIV-positive individuals in Vancouver and Prince George.²⁴

By this hypothesis, recent increases in the proportion of IDU who are treated appropriately with HAART may explain the recent decrease in HIV infections in IDU, mediated through a decrease in community HIV viral load levels. There is good evidence to support the contribution of this hypothesis to the recent decrease:

- A correlation between median plasma HIV-1 RNA levels and HIV incidence was demonstrated in a prospective cohort of IDU in Vancouver's DTES (VIDUS and Barriers to Accessing Anti-Retroviral cohorts [BART], 1996-2007) [Figure 12].²⁵ This was most evident between 1996 and 1999, when a decrease in both HIV incidence and median plasma HIV-1 RNA levels was observed. In this study, the time to HIV seroconversion among HIV negative participants was most strongly associated with median plasma HIV-1 RNA levels after adjustment for housing, sexual, injection and drug-related behaviours.
- At a provincial level, the number of HIV-positive people on HAART has been steadily increasing since 2004, when interruption of treatment among people who had already initiated HAART was discouraged (Figure 13). An association between the increase in HAART coverage during this period, decreased population viral load and decreased number of new HIV diagnoses per year has recently been demonstrated.²⁶ In a sub-analysis of individuals on HAART known to be IDU, the proportion of individuals having a viral load <500 copies and <50 copies per mL increased significantly between 2004 and 2009 (by 82 per cent and 86 per cent respectively).
- The proportion of IDU on HAART with high plasma viral loads (>1,500 copies/mL) has decreased during this time period, similarly indicating an overall decrease in community viral load among HIV-positive IDU during this time period (Figure 14). This decreasing trend was observed in all five regional health authorities (Figure 15).

2.2 Changing Patterns of Drug Use Leading to Decreased Risk for HIV Infection

An increase in crack cocaine smoking associated with a decline in drug use through injection has been suggested to account for the recent decrease in HIV transmission through IDU. Crack cocaine smoking has been associated with a decline in injection elsewhere in Canada.²⁷ Although HIV and HCV transmission may occur through sharing smoking paraphernalia,^{28, 29} the risk of infection is far less than through sharing injection drug use equipment. We are currently unable to identify in surveillance data new HIV diagnoses that may be attributed to crack cocaine smoking; however, evidence in support of this hypothesis includes the following:

- An increase in crack cocaine smoking has been consistently reported in the DTES and throughout the province, with concomitant increases in requests for crack smoking supplies.^{15, 30-32}
- Exhibits analyzed from prosecution samples in BC demonstrate an increase in crack cocaine exhibits seized over time (Figure 16), although the mode of drug administration (injection/inhalation) is not known and trends in exhibits may be related to changes in enforcement practices.
- Data from the VIDUS cohort on drug use patterns among IDU in Vancouver from 1996 to 2007 indicate an overall increase in the proportion of participants who report daily crack cocaine smoking; however, this proportion has remained stable since 2003.³¹ An overall decline in the proportion who report daily heroin injection since the late 1990s, and a substantial decline in the proportion of IDU who report daily cocaine injection have also been identified. Previous research in this cohort demonstrated that cocaine injection is a strong, dose-dependent predictor of HIV seroconversion, and that it played a role in Vancouver's HIV epidemic.³³ However, a recent publication from this cohort has demonstrated that daily crack cocaine smoking is independently associated with an increased risk for HIV seroconversion.³¹
- From 2008 to 2009, three rounds of surveys have been completed on drug use patterns among adult IDU in both Vancouver and Victoria (approximately 50 IDU in each city). The surveys are administered through convenience and snowball sampling as part of the larger BC Alcohol and Other Drug Monitoring Project.³⁴ An increase in the proportion who reported crack cocaine smoking was noted over time especially in Vancouver.

2.3 Impact of HIV Prevention Programs Including Harm Reduction

Full participation in harm reduction programs, including needle distribution and methadone maintenance therapy (MMT), has been found to be associated with decreased risk for HIV and HCV.³⁵ These harm reduction programs are available across BC and may be having an impact on observed HIV trends in IDU.

Distribution of harm reduction supplies: The provincial needle exchange policy changed to a needle distribution and recovery policy in 2002, stating that harm reduction supplies should be available to all who need them regardless of choice of drug or where they live. The policy also supports the provision of supplies for the purpose of secondary distribution.³⁶ Recent research found that in Vancouver Coastal Health, decentralization of needle distribution and recovery, and removal of restrictive policies, coincided with large declines both in borrowing/lending of needles and HIV incidence.³⁷

Despite the shift to more permissive policies for provision of harm reduction supplies, overall needle/syringe distribution declined from fiscal year 2006/2007 to 2008/2009, although it increased in

all health authorities in 2009/2010 (Figure 17). Vancouver Coastal Health currently receives about 60 per cent of the provincial needles/syringes, and half of these go to Insite for use on-site and secondary distribution. In Vancouver Island Health Authority, the number of needles distributed had begun to decline prior to the closure of its only fixed harm reduction supply distribution and recovery site in Victoria in May 2008, although an even more significant reduction in service delivery followed.³⁸ A considerable increase in needle/syringe distribution in Fraser Health is noted in 2009/2010; however, the number of needles distributed compared to the population or number of HCV cases in this region remains low.³⁹

The decline in volume of distributed needles/syringes from 2006/2007 to 2008/2009 in all regions except Vancouver Coastal may reflect a decreased demand for needles, which may be related to an increase in crack cocaine smoking and a decrease in injection. However, this distribution data needs to be interpreted with caution; while the provincial distribution policy is endorsed by all health authorities, reach of supply distribution is not uniform. These trends may be influenced by some municipalities continuing to object to the integration of harm reduction into the local problematic substance use prevention, care, treatment and support continuum, or through bylaws that prohibit or local policing policies that inhibit harm reduction supply distribution and recovery.

Substitution therapy: Methadone maintenance therapy (MMT) programs reduce the transmission of HIV more effectively than HCV.^{40,41} MMT programs may be affecting the transmission of HIV among IDU in BC: there was a 10 per cent increase in patients receiving MMT in BC from 2007 to 2009, from 8,985 patients in 2007 to 11,033 in 2009.⁴² Recently, a randomized clinical trial in Vancouver demonstrated that injection diacetylmorphine (the term for pharmaceutical-grade heroin) was more effective than oral methadone at reducing illegal drug use and increasing retention in addiction care,⁴³ and further studies of new strategies for prescription opioids for substitution therapy are underway. However, these strategies related to substitution therapy address opioid dependence only; a 2005 report highlighted the rise of cocaine and other stimulant use among residents of the DTES and identified the need for substitution therapies with a greater scope than opioid maintenance.⁴⁴

Other HIV prevention programs for people who use drugs by injection: Harm reduction programs are one component of comprehensive HIV prevention strategies for IDU. Other programs that have a primary or secondary aim of preventing HIV infections in IDU are in place across BC; for example, condom distribution, mental health and substance use services, outreach programs and other support services. While these programs are likely having an impact on preventing new HIV infections, provincial data for these services are not readily available and comparison of utilization data to HIV trends is not possible.

2.4 Decreased Testing for HIV Among People Who Use Drugs by Injection

Changes in HIV testing programs or availability of HIV testing could conceivably lead to changes in the number of new positive HIV tests. In BC, over 95 per cent of HIV screening tests and all confirmatory testing in BC is conducted by the Provincial Health Services Laboratory (BCCDC Site), which currently conducts over 170,000 HIV tests per year. The volume of HIV tests conducted has been steadily increasing since 2004, with a stable or increasing number of HIV tests in each health authority and health service delivery area and in most local health areas. However, these overall trends may mask testing trends in populations such as IDU, as the total number of HIV tests in IDU cannot be measured (i.e., documentation of exposure category is only collected for people with a positive HIV test, and is not known for individuals with a negative HIV test).

Over the past few years, point-of-care (POC) HIV testing has been increasingly used in BC, and is available to IDU in settings such as Insite or within BC correctional facilities. However, the relative volume of POC HIV tests used in BC is small in comparison to laboratory-based HIV testing, and any preliminary positive POC HIV test would be confirmed by a standard blood test (and identified as a new diagnosis of HIV in surveillance data). Thus, it is unlikely that a switch from standard to POC HIV testing is contributing to these trends.

There is little information on the uptake or frequency of HIV testing in HIV-negative IDU over time in BC. The Victoria I-Track survey is a repeated cross-sectional survey of IDU in Victoria. Between the first two rounds of the survey (conducted in 2003 and 2005), the proportion of participants ever tested for HIV increased from 86.2 per cent to 93.6 per cent, while the proportion of participants who reported being tested in the past two years was similar in both rounds at 75 per cent and 76 per cent.

2.5 Changes in the Population of People Who Use Drugs by Injection: Aging, Saturation

Changes in the composition of the IDU population or population dynamics influencing HIV transmission may explain the recent decrease in HIV in IDU. Various hypotheses have been proposed regarding changes in the composition of the IDU population. These include the aging of the population who inject, with few younger HIV-susceptible people initiating injecting. This also supposes that older injectors who were vulnerable to HIV are now infected (i.e., this age group is saturated) so there are fewer incident cases in this older, long-term injecting population. HIV saturation has been thought to explain the increase and peak of HIV infections in IDUs in the mid 1990s, as those most vulnerable were infected early, leading to the subsequent decrease in the number of new diagnoses once the saturation point was reached.

The largest recent decrease in new HIV diagnoses is among IDU of younger ages, which supports the suggestion that fewer youth are transitioning into injecting. However, the ARYS study (a prospective cohort of >500 street-involved youth aged 14-26 in the DTES who use illegal drugs other than marijuana) found 30 per cent had injected drugs (42 per cent females, 12 per cent males). Of those who had injected, 29 per cent had shared a syringe in the previous 6 months.⁴⁵ Despite this prevalence of HIV risk activities, only 15 (2.8 per cent) of the youth were HIV positive, of whom 53 per cent reported injecting.⁴⁶ In this study, syringe sharing was a qualitative measure (Yes/No) and therefore sharing may be infrequent or it may be occurring in networks of younger or other IDU with low HIV prevalence.

Anecdotal reports from frontline providers and researchers in BC support the perception of an aging IDU population. However, some have raised the concern that younger people who use drugs at risk of HIV infection may not be accessing HIV testing and associated health care, and HIV infections may be occurring but are not being diagnosed. However, there are no specific data to support or refute these concerns. Cocaine smoking is common in both adult and young drug-using populations. Currently, supplies available through the provincial harm reduction supply program for those who smoke crack cocaine include three sizes of mouthpieces and push sticks. However, crack pipes are not available and as a result youth who use non-injection drugs may not be engaged in harm reduction services (and be referred for testing).

2.6 Decreased Sexual Transmission of HIV Among People Who Use Drugs by Injection

The contribution of sexual transmission to new HIV infections among IDU is acknowledged but has typically received less attention compared to transmission due to injection-related behaviours.^{47,48} In BC, IDU report high levels of sexual risk behaviours, and injection and sexual acquisition networks do overlap and contribute to heightened vulnerability to HIV (i.e., among female sex workers, men who have sex with men, and street youth).⁴⁹⁻⁵² In addition, sexually transmitted infections (STI) such as syphilis promote both HIV susceptibility and transmission, through lesions that impair mucosal or skin barriers and by increasing HIV viral loads and infectiousness during acute episodes of STI.

Provision of condoms and sexual health counselling are integrated components of many harm reduction and prevention programs and health services for IDU in BC, and may be having an impact. For example, among IDU at Insite, consistent condom use has increased over time, suggesting a possible beneficial effect of the supervised injection facility on safer sexual practices.⁵³

While reductions in sexual risk behaviours or sexually transmitted infections over time among IDU in BC could contribute to the observed decrease in new HIV infections in IDU, there is little evidence to support or refute this hypothesis. One suggestive finding is the substantial decrease in infectious syphilis among people who are street involved, sex trade workers or patrons of sex trade workers in 2007-2009 (from a peak of 136 cases in 2003 to 19 cases in 2009), centred on the Lower Mainland. While not defined by injection drug use, sexual networks in this population would be expected to overlap significantly with IDU networks. However, data on trends in STI (including more prevalent STI such as gonorrhoea and chlamydia) among defined IDU populations are not available.

CONCLUSIONS

The recent decrease in the number of reported new positive HIV tests in IDU in BC is encouraging, and appears to represent a true decrease in HIV incidence among IDU. Based on the exploration of potential hypotheses presented in this report, it is likely that the decrease is due to several factors acting in concert. In particular, the uptake and expansion of HAART in IDU and concomitant reduction in community HIV viral loads around the province has likely been a major driver of reducing HIV incidence in this population. The transmission of HIV in IDU in BC has likely also been affected by changes in drug use over time (in types of drugs and routes used) and subsequent changes in the composition of the injection drug user population. Factors such as changes in drug availability or drug use, or changes in the population may be less amenable to influence by the health system, and if these factors change, may lead again to increases in HIV transmission among IDU.

People who use drugs by injection are a recognized priority population for HIV prevention in BC, and the sustained and multi-level response to the HIV epidemic in IDU is also contributing to this decrease. In addition to expanding access to HAART, this response includes the delivery of effective harm reduction services (including established interventions such as needle distribution and substitution therapy, and innovations such as supervised injection facilities and prescription opioids) and community-based HIV prevention services. This provincial response needs to be sustained and new opportunities for further prevention of HIV in IDU explored. This success also challenges the health system in BC to ensure that equivalent sustained, multi-level HIV prevention responses exist equally in all populations affected by

HIV—particularly for gay, bisexual and men who have sex with men and marginalized Aboriginal people, where trends in new HIV diagnoses are not decreasing.

This report provides a review of ecological data and considers a broad range of evidence and data sources of varying data quality and relationship to the hypotheses in question. As a result, it is not possible to assess all hypotheses equally for their potential impact on new HIV infections in IDU, and there is not sufficient evidence to support or refute some of the hypotheses, or to determine what other factors may be contributing to the observed trends. Further research in these areas would be informative; for example, research into the HIV testing patterns of IDU over time, changes in the age distribution of IDU, and access of younger IDU to health and harm reduction services.

In BC, a blood-borne pathogens approach including both HIV and HCV infection is typically applied to strategies in IDU. Although the rate of HCV reports and recent HCV seroconversions has been stable or decreasing despite increases in HCV test volume provincially, a decrease of similar magnitude of acute HCV reports in BC—an infection that is most often acquired through injection drug use—has not been observed. Some of the hypotheses proposed in this report may also be contributing to reduced transmission of HCV among IDU. For example, increased smoking of crack cocaine and less drug injection overall would be expected to also have an impact on HCV transmission in this population. However, there are important differences between HIV and HCV transmission, including the different roles for sexual transmission and the greater prevalence and infectivity of HCV compared to HIV. Furthermore, the impact of HAART on HIV incidence would not be expected to affect HCV transmission. These may explain apparent differences between HIV and HCV trends in IDU in BC.

THE NATURE OF ADDICTION

There is an evolving understanding of the nature of psychoactive substance use and how it affects the brain. There is a solid body of evidence that makes it clear that most psychoactive substances (drugs) produce their effects by acting on specific receptors in the brain. Some kinds of drug use are initially rewarding, as certain drugs act directly on brain structures (e.g., the mesolimbic dopamine system) that are activated by fundamental behaviour patterns linked to survival (food and sex). In addition to these neurophysiological factors, the outcomes of psychoactive substance use are also affected by set and setting (e.g., a person’s psychological history, their reasons for and expectations of using, and the immediate social and broader socio-economic context in which use occurs). In terms of a public health understanding of psychoactive substance use, instances and patterns of use can occur along a spectrum of use from beneficial, to non-problematic, to problematic and/or dependent.⁵⁴ For most people, substance use does not lead to chronic dependence, and yet much harm may result from non-dependent substance use.

Ongoing drug use can be understood in relation to continual use and regularly experienced pleasurable effects of the drug, which may “trick” the brain into seeing the drug-taking as an essential survival activity. Long-term usage has been shown to bring about changes in brain structure and functioning that can be demonstrated on brain scanning and that last for months, if not years. These brain changes are associated with environmental and behavioural cues and explain why, after years of abstaining from the use of a particular drug, when exposed to particular stimuli, individuals can experience overwhelming cravings for it.⁵⁵

As the National Institute on Drug Abuse states,

Addiction is a chronic relapsing brain disease that is characterised by compulsive drug seeking and use, despite harmful consequences. It is considered a brain disease because drugs change the brain—they change its structure and how it works. These brain changes can be long lasting, and can lead to the harmful behaviours seen in people who abuse drugs.⁵⁶

The adolescent brain seems to be particularly susceptible to drug-induced sensitization, which may instil vulnerabilities for drug use in later life. In addition, factors such as earlier childhood traumatic experiences can make individual adolescents much more vulnerable to poor decision-making and, perhaps, prime them for enhanced susceptibility to this sensitization. There is ample evidence that those who use drugs on the street have very high rates of identified early trauma—such as fetal alcohol spectrum disorder, physical and/or sexual abuse, abandonment—or untreated conditions like ADHD, bipolar disorders or dyslexia, which result in poor school attachment and performance. Indeed, the epigenetic factors that may be triggered through poverty, neglect or poor parenting practices and that can affect an individual throughout his or her life are only beginning to be understood.

It is also apparent that the high degree of co morbidity (co-occurrence in the same individual) of mental illness and substance dependence is because these problems are linked through shared neurologic or behavioural abnormalities and may have a shared biologic basis.⁵⁷ This understanding underlies the critical importance of viewing drug dependence and addictions as health issues with underlying biological causes.

With this understanding we must therefore ask whether dealing with substance dependence or addiction—and particularly the severely dependent injection drug-using forms of addiction—through a predominantly criminalized social framework is the best approach. The 2010 Vienna Declaration calls for the incorporation of scientific evidence into drug policy formation, and recommends “Decriminalisation of drug users, the scaling up of drug dependence options and a transparent review of the effectiveness of current drug policies.”⁵⁸ This declaration has been signed by more than 2,100 researchers and scientists and over 250 law enforcement, judiciary and legal professionals worldwide.

In addition, the International Federation of the Red Cross and Red Crescent Societies stated in a December 2010 report: “Repressive laws, which include imprisonment and harassment, drive many drug users underground, away from health and social support services. This makes providing HIV prevention, treatment, care and support almost impossible and exposes the general population to more harm.”⁵⁹ Indeed, evidence suggests that the rigorous enforcement of drug prohibition laws does little to prevent use or restrict access to illegal drugs. For example, a recent study comparing rates of illegal drug use internationally found that “countries with more stringent policies towards illegal drug use did not have lower levels of such drug use than countries with more liberal policies.”⁶⁰ Similarly, the retail prices of illegal drugs such as heroin and cocaine show a declining trend (with decreases of between 50 to 80 per cent) in both North America and Europe between 1990 and 2008, while over the same period spending on drug law enforcement, courts and prisons has increased steadily.⁶¹ Likewise, scientific analysis of data on marijuana seizures, arrests, use and availability in the United States shows cannabis use is unaffected by law enforcement and punishment.⁶²

In light of this, recent editorials in mainstream British Columbia newspapers have argued that Canadian (and global) drug policies need serious reform. In 2009, the Vancouver Sun suggests that “it’s time for all

countries, including Canada, to take a long, hard look at their drug policy, and at the evidence, and to ensure that the former is informed by the latter.”⁶³ Likewise, the Vancouver Province argues that “there is mounting evidence the so-called War on Drugs can’t be won—and too many people are dying while it’s being fought.”⁶⁴

Would decriminalization of illegal drugs lead to expansion of drug use and drug-related harms? Natural experiments in decriminalization of marijuana in the United States and Australia, followed by re-criminalization, have been studied.^{65,66} No increases in use were detectable that could be linked to decriminalization. The Dutch experience with cannabis cafes similarly showed no expansion in domestic youth cannabis consumption and lower rates of use than in the United States, which has a heavy law enforcement focus.⁶⁷ Similarly, the experience of Portugal—which decriminalized all possession of illegal drugs for the purposes of personal use in 2001—was recently evaluated in an article published in the *British Journal of Criminology*.⁶⁸ The authors found that the following changes had occurred in Portugal but not in neighbouring Spain and Italy:

- No major increase in reported illegal drug use among adults.
- Reduced illegal drug use among problematic drug users and adolescents.
- Reduced burden of drug offenders on the criminal justice system.
- Increased uptake in drug treatment.
- Reduction in opiate-related deaths and infectious disease.

In summary, treating illegal drug use and addiction as primarily a law enforcement matter is not only ineffective, but also prevents scarce public resources from being allocated to prevention, treatment and harm reduction. Approaches that focus on drug interdiction and criminalization of non-medical use have, at best, limited effectiveness. British Columbia policies that focus on early childhood development, upstream prevention and treatment of addiction as social and medical issues are more evidence-based and should be enhanced.

RECOMMENDATIONS

Current efforts to prevent HIV infection in people who use injection drugs need to be sustained and expanded, especially given the potential for resurgence of HIV with any future changes in the route of drug use and exposure of younger, uninfected IDU. BC is a world leader in the development of evidence-based, effective interventions to prevent HIV among injection and non-injection drug users; this evidence base needs to be expanded, and effective interventions need to be scaled up provincially. Furthermore, multi-level, combination approaches are required,⁶⁹ in order to address the vulnerability to HIV in IDU that arises through the convergence of individual, structural and environmental factors.⁷⁰

- 1. Expand access to, uptake of, and adherence to, HAART:** The trends presented in this report provide strong support for the hypothesis that the expansion of HAART has an impact on the incidence of HIV at a population level, and provides further support for the STOP HIV/AIDS pilot project initiated in 2010 to increase the detection of HIV, and access to and uptake of HAART among HIV-positive people in Vancouver and Prince George. Evaluation of this three-year project will inform decisions to implement this program in other jurisdictions in BC.²⁴
- 2. Expand harm reduction programs:** Sustain and expand current programs including harm reduction supply distribution, appropriate opioid maintenance therapy, and substance

dependence treatment services. While continuing to prevent HIV infections, these services also prevent HCV infections and have many other health benefits (e.g., overdose reduction, access to social services, referral to substance use programs). Reducing these programs can lead to increased risk for infection among people who use illegal drugs, as observed in Victoria when increased needle sharing was observed following closure of a fixed-site harm reduction supply program.^{38,71}

- a. Current best practices for harm reduction must be followed, including providing harm reduction services wherever people are (including in hospitals, correctional facilities and all health settings). Harm reduction services must separate distribution of sterile syringes and recovery of used ones, and not require needle exchange (e.g., no requirement of used syringes in exchange for sterile ones).
- b. The individual and health system benefits of supervised injection have been clearly demonstrated and access to supervised injection services should be expanded in BC, ideally by incorporation into routine public health services (i.e., as per the Dr. Peter Centre model).
- c. Use of prescription opioids for substitution therapy should be instituted, given the success of injection diacetylmorphine as substitution therapy for injection drug users in research trials.
- d. Safer crack cocaine smoking among those who use this substance needs to be encouraged, and crack cocaine smokers need to be engaged, by including crack pipes with available harm reduction supplies and establishing supervised inhalation sites.
- e. Harm reduction services in corrections services—including needle distribution—is urgently needed.⁷²

3. Improve data and monitoring systems: In this report we have identified many knowledge gaps; as a result, we have been unable to fully examine all hypotheses. Current monitoring and research initiatives need to be sustained, including continued monitoring of drug use and routes in BC through the BC Alcohol and Other Drug Monitoring Project operated by the Centre for Addictions Research of BC, in order to detect future changes in drug supply and use that may lead to increased HIV transmission. The following improvements in data and monitoring systems are required:

- a. Monitoring systems for community-based prevention services are needed in order to evaluate their impact. An HIV/HCV Outcomes for BC Working Group has been established and is working on provincial process evaluation tools and data collection systems for community-based HIV and HCV prevention services.
- b. Better data are needed on the population dynamics of IDU in BC, to address the question of whether the decrease in new positive HIV tests among younger IDU is related to less injection, or less engagement of younger IDU with harm reduction and testing services.
- c. Improvements to provincial HIV surveillance data are needed in order to track HIV infections that may be related to non-injection drug use. Linkage of provincial HIV surveillance to HIV drug treatment data is required in order to characterize trends in the stage of infection at diagnosis, access to HIV care and community viral loads among IDU.
- d. Regional population data on HIV testing patterns among IDU is required, which may require the development of a provincial system to identify risk factors for infection among individuals who have negative HIV tests.

- 4. Ensure equity of access to services:** People who use drugs by injection across BC do not have equal access to harm reduction and other HIV prevention services.³⁹ These services are often concentrated in urban areas and access needs to be expanded to all parts of the province.
- a. Aboriginal people are disproportionately impacted by HIV and have high HIV incidence and mortality rates, reflecting increased vulnerability to infection related to illegal drug use and a lack of access to HAART.⁷³ Increasing the awareness of HIV and promotion of HIV prevention, developing more culturally sensitive treatment options, and increasing the uptake of HAART among Aboriginal people are needed.
 - b. Greater provincial coordination and monitoring of opioid maintenance treatment in BC is required in order to address current service gaps.⁷⁴
 - c. Political pressure should not limit access to and funding for necessary health services for those affected by problematic substance use and addictions, and municipal bylaws that affect the ability to access these services must be addressed. This recommendation is supported by the Union of BC Municipalities, who in September 2010 lobbied the province to legislate that base levels of harm reduction services, including needle distribution and recovery, and access to safer substance use equipment and detoxification and addiction treatment beds, be made available in every local government area in British Columbia.
- 5. Expand testing for HIV and HCV:** Earlier diagnosis of HIV and HCV infection in IDU facilitates appropriate and timely access to care and treatment services, and may lead to behaviour change that can prevent secondary transmission.
- a. HIV testing for IDU can be enhanced by expanding point-of-care (rapid) HIV testing programs for HIV, and exploring new approaches such as providing incentives for testing.
- 6. Support initiatives that address the determinants of health:** The determinants of health contribute substantially to vulnerability to HIV infection, including among IDU. Cross-sectoral approaches to address these determinants are required.
- a. Implement actions in *Healthy Minds, Healthy People: A Ten Year Plan to Address Mental Health and Substance Use in British Columbia* to reduce vulnerability in children and youth. Based on the understanding that positive mental health and mental fitness are the foundation for optimal overall health over the lifespan, the plan has four priorities: to promote mental health in early childhood and throughout life; to reduce harms associated with substance use; to reduce stigma and discrimination; and to inform the health system and educate the public. Initiatives that focus on children lay the foundation for healthy development and healthy lifestyles in adulthood, and community supports for families help to ensure positive development of cognitive, social and self-regulation skills for their children and youth.

“Given that early child development lays the foundation for health and wellness, it is increasingly evident that children must be at the centre of a public mental health strategy.”

Preventing Mental Health Disorders in Children: A Public Health Priority, Canadian Journal of Public Health, 2007.

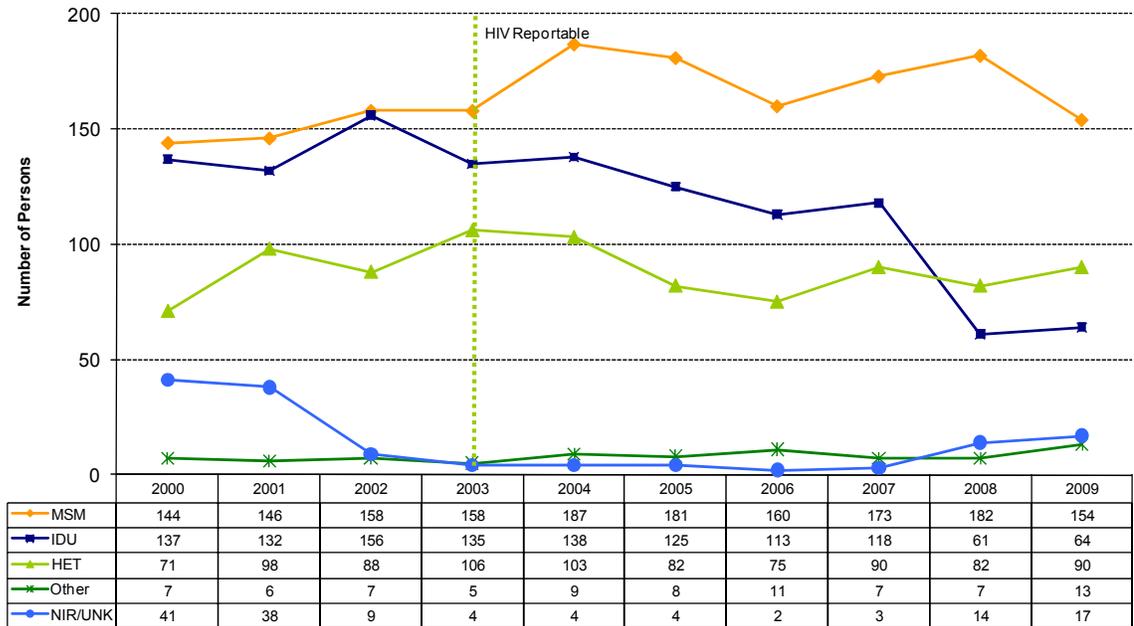
Actions to support and enhance childhood development start with

- screening women in the perinatal period for mental health and substance use-related risk factors and providing appropriate follow-up;
 - continuing to implement the healthy infant and child development core public health program;
 - enhancing universal programs that promote social-emotional, cognitive development and resilience in children, youth and families (e.g., StrongStart BC and FRIENDS);
 - supporting full-day kindergarten opportunities across the province;
 - promoting mental health within schools through comprehensive health activities that encourage the development of lifelong skills, attitudes and healthy behaviours; and
 - using the Neighbourhood Learning Centre and partnerships with local governments to strengthen community connections.
- b. Adopt a pragmatic public health approach to psychoactive substance use that minimizes harms, and explore regulatory alternatives to prohibition for currently illegal drugs^{68, 75, 76}
- c. Continue to address poverty, unstable housing and homelessness.⁷⁷⁻⁷⁹
- d. Regional health authorities need to continue to engage with communities to address both stigma and misconception around harm reduction initiatives.

Table 1 Milestones in the Provincial Response to the HIV Epidemic in IDU

1988	BCCDC Street Nurse Program created
1989	First Needle Exchange Program in British Columbia (Vancouver)
1992	Provincial HIV/AIDS Drug Treatment Program established
1994	Centralized provincial bulk purchase of syringes for all needle exchange programs
1996	Vancouver Injection Drug Users Study (VIDUS) established
1996	11 th International AIDS Conference, Vancouver
1997	Public health emergency declared by Chief Medical Health Officer of the Vancouver Richmond Health Board
1997	Vancouver Area Network of Drug Users formed
2001	City of Vancouver's four-pillar drug strategy adopted by City Council
2001	Maximally assisted therapy/directly observed therapy (MAT/DOT) program established
2002	Decentralization of needle distribution in Vancouver
2002	Provincial needle distribution and recovery policy replaces one-for-one needle exchange
2002	Dr Peter Centre provides supervised injection
2003	First officially sanctioned supervised injection site (SIF) in North America opens in Vancouver's Downtown Eastside
2003	Cedar Project begins in Vancouver and Prince George
2004	City of Victoria unanimously approves a harm reduction policy framework
2005	North American Opiate Medication Initiative (NAOMI) trial
2007	Bevel up: Drugs, Users and Outreach Nursing teaching DVD and manual released
2007	Addiction and Urban Health Research Initiative formed
2008	Safer smoking supplies (plastic mouth pieces, wooden push sticks) added to provincial harm reduction supplies
2009	BC Harm Reduction Manual published
2010	Cookers and acidifiers are added to provincial harm reduction supplies
2010	STOP HIV/AIDS pilot project announced

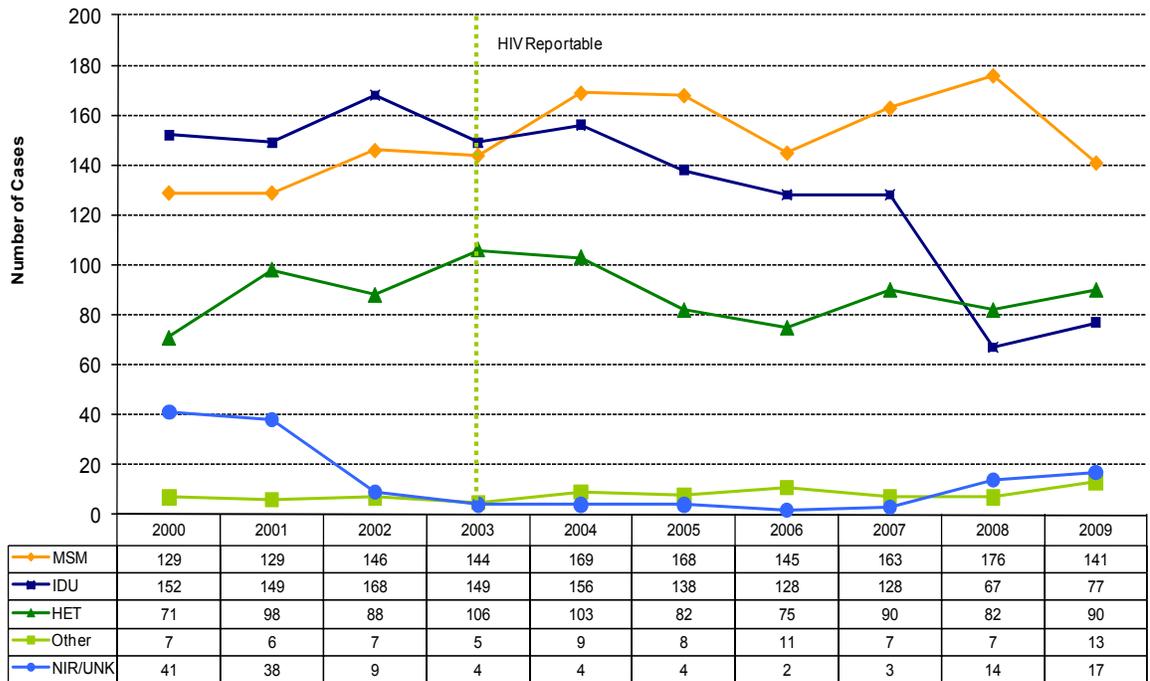
Figure 1 Persons testing newly positive for HIV, by exposure category, BC, 2000 to 2009 (MSM-IDU classified as MSM)



MSM = Men having Sex with Men IDU = Injection Drug Use HET = Heterosexual Contact NIR/UNK = No Identified Risk / Unknown Risk

Source: New positive HIV test data from the HIV/AIDS Surveillance System, BCCDC, extracted March 2010

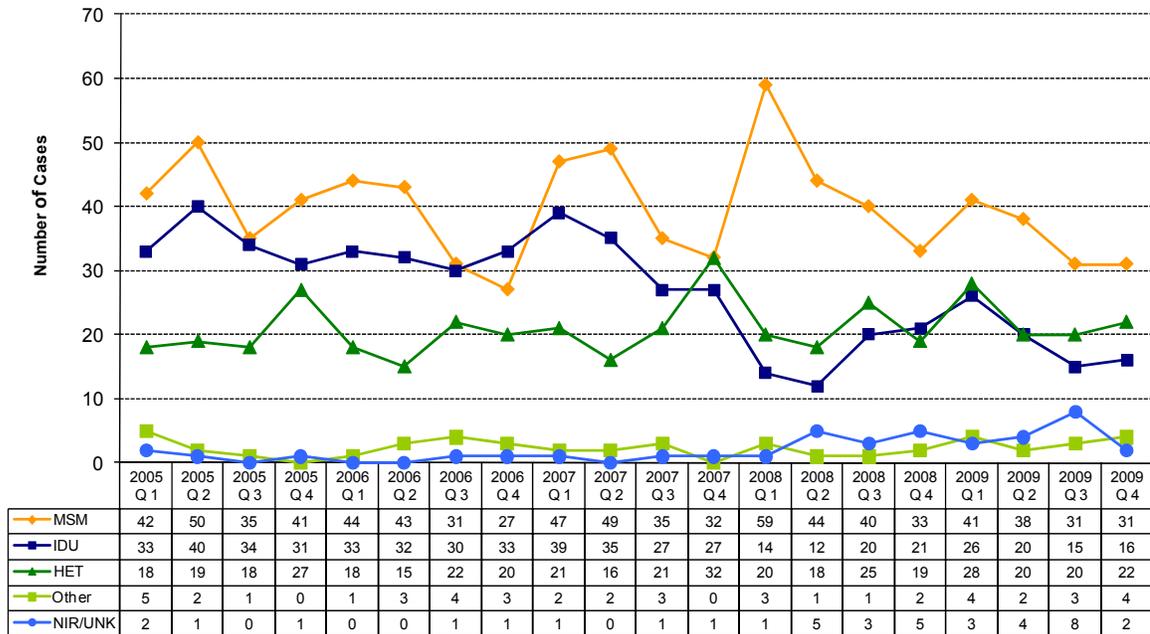
Figure 2 Persons testing newly positive for HIV, by exposure category, BC, 2000 to 2009 (MSM-IDU classified as IDU)



MSM = Men who have sex with Men HET = Heterosexual Contact
 IDU = People who use Injection Drugs NIR = No Identified Risk *Note that this figure, MSM-IDU are included with IDU (which differs from routine surveillance reports where they are included with MSM).

Source: New positive HIV test data from the HIV/AIDS Surveillance System, BCCDC, extracted March 2010

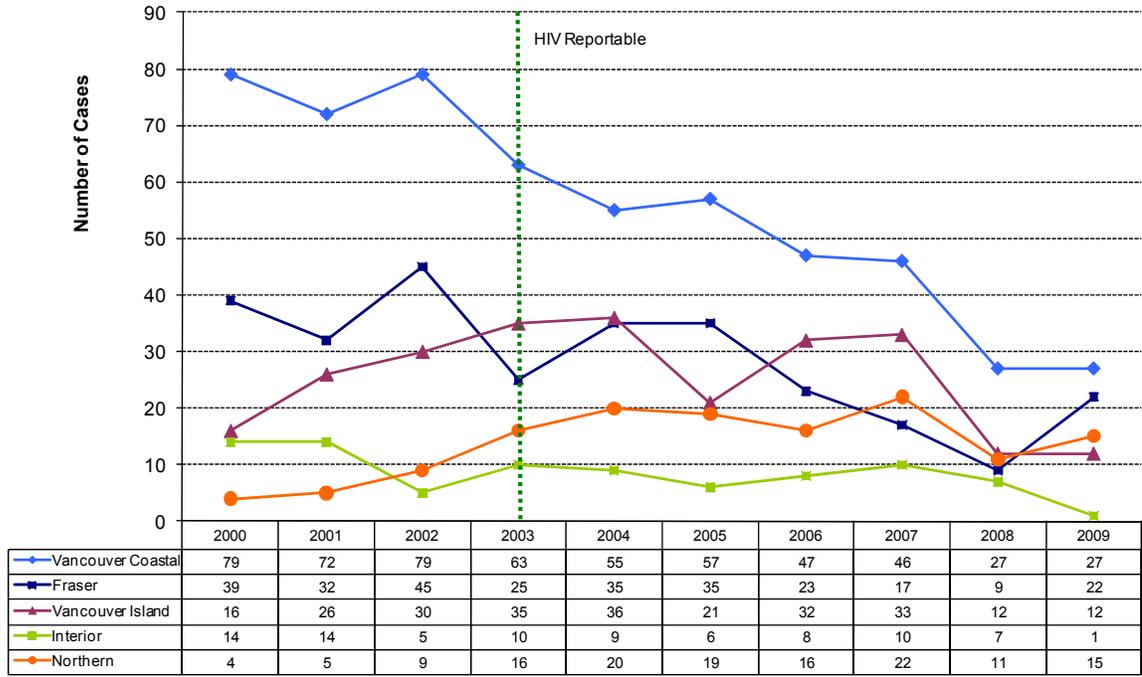
Figure 3 Persons testing newly positive for HIV, by exposure category, BC, 2005 Q1 to 2009 Q4 (MSM-IDU classified as IDU)



MSM = Men who have sex with Men HET = Heterosexual contact *Note that in this figure, MSM-IDU are included with IDU (which differs from
 IDU = People who use Injection Drugs NIR = No Identified Risk routine surveillance reports where they are included with MSM).

Source: New positive HIV test data from the HIV/AIDS Surveillance System, BCCDC, extracted March 2010

Figure 4 Number of new positive HIV tests among IDU, by health authority, BC, 2000 to 2009 (MSM-IDU classified as IDU)



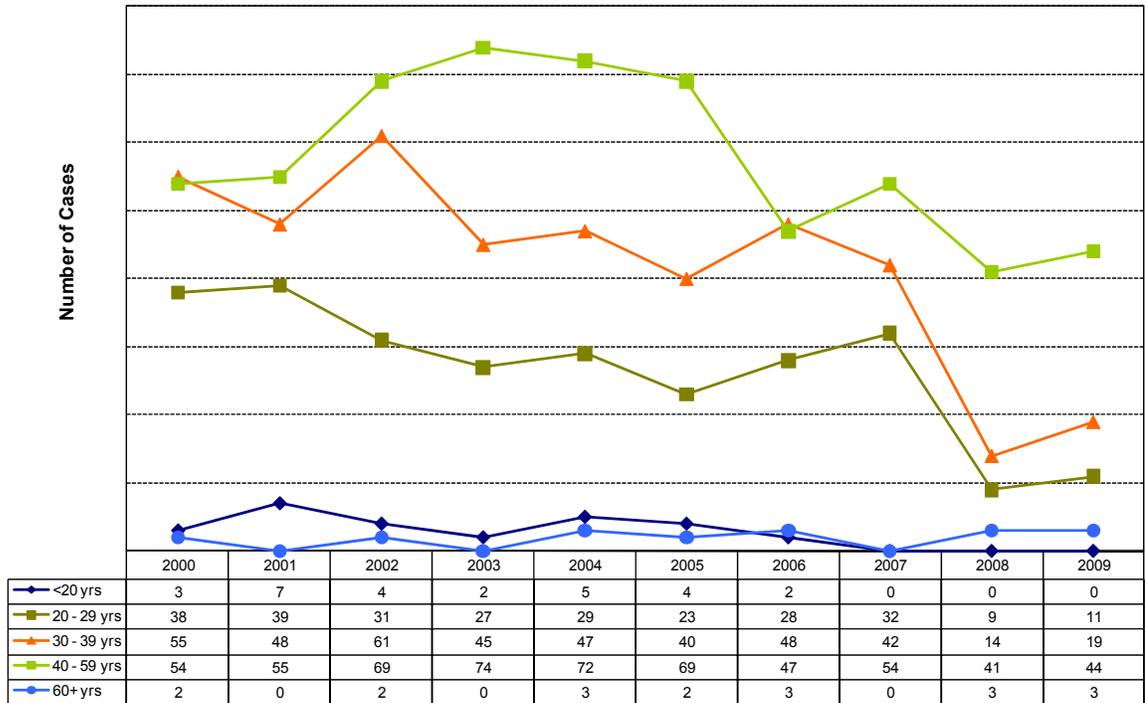
Source: New positive HIV test data from the HIV/AIDS Surveillance System, BCCDC, extracted March 2010

Figure 5 Number of new positive HIV tests among IDU, by sex, BC, 2000 to 2009 (MSM-IDU classified as IDU)



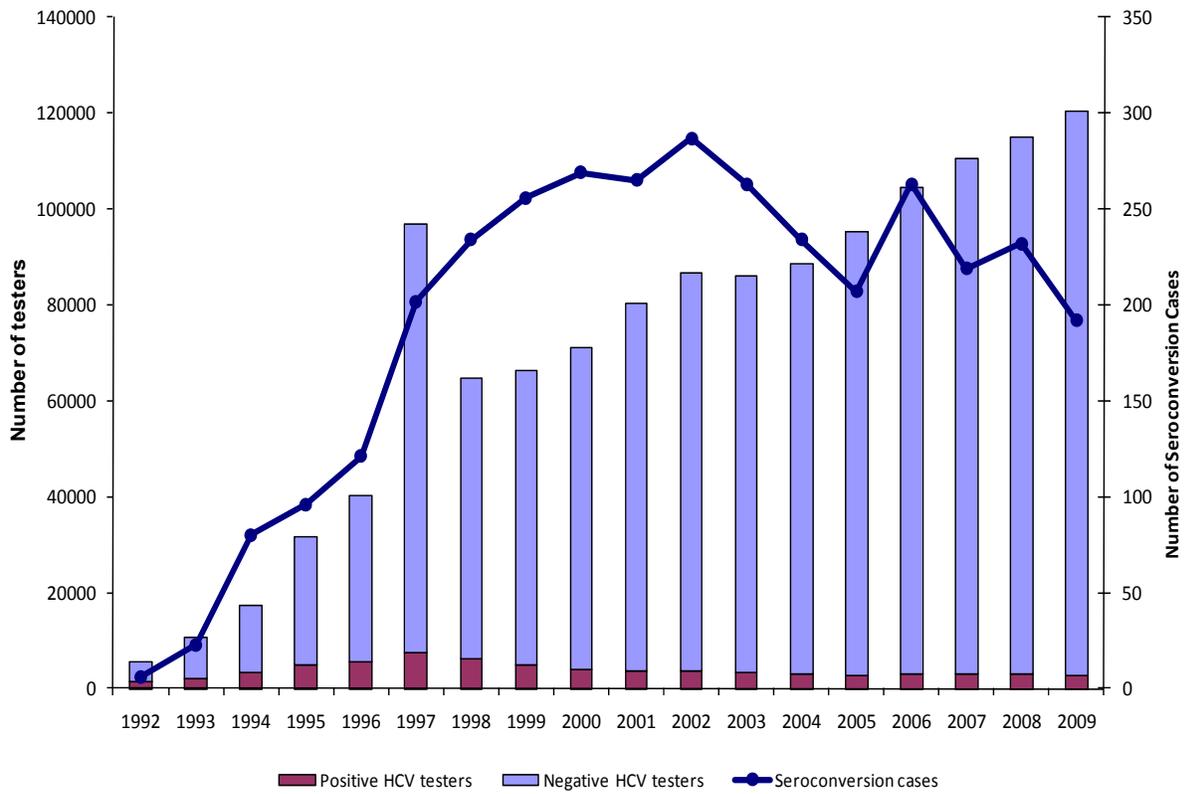
Source: New positive HIV test data from the HIV/AIDS Surveillance System, BCCDC, extracted March 2010

Figure 6 Number of new positive HIV tests among IDU, by age group, BC, 2000 to 2009 (MSM-IDU classified as IDU)



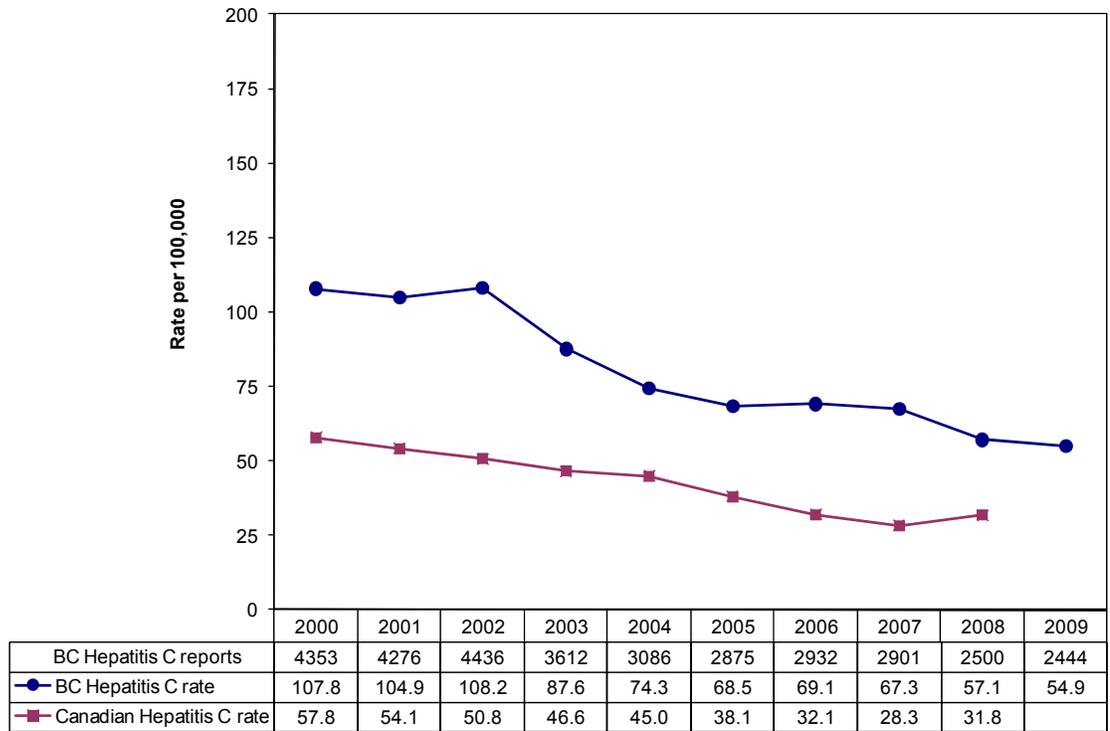
Source: New positive HIV test data from the HIV/AIDS Surveillance System, BCCDC, extracted March 2010

Figure 7 Number of anti-HCV testers, BC, 1992 to 2009



Source: Provincial Public Health Reference laboratory, extracted March 12, 2010

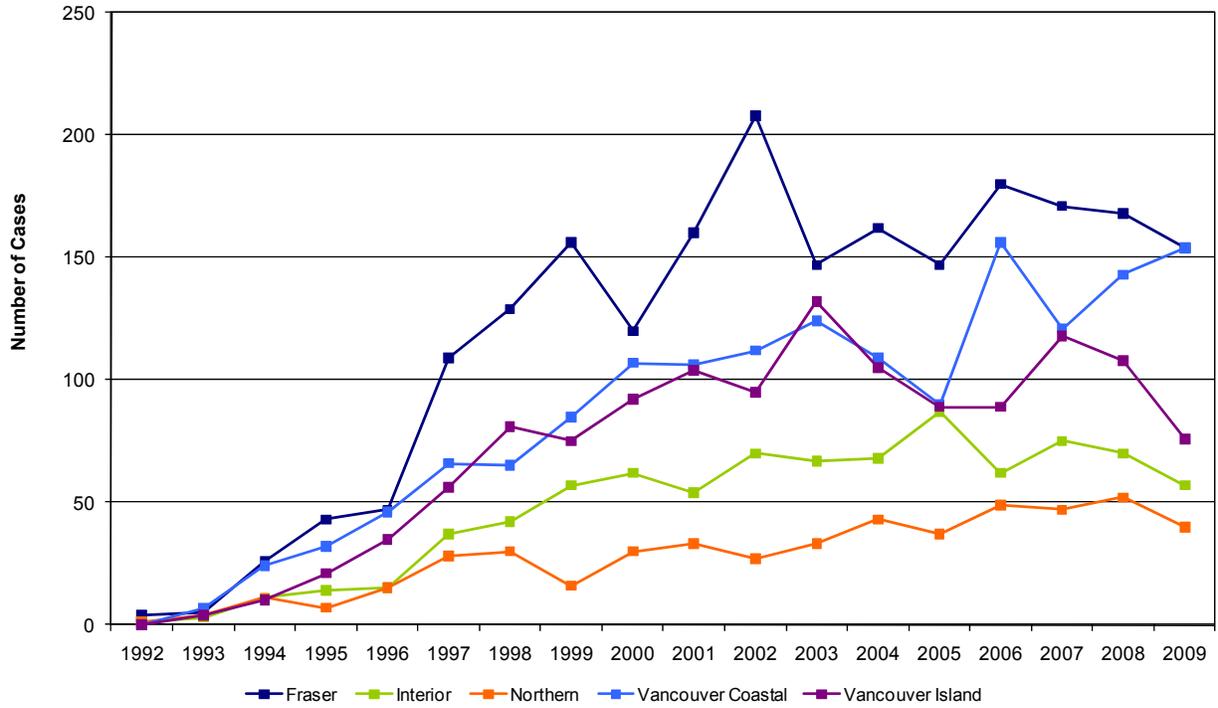
Figure 8 Rates of hepatitis C reports, BC, 2000 to 2009



Note: No Canadian hepatitis C data available for 2009.

Source: BC data from iPHIS, extracted March 10, 2010

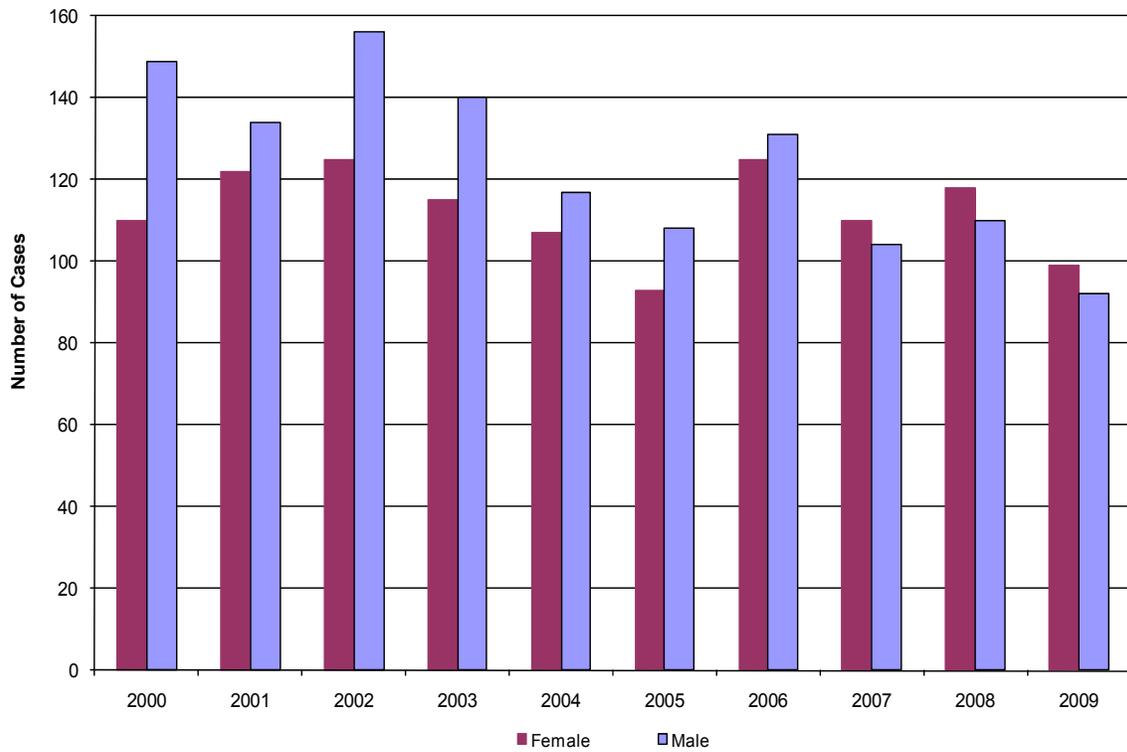
Figure 9 Number of HCV cases identified as seroconversions*, by health authority, BC, 1992 to 2009



* Seroconversion: a positive test with a prior negative on record anytime

Source: Provincial Public Health Reference Laboratory, extracted March 12, 2010

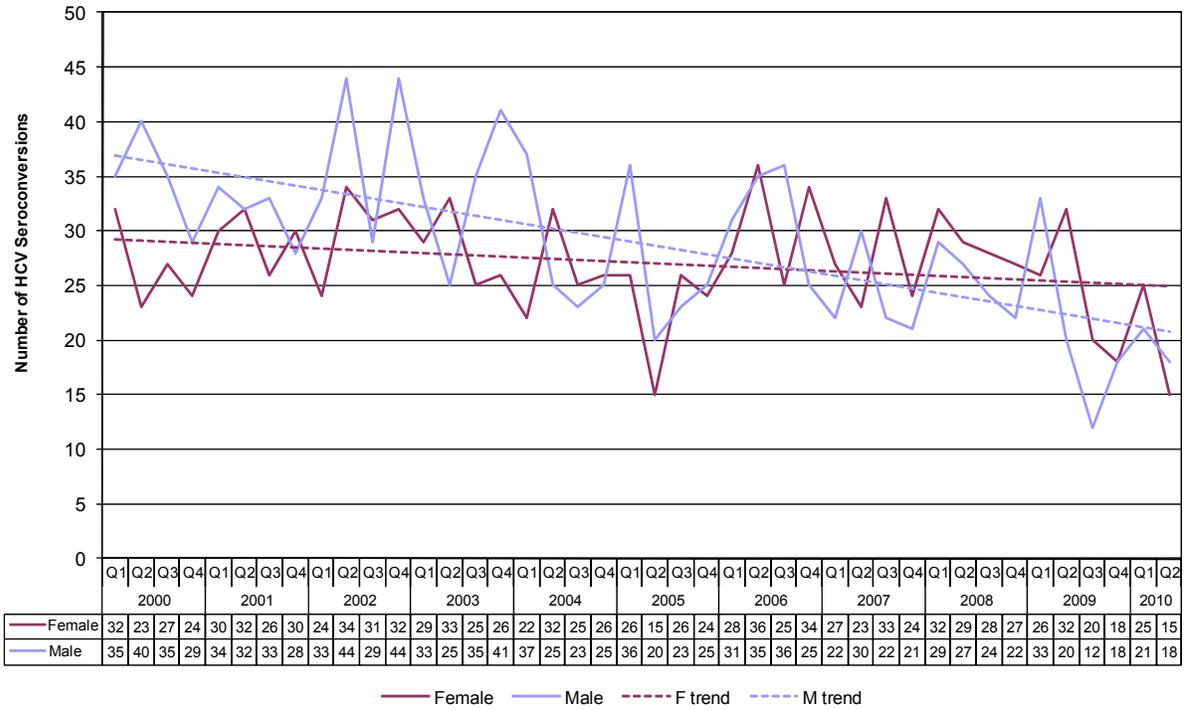
Figure 10 Number of HCV cases identified as seroconversions within 24 months*, by sex, BC, 2000 to 2009



* prior negative test on record within 2 years

Source: Provincial Public Health Reference Laboratory, extracted March 12, 2010

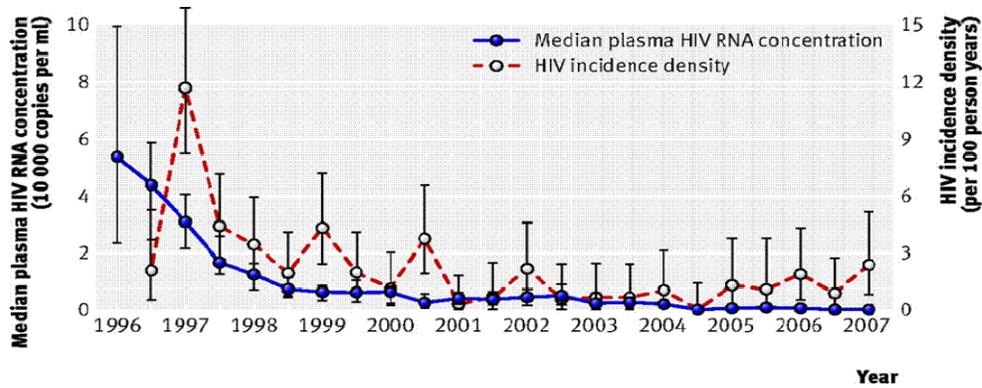
Figure 11 Number of HCV cases identified as seroconversions within 24 months*, by sex, BC, 2000 (Q1) to 2010 (Q2)



* prior negative test on record within 2 years

Source: Provincial Public Health Reference Laboratory, extracted March 12, 2010

Figure 12 Estimated community plasma HIV-1 RNA concentrations and HIV incidence by density, with 95 % confidence intervals, among two parallel cohorts of injection drug users



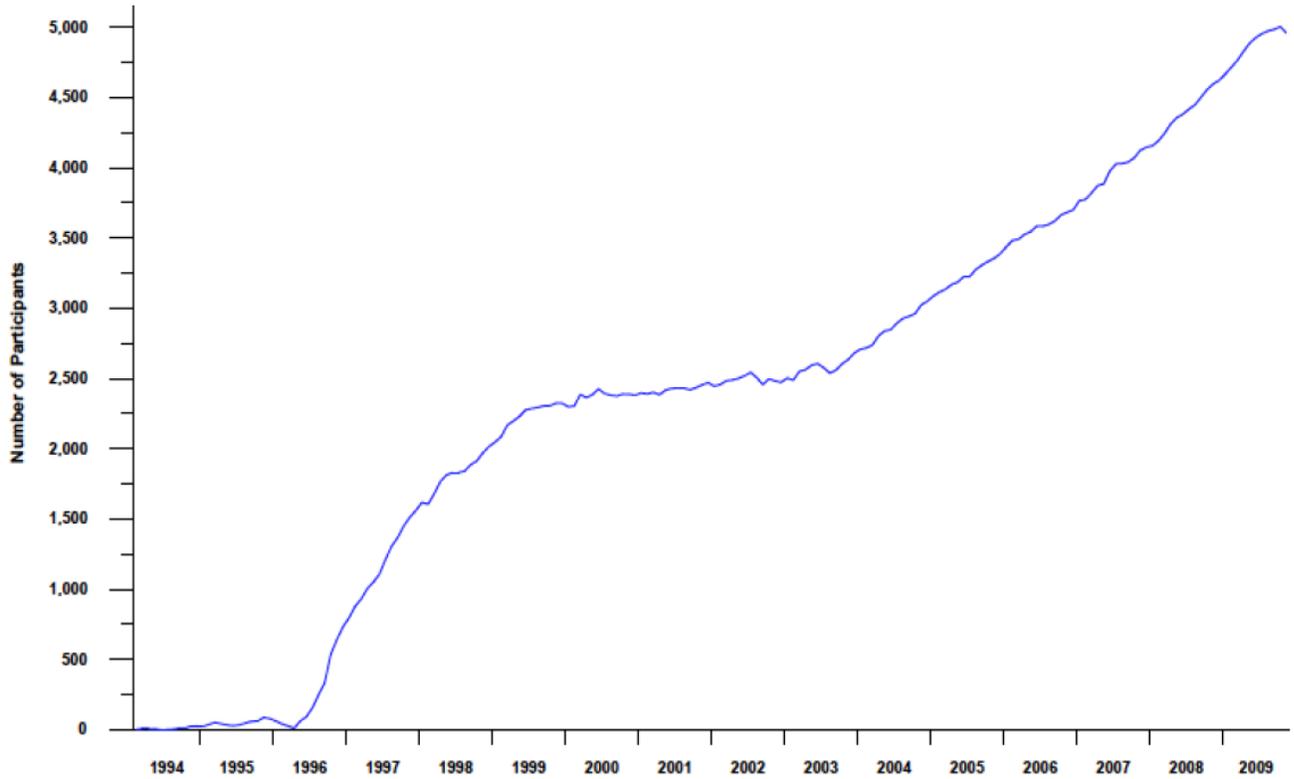
Wood E et al. *BMJ* 2009;338:bmj.b1649

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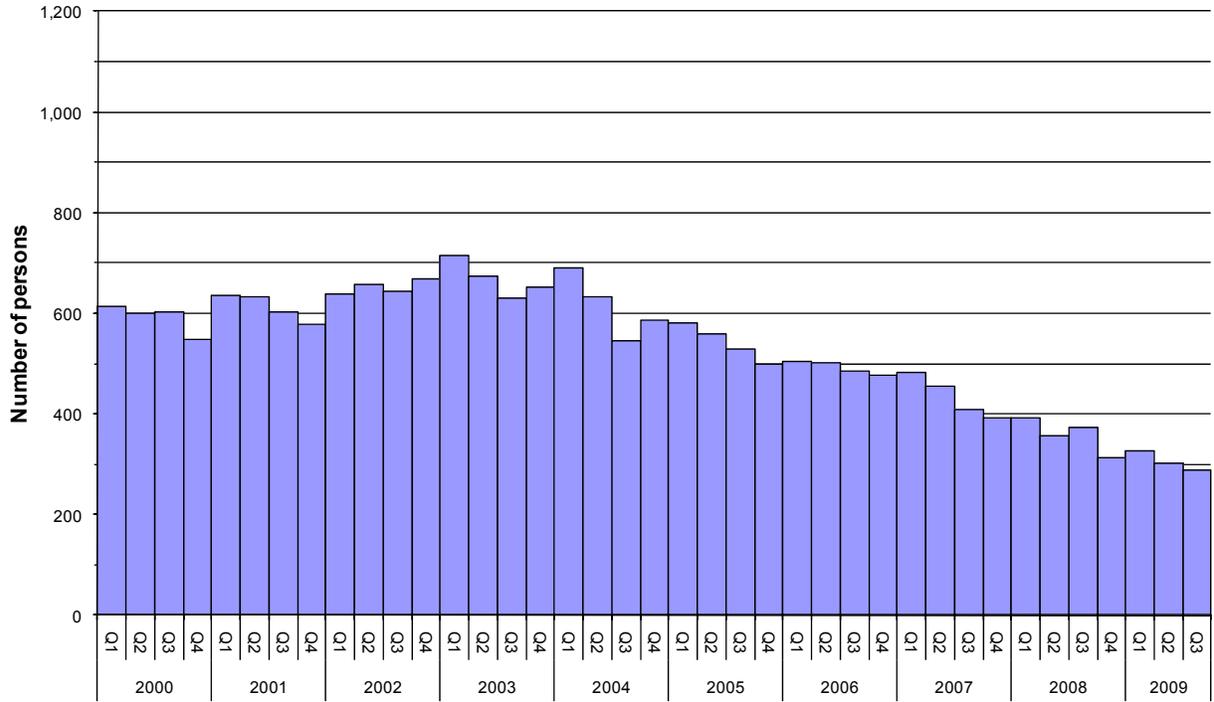
Source: Excerpted from Wood et al. *BMJ* 2009. ⁽²⁵⁾

Figure 13 Number of active participants on HAART in the HIV/AIDS Drug Treatment Program, BC, January 1994 to November 2009



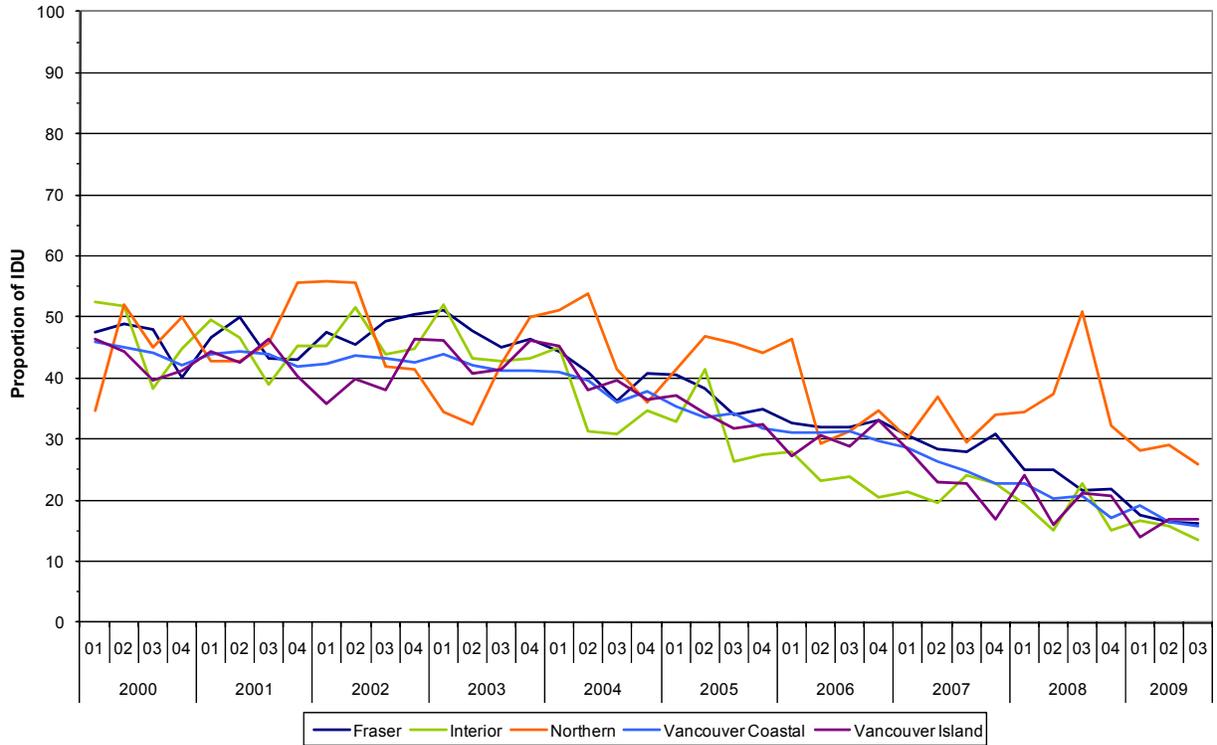
Source: BC Centre for Excellence in HIV/AIDS, report date December 8, 2009.

Figure 14 Number of IDU individuals on ARV with PVL measurements > 1,500 copies/mL, BC, 2000 Q1 to 2009 Q3



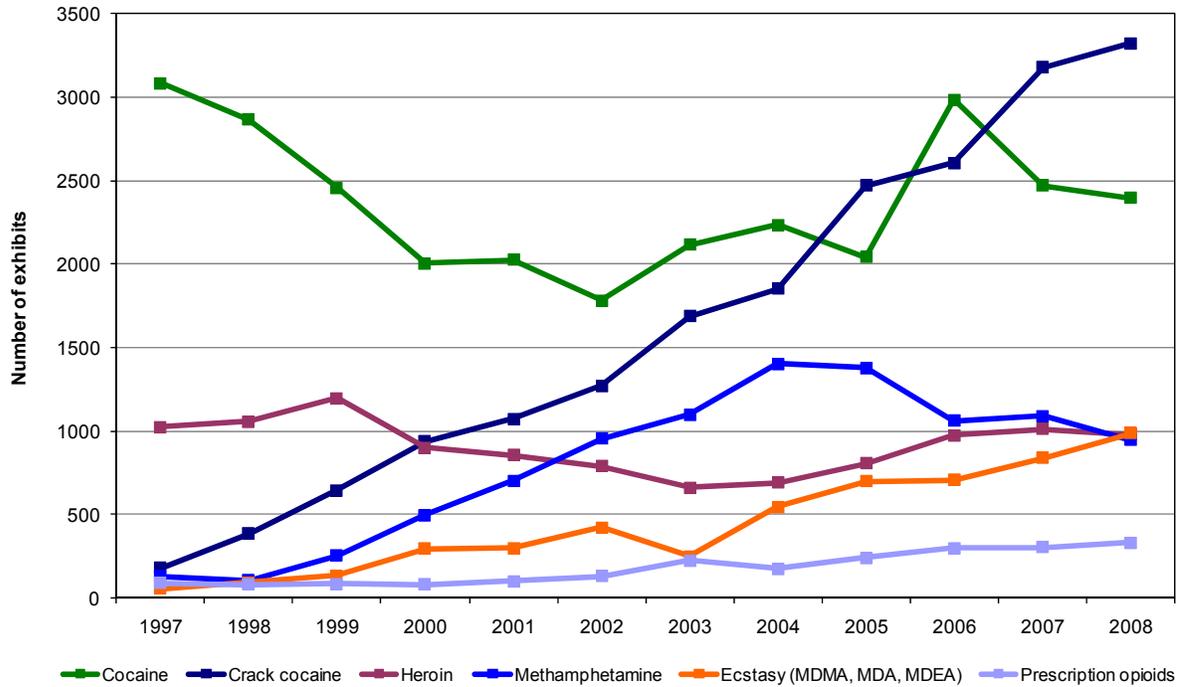
Source: BC Centre for Excellence Drug Treatment Program Database, December 9, 2009.

Figure 15 Percent distribution of IDU individuals tested with PVL measurements > 1,500 copies/mL, by health authority, BC, 2000 Q1 to 2009 Q3



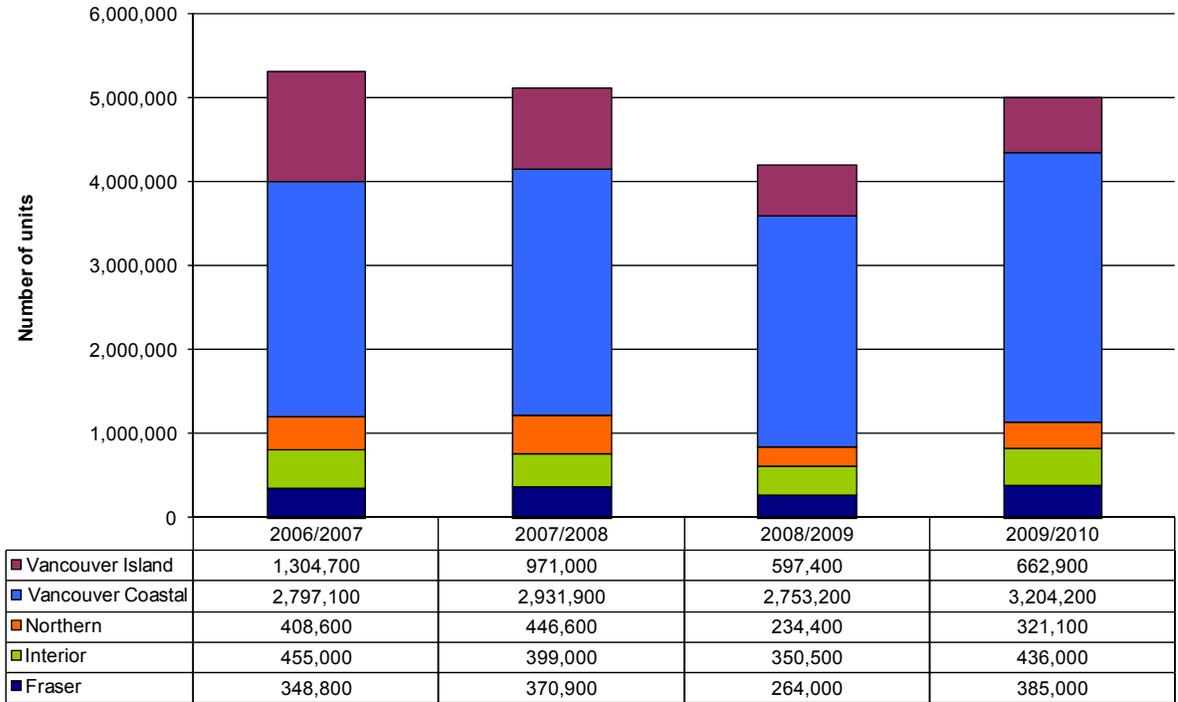
Source: BC Centre for Excellence Drug Treatment Program Database, May 31, 2010.

Figure 16 Number of exhibits analyzed for selected substances, BC, 1997 to 2008



Source: Drug Analysis Service (DAS)/Laboratory Information Management System (LIMS)

Figure 17 Needles/syringes distributed, by health authority, BC, 2006/2007 to 2009/2010



Source: BCCDC, harm reduction supplies ordering data - extracted April 5, 2010

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