BRITISH COLUMBIA
CENTRE *for* EXCELLENCE
in HIV/AIDS

HIV MONITORING QUARTERLY REPORT

FOR FRASER HEALTH

SECOND QUARTER 2014

Foreword

As part of the BC Centre for Excellence (BC-CFE) in HIV/AIDS's mandate to evaluate the outcomes of STOP HIV/AIDS programming in BC, we have developed quarterly HIV/AIDS monitoring reports. These reports provide up-to-date data on a variety of key HIV-related surveillance and treatment indicators. Selection of these indicators was achieved through a collaborative process with various Health Authority (HA) representatives. There are six reports in total, one for each HA and one for the province of BC as a whole. In addition, there is a technical report which explains how each HIV indicator is calculated. Data used in these reports come from the British Columbia Centre for Disease Control (BCCDC), MSP billings, hospitalization data from the Discharge Abstract Database, the Sunquest Laboratory database at the Provincial Public Health Microbiology and Reference Laboratory, Providence Health Care laboratory and the BC-CFE Drug Treatment Program (DTP) Database.

The objectives of these reports are to:

1. Provide timely HA-specific information on key HIV indicators which will guide and inform HIV leaders and innovators in the development of future HIV interventions and programs which will ultimately lead to decreasing the burden of HIV in BC. The indicators will reflect ongoing or past successful public health interventions and highlight areas in the HIV care spectrum which require further attention and support.
2. Highlight limitations in our current data due to incomplete or time lagged data and to develop future strategies to improve complete and timely data capture.

These reports are produced for the benefit of individual HA's. As such, we are enthusiastic about your involvement and cooperation regarding the development of these monitoring reports. Please forward your comments and queries to Irene Day, Director of Operations at the BC-CFE at iday@cfenet.ubc.ca.

List of Indicators

Table of Contents

Acknowledgements and Contributions

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British Columbia Centre for Excellence in HIV/AIDS (BC-CFE): The BC-CFE is responsible for the conception, preparation and ongoing review of this quarterly report. The BC-CFE provides the data and outputs for Indicators 5 (HIV Cascade of Care), 6 (Programmatic Compliance Score), 7 (New Antiretroviral Starts), 8 (CD4 Cell Count at ART Initiation), 9 (Active and Inactive Drug Treatment Program Participants), 10 (Antiretroviral Adherence Level), 11 (Resistance Testing Results by Resistance Category), 12 (AIDS-Defining Illness), and 13 (HIV-Related Mortality). The BC-CFE database provides PVL and CD4 cell count testing data, as well as ART use. All PVL measurements in BC are performed at the St Paul's Hospital virology laboratory, thus PVL data capture is 100%. An estimated 80% of all CD4 count measurements performed in the province are captured in the BC-CFE data holdings. The STOP HIV/AIDS Technical Monitoring Committee–BC-CFE is responsible for oversight of the monitoring report. Motoi Matsukura writes and compiles the monitoring report. Guillaume Colley, Dr. Viviane Lima and Nada Gataric perform analysis of Indicators 5–13. James Nakagawa is responsible for publishing and editing. This report was conceived and guided by Dr. Julio Montaner.

BC Centre for Disease Control
An agency of the Provincial Health Services Authority

British Columbia Centre for Disease Control (BCCDC): The BCCDC provides the data and outputs for Indicator 1 (HIV Testing Episodes), Indicator 2 (HIV Testing Rate), Indicator 3 (New HIV Diagnoses), Indicator 4 (Stage of HIV at Diagnosis) and Indicator 12 (AIDS-Defining Illness). The BCCDC is the single provincial agency that centralizes all HIV surveillance through the Public Health Microbiology and Reference Laboratory, which does more than 90% of all HIV screening tests in BC and all confirmatory testing. Theodora Consolacion and Dr. Mark Gilbert are responsible for outputs for Indicators 1–4.

Other Data Sources:

The above databases were supplemented with:

(I) The BC Vital Statistics database which was used to calculate Indicator 5. The HIV Cascade of Care and Indicator 13. HIV-Related Mortality.

(II) Linkage and preparation of the de-identified individual-level database used for calculating Indicator 5. The HIV Cascade of Care was facilitated by the British Columbia Ministry of Health.

(III) The Statistics Canada database: BC and HIV-positive population counts were acquired through the statistics Canada website to calculate HIV-specific mortality rates for Indicator 13. HIV-Related Mortality.

Membership of the STOP HIV/AIDS Technical Monitoring Committee–BC-CfE

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The Seek and Treat for Optimal Prevention (STOP) HIV/AIDS BC Provincial Program: A Note on Monitoring and Interpreting HIV Indicators

The Seek and Treat for Optimal Prevention (STOP) of HIV/AIDS programme is a provincial initiative to improve HIV diagnosis and care delivery in BC through increased HIV-specific funding to all HSDA's across BC. The STOP provincial programme is an expansion of a four-year STOP pilot project which was implemented in two Health Service Delivery Areas in March 2010; the Vancouver HSDA which bears the largest burden of the HIV epidemic in the province and the Northern Interior HSDA which bears a high burden of HIV-related mortality. The STOP pilot project demonstrated the urgent need for improved efforts in early diagnosis of HIV and timely initiation of antiretroviral therapy (ART) initiation.

The expansion to a province-wide programme was announced on November 30th 2013 by the BC Ministry of Health with roll out of funding beginning on April 1st, 2013. This funding is intended to be used in the implementation and evaluation of HIV-related diagnosis and care initiatives within individual HA's. Goals of the project include: 1. A reduction in the number of new HIV infections in BC; 2. Improvements in the quality, effectiveness, and reach of HIV prevention services; 3. An increase in early diagnosis of HIV; 4. A reduction in AIDS cases and HIV-related mortality.

The goals of HA-led STOP-funded initiatives are to work toward achieving these goals. To these ends some outcome measures or indicators of progress have been drafted that should be considered in the design and implementation phases of these initiatives.

HIV Testing Episodes and Rates

In this section, the number of HIV test episodes and point of care (POC) HIV tests conducted each quarter in BC is shown. In general terms the goal is to increase the number of tests performed and to maximize testing efficiency. Test episodes are allocated by region according to where the test is performed.

Indicator 1. HIV Testing Episodes

Figure 1.1 HIV Test Episodes for Fraser Health, 2009 Q3–2014 Q2

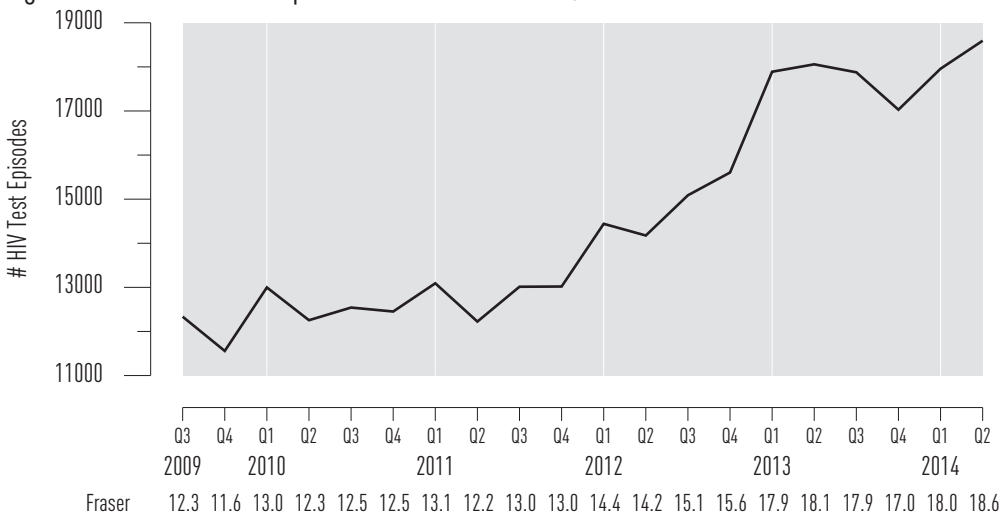
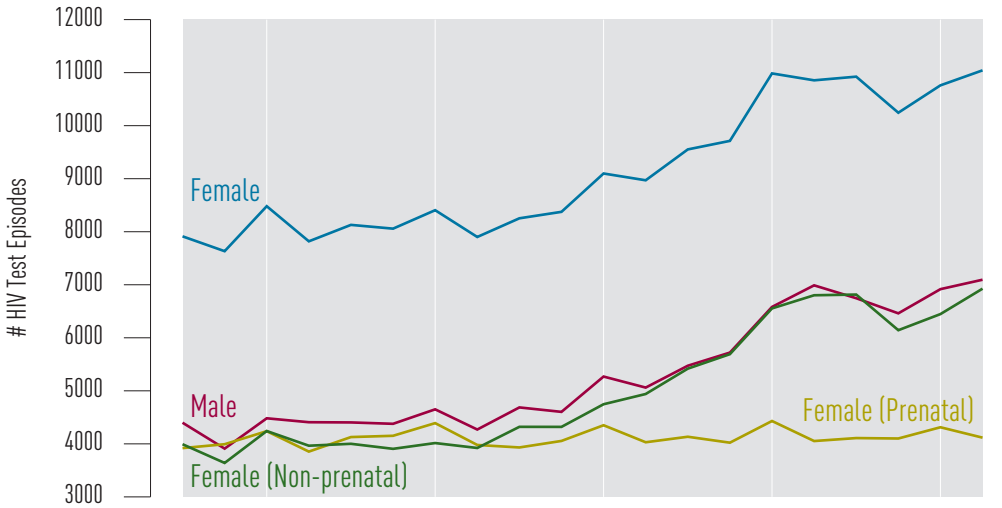


Figure 1.2 HIV Test Episodes by Gender and Prenatal Status for Fraser Health, 2009 Q3–2014 Q2 [1]



	Q3 2009	Q4	Q1 2010	Q2	Q3	Q4	Q1 2011	Q2	Q3	Q4	Q1 2012	Q2	Q3	Q4	Q1 2013	Q2	Q3	Q4	Q1 2014	Q2
Female	7.9	7.6	8.5	7.8	8.1	8.1	8.4	7.9	8.3	8.4	9.1	9.0	9.6	9.7	11.0	10.9	10.9	10.2	10.8	11.0
Male	4.4	3.9	4.5	4.4	4.4	4.4	4.7	4.3	4.7	4.6	5.3	5.1	5.5	5.7	6.6	7.0	6.7	6.5	6.9	7.1
Prenatal	3.9	4.0	4.2	3.9	4.1	4.2	4.4	4.0	3.9	4.1	4.4	4.0	4.1	4.0	4.4	4.1	4.1	4.1	4.3	4.1
Non-prenatal	4.0	3.6	4.2	4.0	4.0	3.9	4.0	3.9	4.3	4.3	4.7	4.9	5.4	5.7	6.6	6.8	6.8	6.1	6.4	6.9
Other	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

1 *NB: Testing does not include point of care tests.*

Figure 1.3 HIV Test Episodes by Age Category for Fraser Health, 2009 Q3–2014 Q2 [1,2]

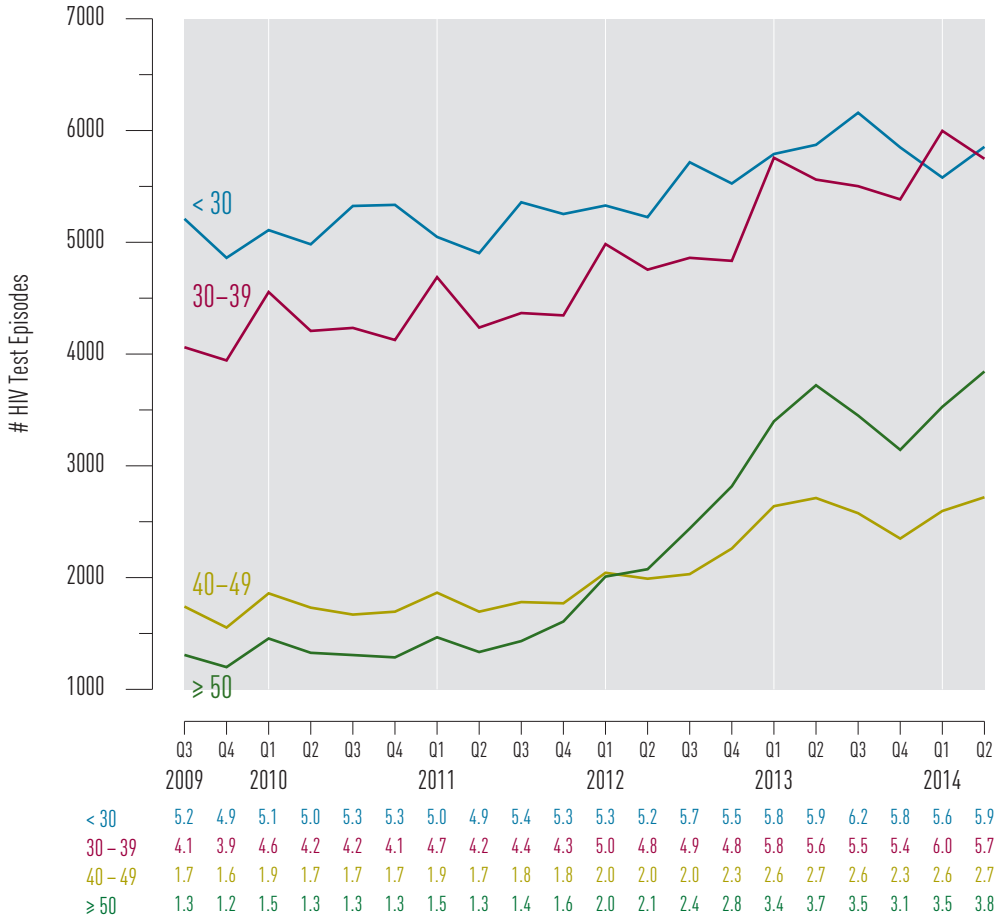
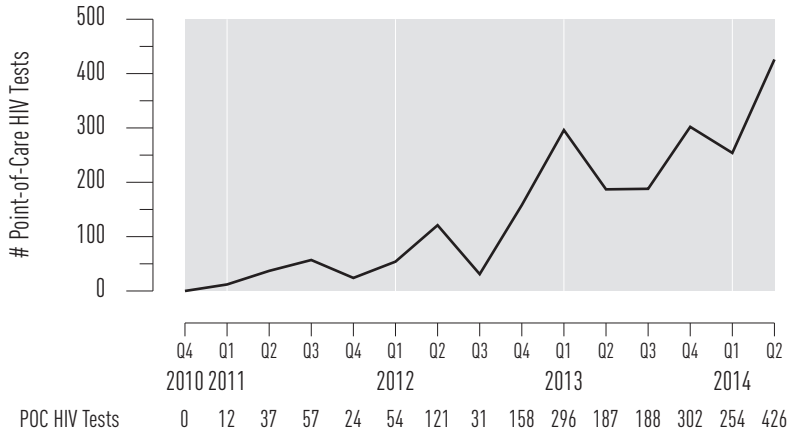


Figure 1.4 Point-of-Care HIV Tests for Fraser Health, 2010 Q4–2014 Q2



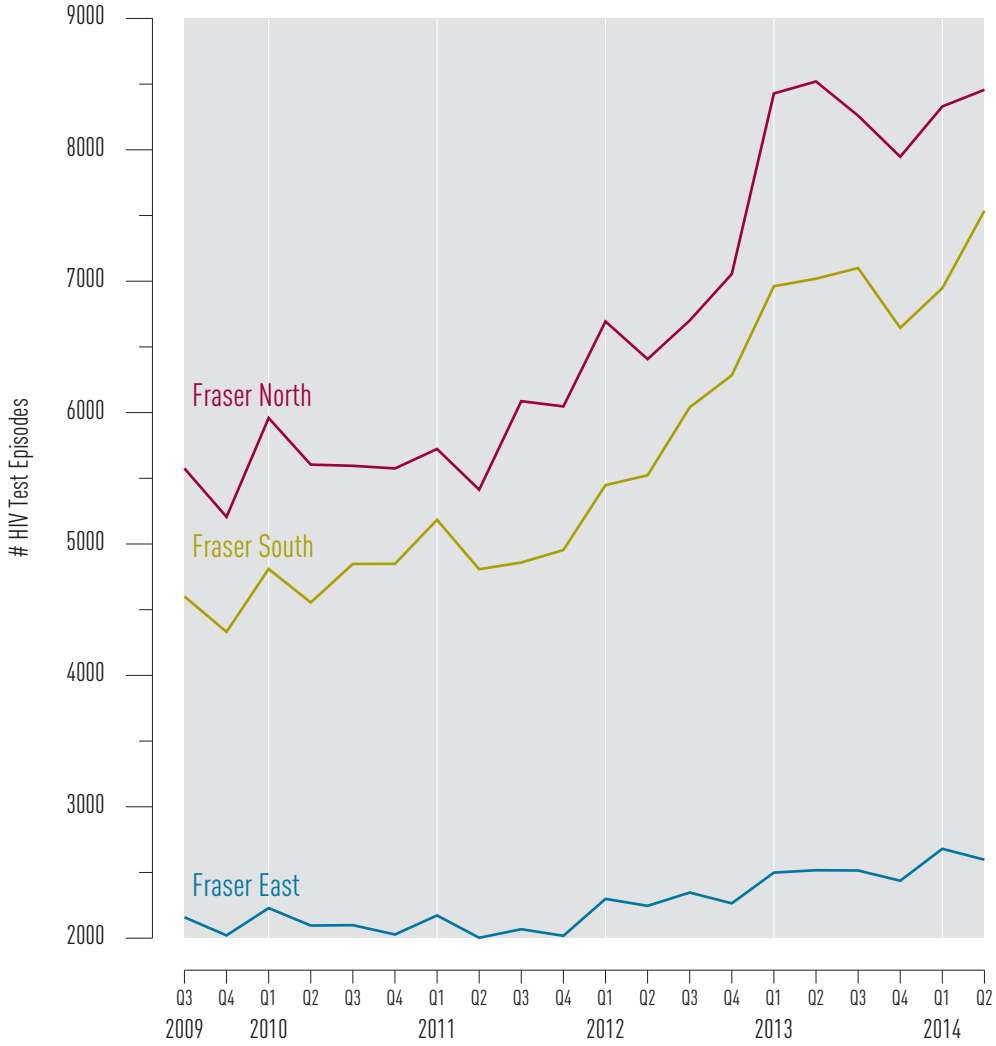
2 *Data Source: The BC Public Health Microbiology and Reference Laboratory (BCPHMRL) courtesy of the BC Centre for Disease Control (BCCDC).*

Limitations:

1 *Repeat tests in individuals who test using various identifiers may not be identified and these individuals may be counted more than once.*

2 *POC testing data is available from the fourth quarter of 2010 and onwards.*

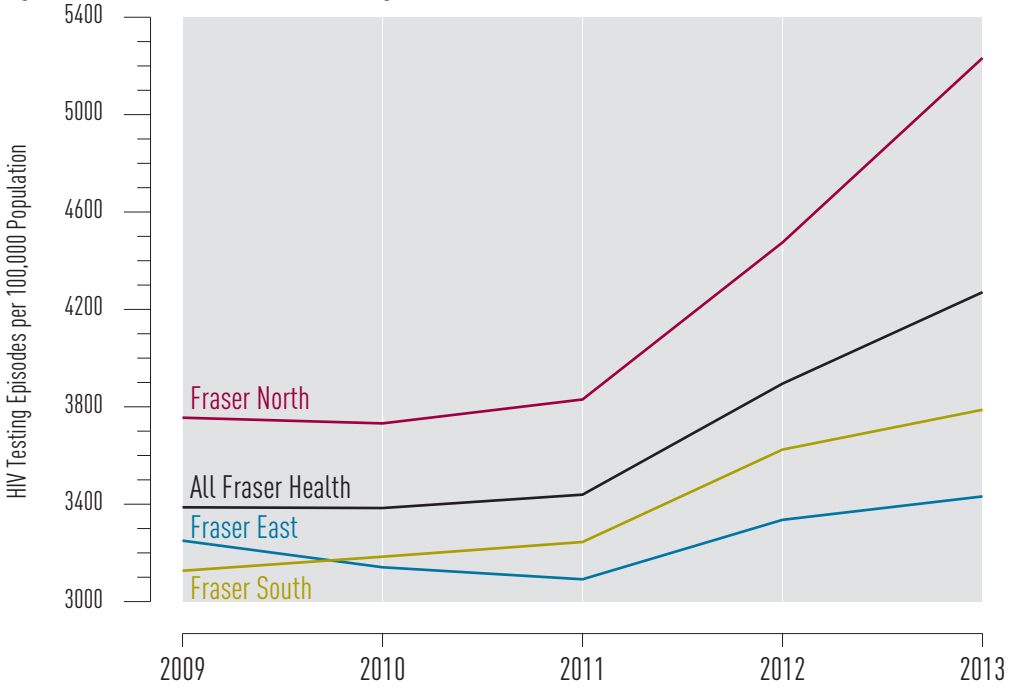
Figure 1.5 HIV Test Episodes for Fraser Health, 2009 Q3–2014 Q2



Fraser East	2.2	2.0	2.2	2.1	2.1	2.0	2.2	2.0	2.1	2.0	2.3	2.2	2.3	2.3	2.5	2.5	2.5	2.4	2.7	2.6
Fraser North	5.6	5.2	6.0	5.6	5.6	5.6	5.7	5.4	6.1	6.0	6.7	6.4	6.7	7.1	8.4	8.5	8.3	7.9	8.3	8.5
Fraser South	4.6	4.3	4.8	4.6	4.8	4.8	5.2	4.8	4.9	5.0	5.4	5.5	6.0	6.3	7.0	7.0	7.1	6.6	6.9	7.5

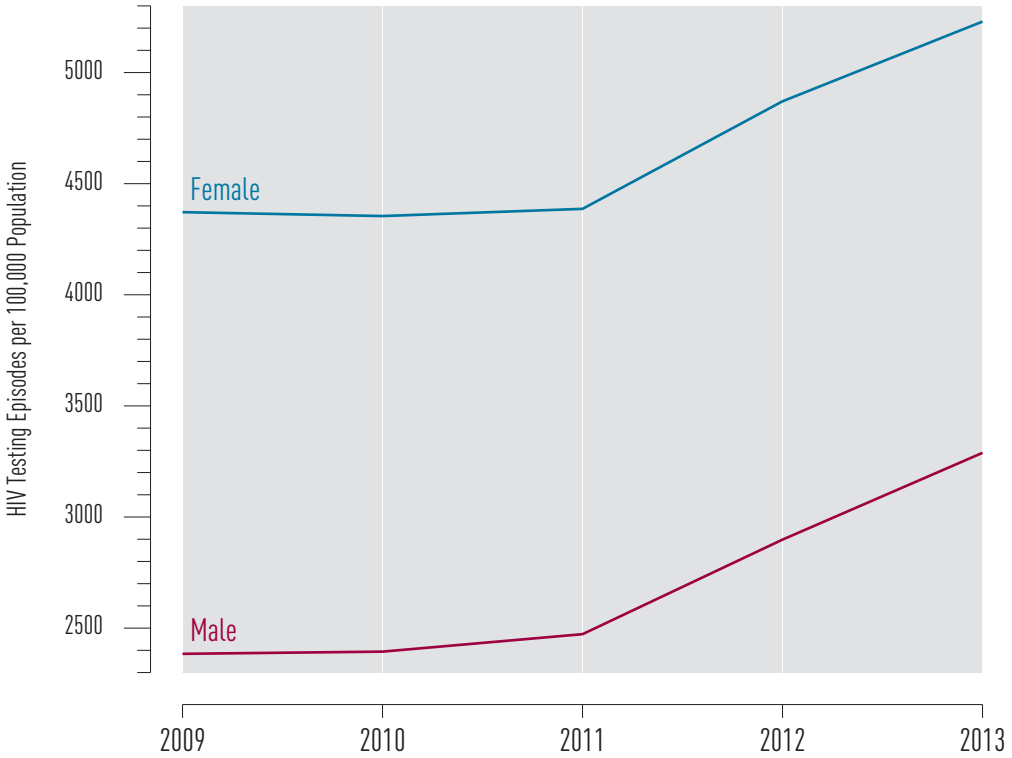
Indicator 2. HIV Testing Rates

Figure 2.1 Rate of HIV Testing for Fraser Health and HSDAs, 2009–2013 [1]



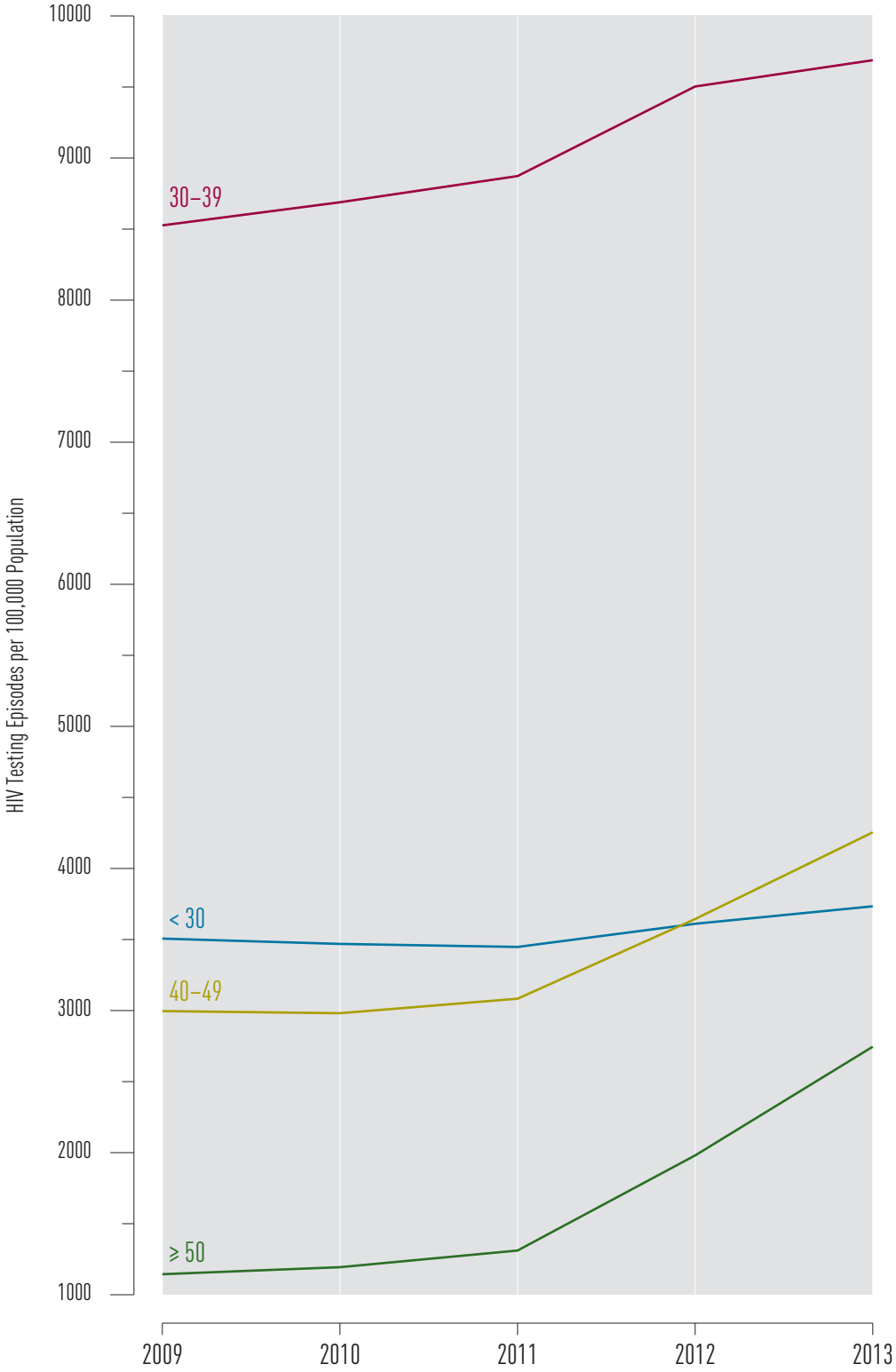
	2009	2010	2011	2012	2013
Fraser Health	3387.2	3384.2	3439.2	3895.2	4270.7
Fraser East	3250.3	3140.9	3091.6	3335.8	3431.9
Fraser North	3755.3	3731.9	3830.1	4475.1	5232.6
Fraser South	3126.6	3184.3	3244.7	3624.3	3787.9

Figure 2.2 Rate of HIV Testing by Gender for Fraser Health, 2009–2013 [1]



	2009	2010	2011	2012	2013
Female	4371.8	4354.3	4386.7	4870.7	5229.5
Male	2384.3	2394.2	2472.8	2898.3	3288.8

Figure 2.3 Rate of HIV Testing by Age Category for Fraser Health, 2009–2013 [1]



	2009	2010	2011	2012	2013
< 30	3506.4	3469.1	3447.7	3610.7	3733.9
30–39	8526.3	8688.8	8873.2	9503.6	9688.7
40–49	2996.2	2981.3	3083.5	3644.2	4254.3
≥ 50	1144.4	1193.8	1311.1	1980.5	2745.6

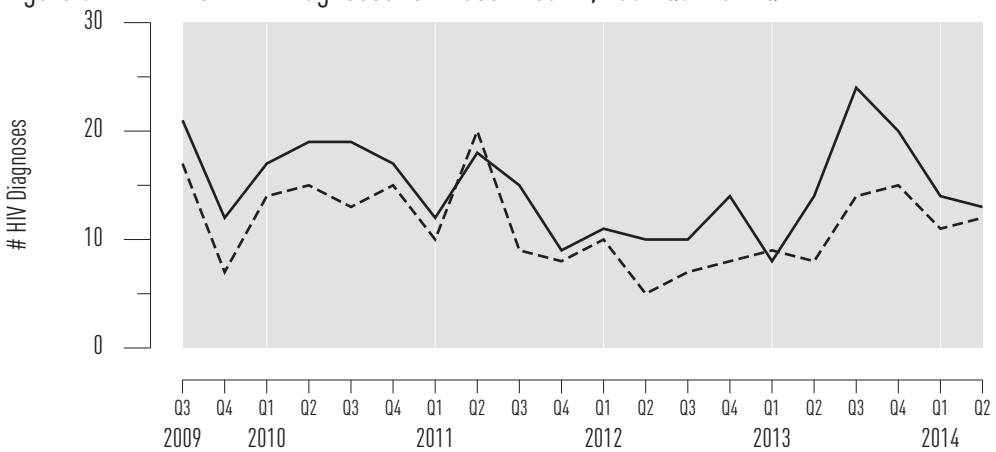
1 *NB: Testing does not include point of care tests.*

New HIV Diagnoses

Trends in HIV diagnoses by gender and exposure category are described. Interpreting HIV diagnoses must be done with consideration that trends are influenced by both changes in testing rate as well as changes in transmission rates. It is important to note that new HIV diagnoses cases and rates are not synonymous with HIV incidence as a person may have become infected with HIV long before they tested positive for HIV. However, as there is no reliable method for measuring HIV incidence we follow trends in HIV diagnoses.

Indicator 3. New HIV Diagnoses

Figure 3.1 New HIV Diagnoses for Fraser Health, 2009 Q3–2014 Q2 [3]



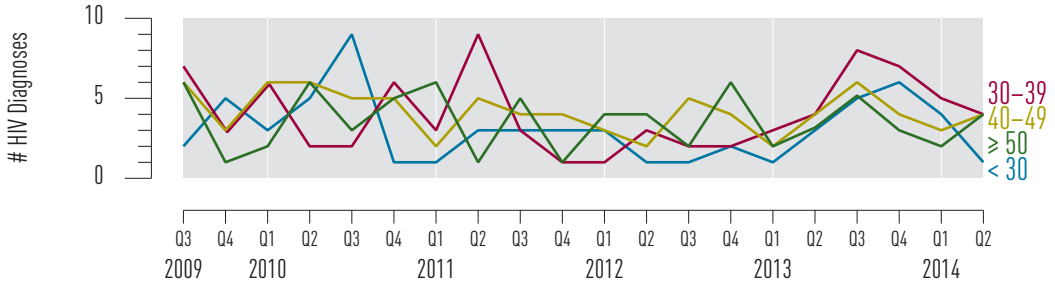
Fraser Health	By Client Residence	21	12	17	19	19	17	12	18	15	9	11	10	10	14	8	14	24	20	14	13
	By Provider Address	*17*	*7*	*14*	*15*	*13*	*15*	*10*	*20*	*9*	*8*	*10*	*5*	*7*	*8*	*9*	*8*	*14*	*15*	*11*	*12*

Figure 3.2 New HIV Diagnoses for Fraser Health by Gender, 2009 Q3–2014 Q2 [3]

Female	9	4	6	8	3	5	1	5	4	1	0	3	2	3	1	3	2	4	5	4
Male	12	8	11	11	16	12	11	13	11	8	11	7	8	11	7	11	22	16	9	9

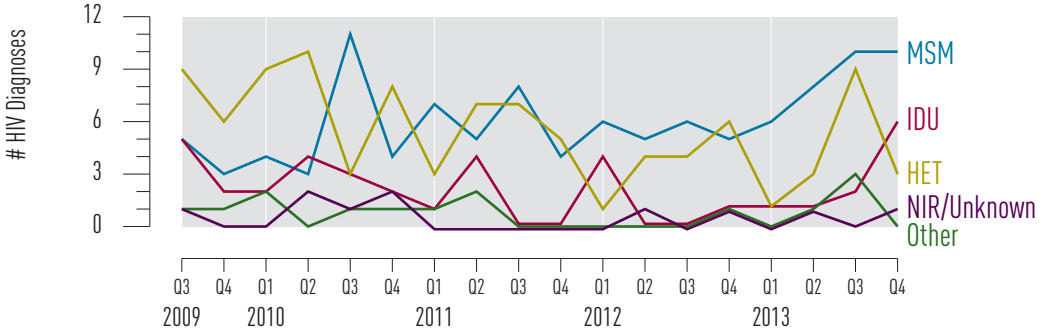
3 *Data Source: BCCDC. "By Provider Address" is graphed as dashed line in same colour.*

Figure 3.3 New HIV Diagnoses for Fraser Health by Age Category, 2009 Q3–2014 Q2 [3]



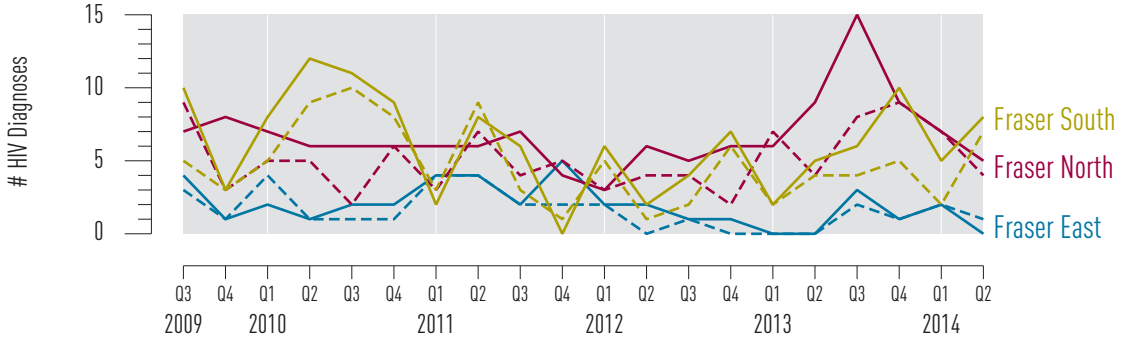
< 30 years	2	5	3	5	9	1	1	3	3	3	3	1	1	2	1	3	5	6	4	1
30–39 years	7	3	6	2	2	6	3	9	3	1	1	3	2	2	3	4	8	7	5	4
40–49 years	6	3	6	6	5	5	2	5	4	4	3	2	5	4	2	4	6	4	3	4
≥ 50 years	6	1	2	6	3	5	6	1	5	1	4	4	2	6	2	3	5	3	2	4

Figure 3.4 New HIV Diagnoses for Fraser Health by Exposure Category, 2009 Q3–2013 Q4 [3,4]



MSM (men who have sex with men)	5	3	4	3	11	4	7	5	8	4	6	5	6	5	6	8	10	10
IDU (injection drug user)	5	2	2	4	3	2	1	4	0	0	4	0	0	1	1	1	2	6
HET (heterosexual)	9	6	9	10	3	8	3	7	7	5	1	4	4	6	1	3	9	3
Other (other exposure identified)	1	1	2	0	1	1	1	2	0	0	0	0	0	1	0	1	3	0
NIR/Unknown (no identified exposure)	1	0	0	2	1	2	0	0	0	0	0	1	0	1	0	1	0	1

Figure 3.5 New HIV Diagnoses for Fraser Health by HSDA, 2009 Q3–2014 Q2 [3]



Fraser East	By Client Residence	4	1	2	1	2	2	4	4	2	5	2	2	1	1	0	0	3	1	2	0
	By Provider Address	*3*	*1*	*4*	*1*	*1*	*1*	*4*	*4*	*2*	*2*	*2*	*0*	*1*	*0*	*0*	*0*	*2*	*1*	*2*	*1*
Fraser North	By Client Residence	7	8	7	6	6	6	6	6	7	4	3	6	5	6	6	9	15	9	7	5
	By Provider Address	*9*	*3*	*5*	*5*	*2*	*6*	*3*	*7*	*4*	*5*	*3*	*4*	*4*	*2*	*7*	*4*	*8*	*9*	*7*	*4*
Fraser South	By Client Residence	10	3	8	12	11	9	2	8	6	0	6	2	4	7	2	5	6	10	5	8
	By Provider Address	*5*	*3*	*5*	*9*	*10*	*8*	*3*	*9*	*3*	*1*	*5*	*1*	*2*	*6*	*2*	*4*	*4*	*5*	*2*	*7*

3 *Data Source: BCCDC. "By Provider Address" is graphed as dashed line in same colour.*

4 *MSM=men who have sex with men; IDU= injection drug user; HET=heterosexual. NIR=No identified risk/exposure.*

Stage of HIV infection at diagnosis

Classification of stage of HIV infection, in the absence of information regarding recent testing history, is reliant on clinical information available at the time of diagnosis, including first CD4+ cell count, laboratory results suggestive of acute HIV infection, and clinical presentation with an AIDS-defining illness (Table 1). The benefits of Treatment as Prevention (TasP) are maximized when antiretroviral therapy (ART) is initiated at high CD4 cell counts. Accordingly, it is preferable that individuals newly diagnosed with HIV be in the early stages of HIV infection (stage 0 or 1) to allow for early ART initiation.

N.B. Interpretation of stage of HIV infection at diagnosis should proceed with caution. Early increases in diagnosis at late stage (i.e., low CD4 counts) may represent a "catching up" of previously missed long term infected individuals rather than a trend toward diagnosis at later stage of infection.

Indicator 4. Stage of HIV Infection at Diagnosis

Table 1 Staging Classifications of Infection at Time of HIV Diagnosis Based on CDC HIV Surveillance Case Definitions

Stage	Criteria				
0	Laboratory criteria met for acute HIV infection, or previous negative or indeterminate HIV test within 180 days of first confirmed positive HIV test.				
1	Stage 0 not met	*and*	CD4 ≥500	*and*	No AIDS case report
2a			CD4 350–499		
2b			CD4 200–349		
3			(CD4 <200	*or*	AIDS case report)
Unknown			No available CD4	*and*	No AIDS case report

Figure 4.1 Stage of HIV Infection at Diagnosis for Fraser Health, 2010–2013 [5]

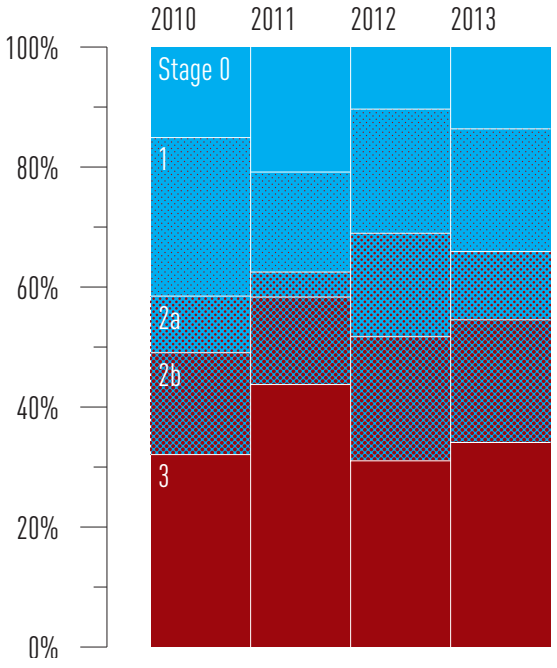
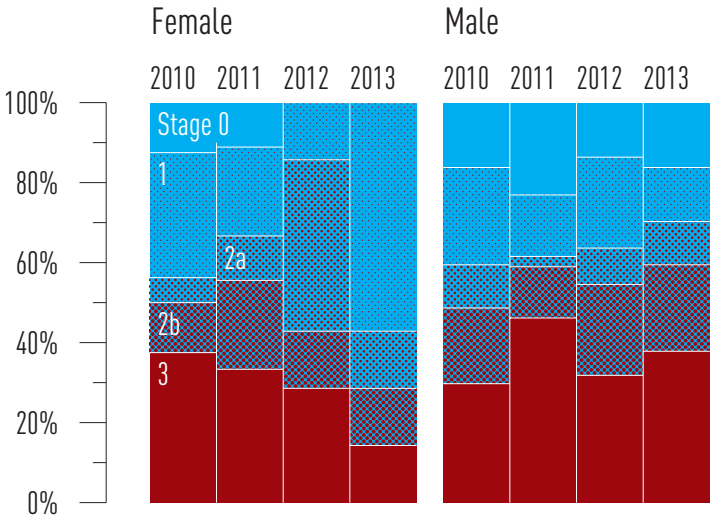


Figure 4.2 Stage of HIV Infection at Diagnosis by Gender for Fraser Health, 2010–2013 [5]



	Fraser Health				*Female*				*Male*			
	2010	2011	2012	2013	2010	2011	2012	2013	2010	2011	2012	2013
Stage 0	8	10	3	6	2	1	0	0	6	9	3	6
Stage 1	14	8	6	9	5	2	1	4	9	6	5	5
Stage 2a	5	2	5	5	1	1	3	1	4	1	2	4
Stage 2b	9	7	6	9	2	2	1	1	7	5	5	8
Stage 3	17	21	9	15	6	3	2	1	11	18	7	14
Unknown	2	1	2	4	0	1	0	0	2	0	2	4
Total *(n=)*	55	49	31	48	16	10	7	7	39	39	24	41

5 *Data Source: BCCDC*

Figure 4.3 Stage of HIV Infection at Diagnosis by Age Category for Fraser Health, 2010–2013 [5]

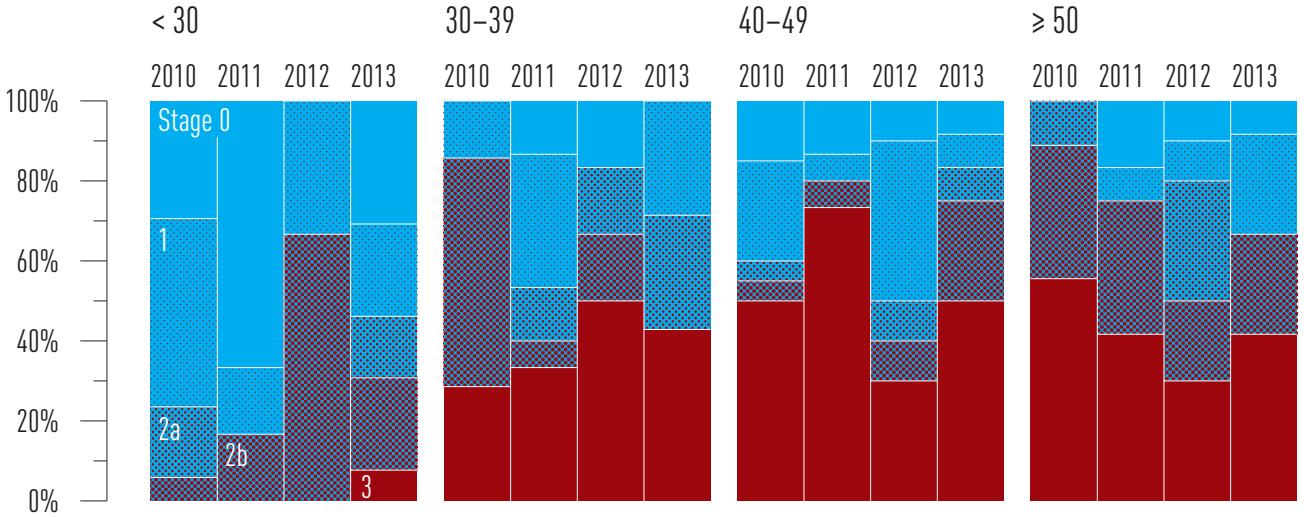
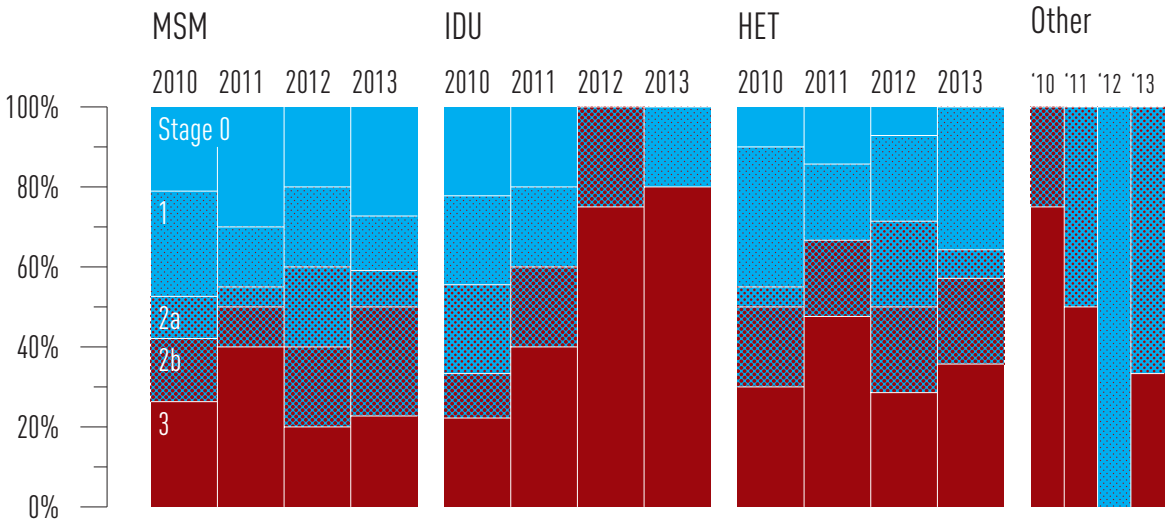


Figure 4.4 Stage of HIV Infection at Diagnosis by Exposure Category for Fraser Health, 2010–2013 [5,6]



	< 30 years				*30–39 years*				*40–49 years*				*≥ 50 years*				*MSM*				*IDU*				*Heterosexual*				*Other*				*NIR/Unknown*			
	2010	'11	'12	'13	'10	'11	'12	'13	'10	'11	'12	'13	'10	'11	'12	'13	'10	'11	'12	'13	'10	'11	'12	'13	'10	'11	'12	'13	'10	'11	'12	'13	'10	'11	'12	'13
Stage 0	5	4	0	4	0	2	1	0	3	2	1	1	0	2	1	1	4	6	2	6	2	1	0	0	2	3	1	0	0	0	0	0	0	0	0	0
Stage 1	8	1	1	3	1	5	0	2	5	1	4	1	0	1	1	3	5	3	2	3	2	1	0	1	7	4	3	5	0	0	1	0	0	0	0	0
Stage 2a	3	0	0	2	0	2	1	2	1	0	1	1	1	0	3	0	2	1	2	2	2	0	0	0	1	0	3	1	0	1	0	2	0	0	0	0
Stage 2b	1	1	2	3	4	1	1	0	1	1	1	3	3	4	2	3	3	2	2	6	1	1	1	0	4	4	3	3	1	0	0	0	0	0	0	0
Stage 3	0	0	0	1	2	5	3	3	10	11	3	6	5	5	3	5	5	8	2	5	2	2	3	4	6	10	4	5	3	1	0	1	1	0	0	0
Unknown	1	1	1	0	0	0	0	2	1	0	1	2	0	0	0	0	1	0	1	0	0	0	0	2	1	1	0	2	0	0	0	0	0	0	1	0
Total *(n=)*	18	7	4	13	7	15	6	9	21	15	11	14	9	12	10	12	20	20	11	22	9	5	4	7	21	22	14	16	4	2	1	3	1	0	1	0

6 *MSM=men who have sex with men; IDU= injection drug user; HET=heterosexual. NIR=No identified risk/exposure.*

Indicator 5. HIV Cascade of Care

The success of seek, test, treat and retain (STTR) strategies like STOP is reliant on early diagnosis of HIV, linking newly diagnosed HIV-positive persons with ongoing care, retaining persons in HIV-care; initiating ART based on best evidenced practices and maintaining optimal ART adherence to ensure a suppressed viral load. These stages of HIV-care can be summarized as: 1. HIV diagnosis, 2. Linkage to HIV care, 3. Retention in HIV care, 4. On ART and 5. Achieving a suppressed VL; collectively, they are referred to as the cascade of care. Leakage between any of these stages of HIV-care means a reduction in the potential of ART as a benefit to the HIV-positive individual and as an HIV transmission prevention method on a population level. Thus, when interpreting trends in the cascade of care, we strive to see increases along each step of the cascade of care (ie. reduced attrition) with the ultimate goal being 100% within each stage of the cascade. Monitoring the Cascade of Care provides a picture as to where deficiencies lie in the delivery and uptake of HIV-care. In this section we present the cascade of care for the year 2012 in BC overall and stratified by sex and age for each Health Authority.

Figure 5.1 Estimated Cascade of Care for Fraser Health, Year Ending 2014 Q2 [7]

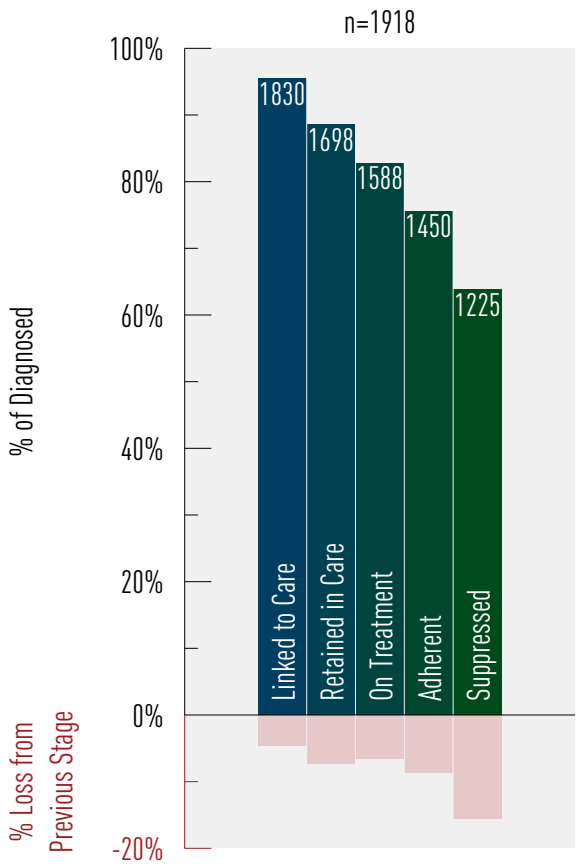
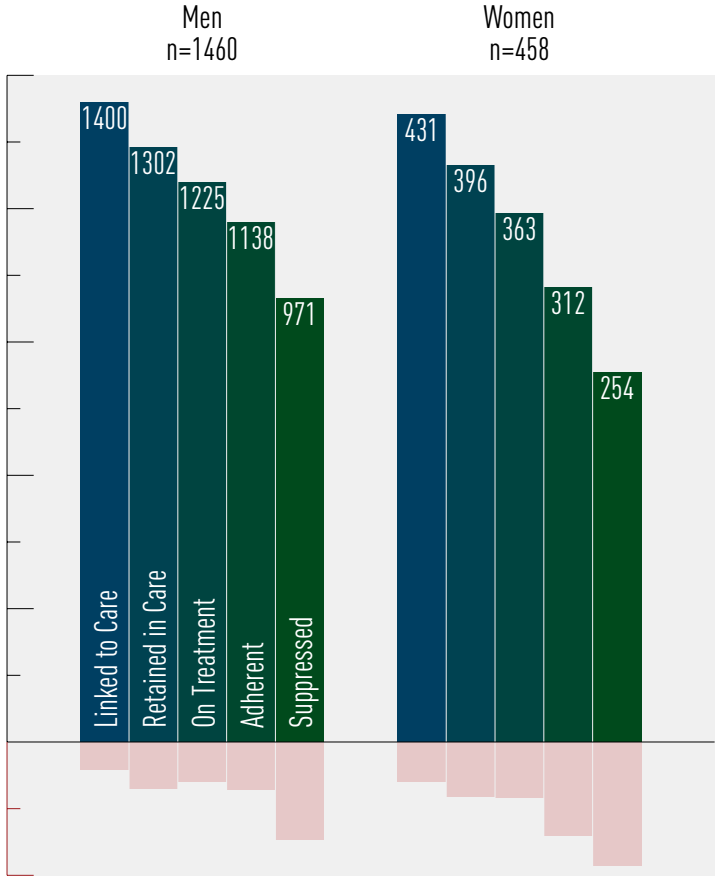


Figure 5.2 Estimated Cascade of Care for Fraser Health by Gender, Year Ending 2014 Q2 [8]

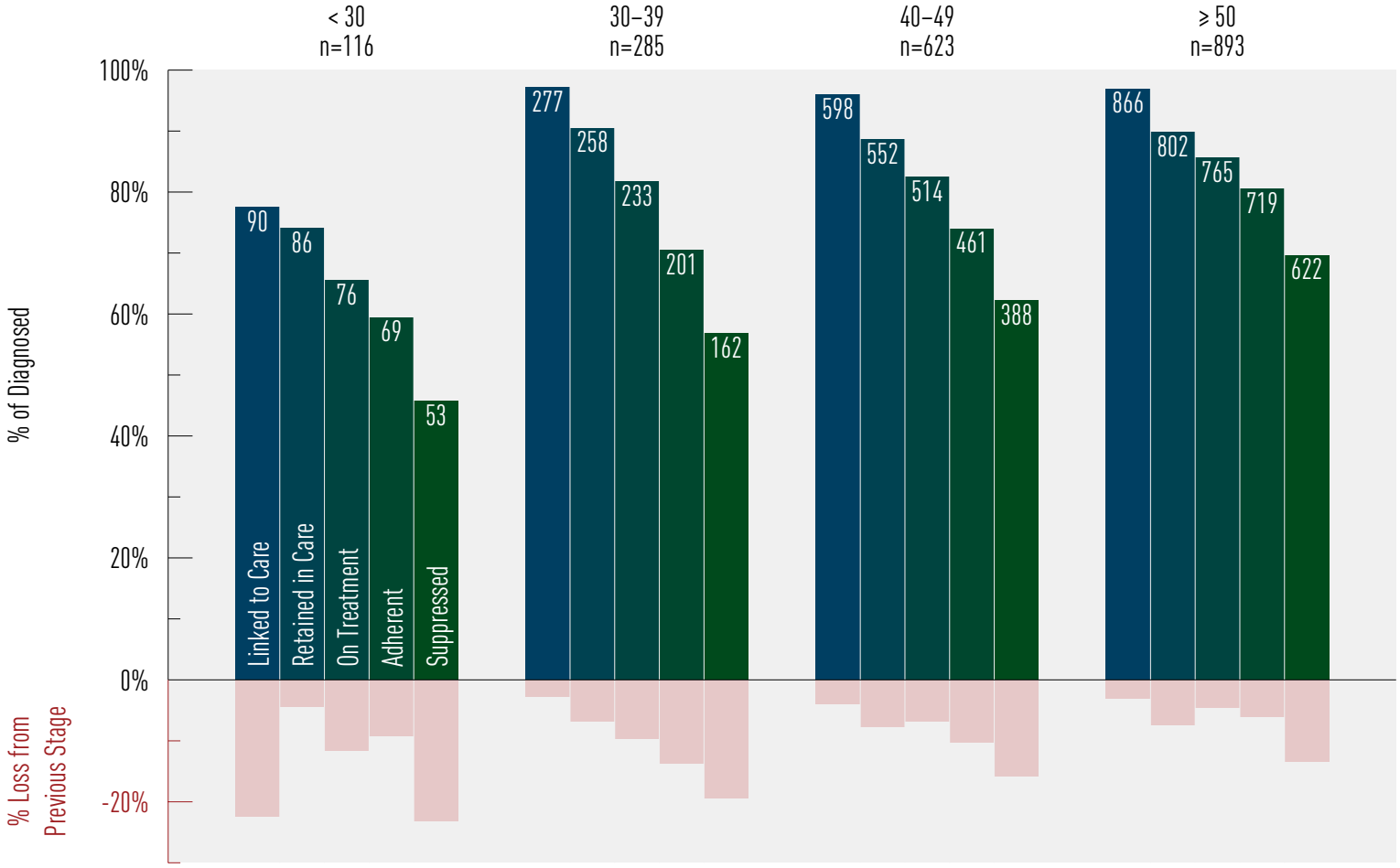


7,8 *Data is for the period 2013 Q3–2014 Q2.*
Data Sources:
1 *British Columbia Centre for Excellence Drug Treatment Program (DTP) Database (ARV use, VL and CD4 count).*
2 *Administrative data (ex. MSP billings; hospitalization data from the Discharge Abstract Database (DAD)).*

Limitations: HA assignment is based on the most recent HA of residence of the patient, if not available of the HIV-care provider. If the most recent HA of residence is not updated then the designated HA may be incorrect.

NB: Transgender has been assigned to their biological sex.

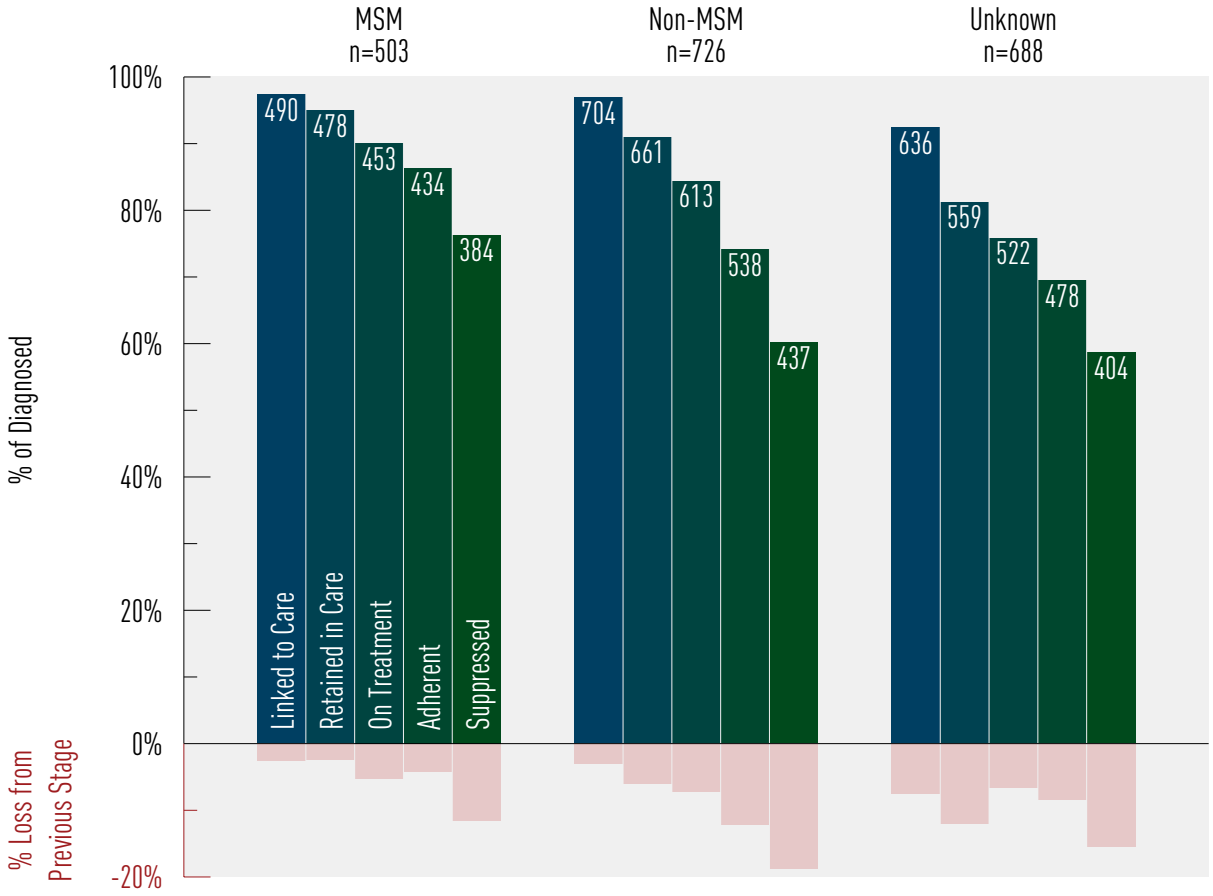
Figure 5.3 Estimated Cascade of Care for Fraser Health by Age Category, Year Ending 2014 Q2 [9]



9 *Data is for the period 2013 Q3–2014 Q2.*
Data Sources:
1 *British Columbia Centre for Excellence Drug Treatment Program (DTP) Database (ARV use, VL and CD4 count).*
2 *Administrative data (ex. MSP billings; hospitalization data from the Discharge Abstract Database (DAD)).*

Limitations: HA assignment is based on the most recent HA of residence of the patient, if not available of the HIV-care provider. If the most recent HA of residence is not updated then the designated HA may be incorrect.

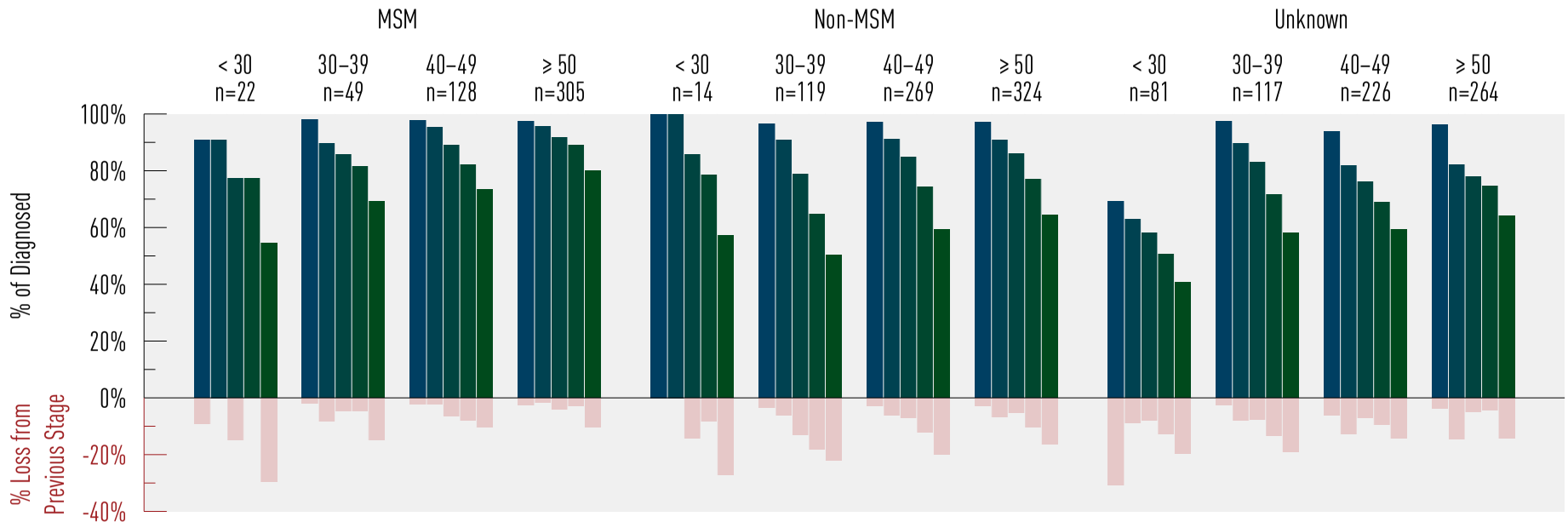
Figure 5.4 Estimated Cascade of Care for Fraser Health by MSM Status, Year Ending 2014 Q2 [10]



10 *Data is for the period 2013 Q3–2014 Q2.*
Data Sources:
1 *British Columbia Centre for Excellence Drug Treatment Program (DTP) Database (ARV use, VL and CD4 count).*
2 *Administrative data (ex. MSP billings; hospitalization data from the Discharge Abstract Database (DAD)).*

Limitations: HA assignment is based on the most recent HA of residence of the patient, if not available of the HIV-care provider. If the most recent HA of residence is not updated then the designated HA may be incorrect.

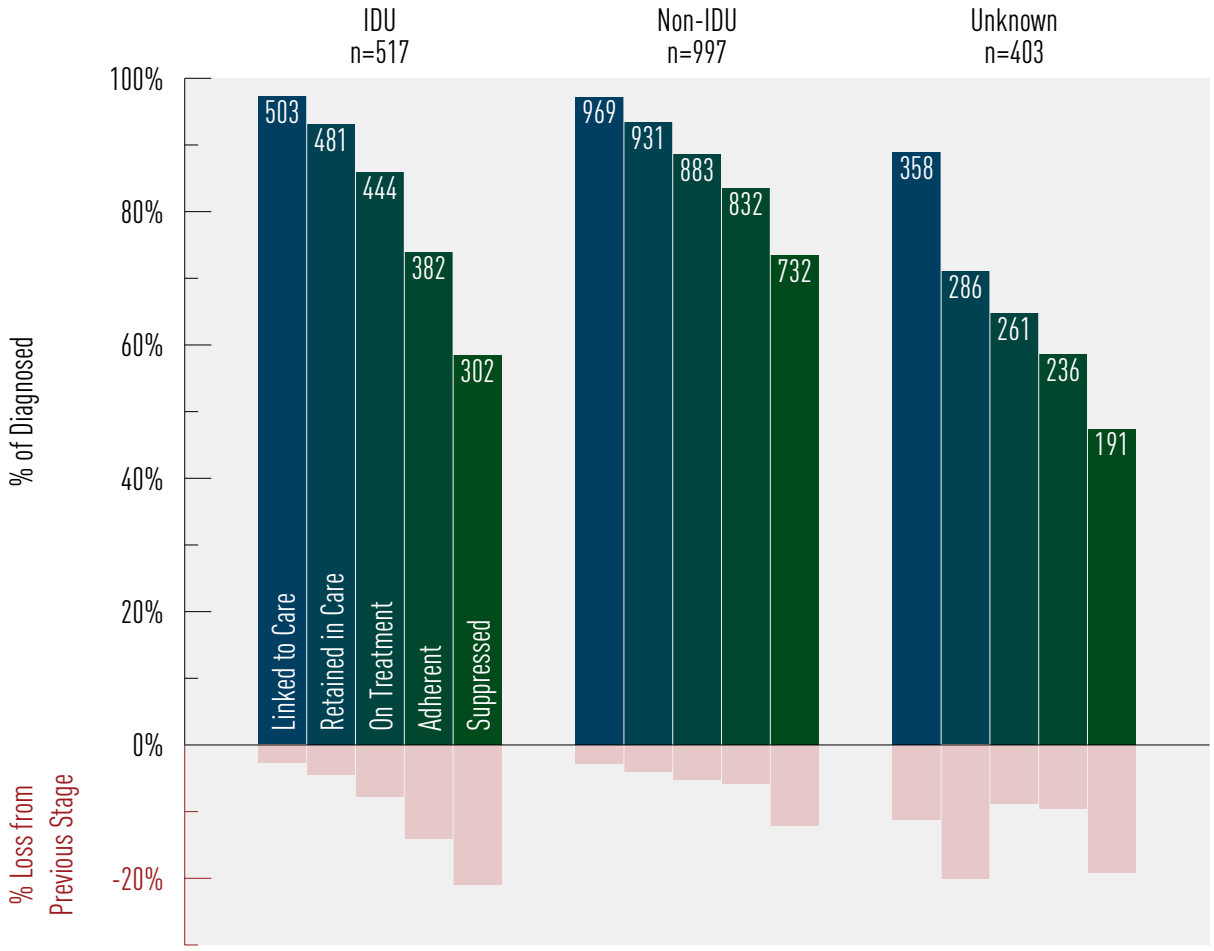
Figure 5.5 Estimated Cascade of Care for Fraser Health by Age Category and MSM Status, Year Ending 2014 Q2 [11]



11 *Data is for the period 2013 Q3–2014 Q2.*
Data Sources:
1 *British Columbia Centre for Excellence Drug Treatment Program (DTP) Database (ARV use, VL and CD4 count).*
2 *Administrative data (ex. MSP billings; hospitalization data from the Discharge Abstract Database (DAD)).*

Limitations: HA assignment is based on the most recent HA of residence of the patient, if not available of the HIV-care provider. If the most recent HA of residence is not updated then the designated HA may be incorrect.

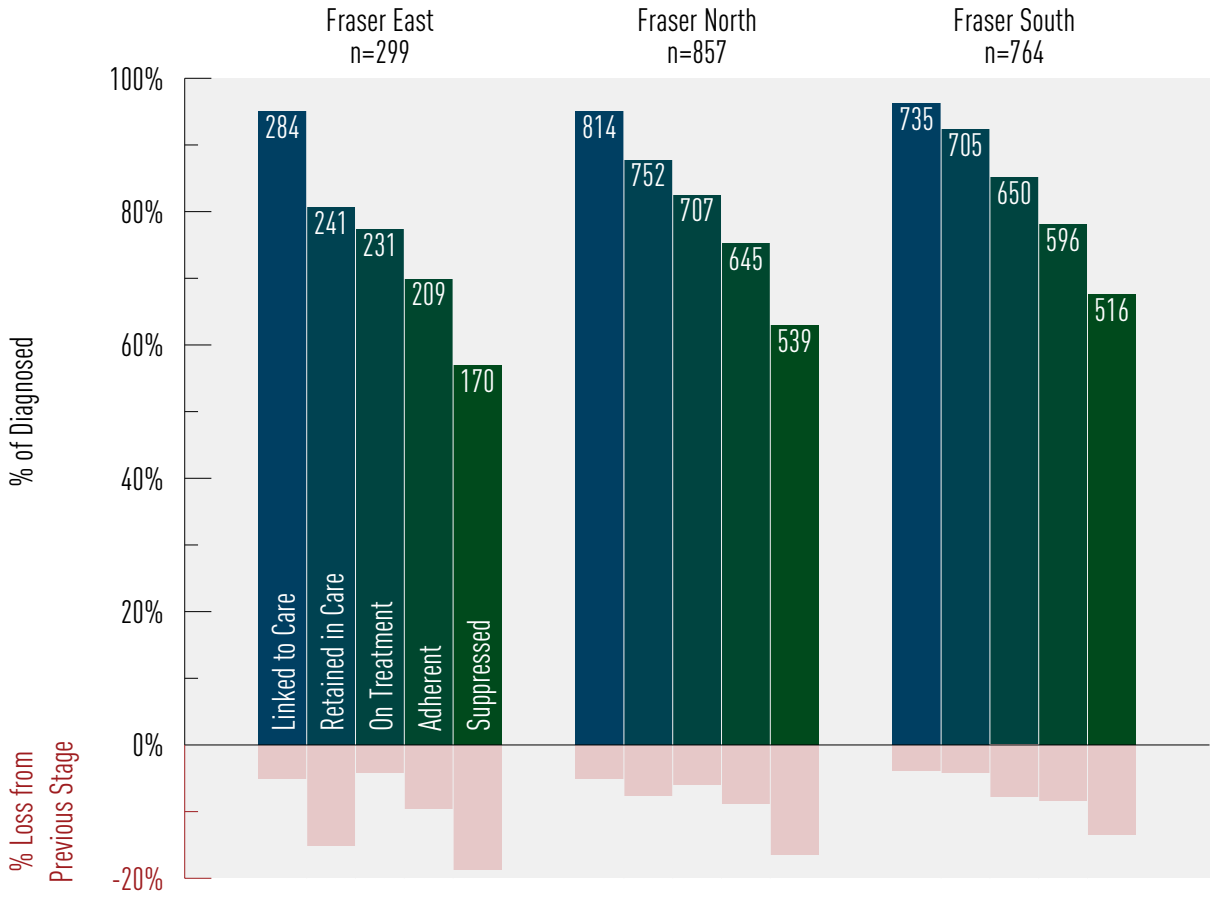
Figure 5.6 Estimated Cascade of Care for Fraser Health by History of IDU, Year Ending 2014 Q2 [12]



12 *Data is for the period 2013 Q3–2014 Q2.*
Data Sources:
1 *British Columbia Centre for Excellence Drug Treatment Program (DTP) Database (ARV use, VL and CD4 count).*
2 *Administrative data (ex. MSP billings; hospitalization data from the Discharge Abstract Database (DAD)).*

Limitations: HA assignment is based on the most recent HA of residence of the patient, if not available of the HIV-care provider. If the most recent HA of residence is not updated then the designated HA may be incorrect.

Figure 5.7 Estimated Cascade of Care for Fraser Health by HSDA, Year Ending 2014 Q2 [13]



13 *Data is for the period 2013 Q3–2014 Q2.*
Data Sources:
1 *British Columbia Centre for Excellence Drug Treatment Program (DTP) Database (ARV use, VL and CD4 count).*
2 *Administrative data (ex. MSP billings; hospitalization data from the Discharge Abstract Database (DAD)).*

Limitations: HA assignment is based on the most recent HA of residence of the patient, if not available of the HIV-care provider. If the most recent HA of residence is not updated then the designated HA may be incorrect.

Indicator 6. The Programmatic Compliance Score (PCS)

The Programmatic Compliance Score (PCS) is a summary measure of risk of future death, immunologic failure and virologic failure from all causes for people who are starting ART for the first time. It is composed of patient- and physician-driven effects. PCS scores range from 0–6 with higher scores indicative of poorer health outcomes and greater risk of death. Table 1 provides mortality, immunologic failure and virologic failure probabilities for given PCS scores. We interpret an individual with a PCS≥4 as being 22 times more likely to die, almost 10 times more likely to have immunologic failure and nearly 4 times as likely to demonstrate virologic failure compared to those individuals with a PCS score of 0. A detailed description of how the PCS score is calculated and its validation can be found in the technical report. In short, PCS scores are calculated by summing the results (yes=1, no=0) of six un-weighted non-performance indicators based on IAS–USA treatment guidelines:

1. having <3 CD4 cell count tests in the first year after starting antiretroviral therapy (ART);
2. having <3 plasma viral load (VL) tests in the first year after starting ART;
3. not having drug resistance testing done prior to starting ART;
4. starting on a non-recommended ART regimen;
5. starting therapy with CD4<200 cells/µL; and
6. not achieving viral suppression within 9 months since ART initiation.

In this section we provide PCS scores and their components over time for the province of BC. A decline to 0%, **(i.e., all individuals having a score of 0)** is the eventual goal.

Table 2. The Probability of Mortality, Immunologic Failure and Virologic Failure based on the Programmatic Compliance Score

Programmatic Compliance Score	Mortality Risk Ratio (95% Confidence Interval)	Immunologic Failure Risk Ratio (95% CI)	Virologic Failure Risk Ratio (95% CI)
0 (Best score)	1 (–)	1 (–)	1 (–)
1	3.81 (1.73–8.42)	1.39 (1.04–1.85)	1.32 (1.05–1.67)
2	7.97 (3.70–17.18)	2.17 (1.54–3.04)	1.86 (1.46–2.38)
3	11.51 (5.28–25.08)	2.93 (1.89–4.54)	2.98 (2.16–4.11)
4 or more (Worst score)	22.37 (10.46–47.84)	9.71 (5.72–16.47)	3.80 (2.52–5.73)

Reference: Lima VD, Le A, Nosyk B, Barrios R, Yip B, et al. (2012) Development and Validation of a Composite Programmatic Assessment Tool for HIV Therapy. PLoS ONE 7(11): e47859. doi:10.1371/journal.pone.0047859

Figure 6.1 PCS Components for Fraser Health, 2012 Q3–2014 Q2 [14]

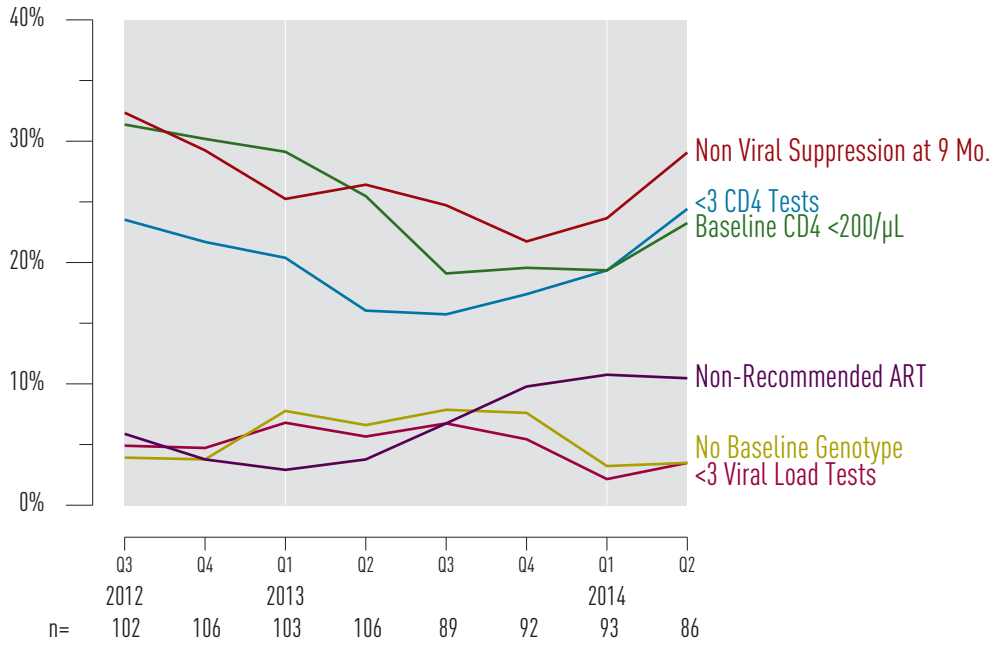
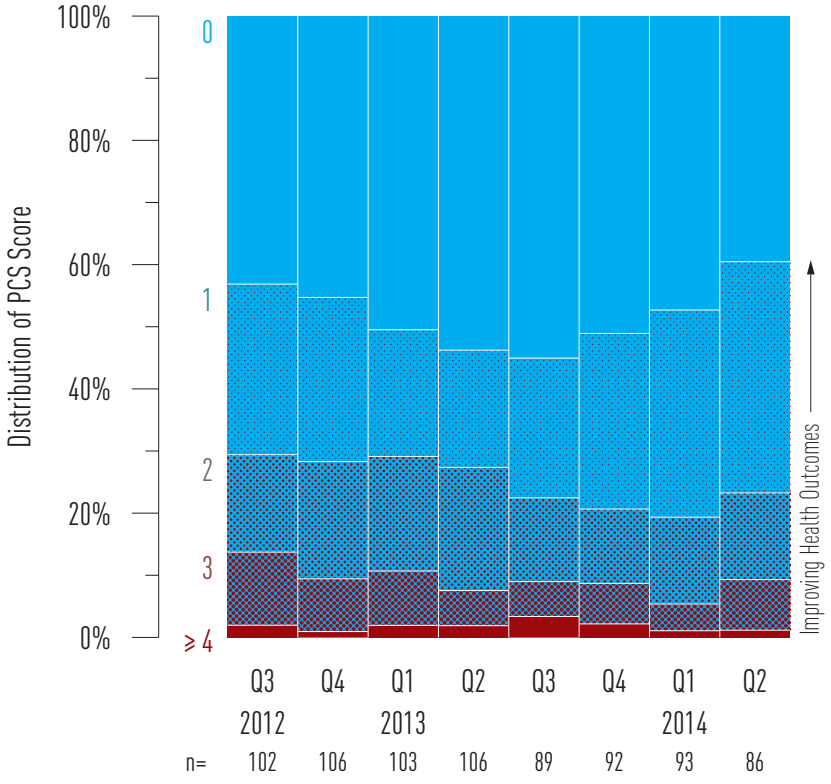


Figure 6.2 Historical Trends for PCS Score for Fraser Health, 2012 Q3–2014 Q2 [14,15]



14 *Data Source: British Columbia Centre for Excellence Drug Treatment Program (DTP) Database. Limitations: CD4 cell count capture is approximately 80%.*

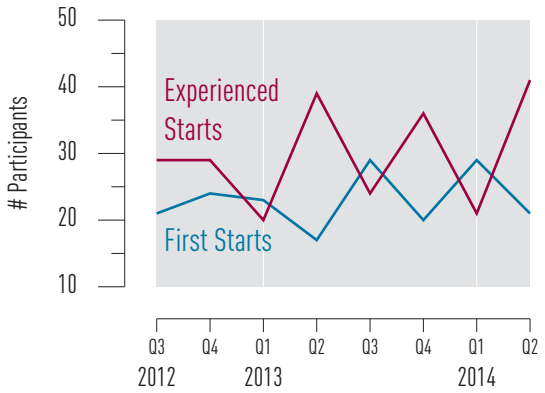
15 *Each quarter's data is calculated as the sum of the 4 quarters leading up to it. e.g. 2013 Q1 is calculated from 2012 Q2 – 2013 Q1. NB: A score of 0 is the best score and a score of 4 or more is the worst score.*

Antiretroviral Uptake

In this section we present trends in ART uptake, the number and proportion of new HIV treatment initiations and the number of active and inactive DTP participants. Trends in ART uptake should be interpreted under the consideration of changing BC HIV treatment guidelines. BC HIV treatment guidelines are updated regularly by the BC-CfE Therapeutic Guidelines Committee and reflect those of the International AIDS Society. Most recent changes were made in 2012 and HIV treatment is now recommended for all HIV-positive adults regardless of CD4 cell count; as evidence demonstrates that early initiation of HIV treatment maximizes both the individual's health outcomes as well as the potential of ART as a form of HIV transmission prevention at a population level. As such, trends in the number and proportion of persons on ART and new ART starts (in both naïve and experienced persons) are expected to increase over time at higher CD4 cell counts.

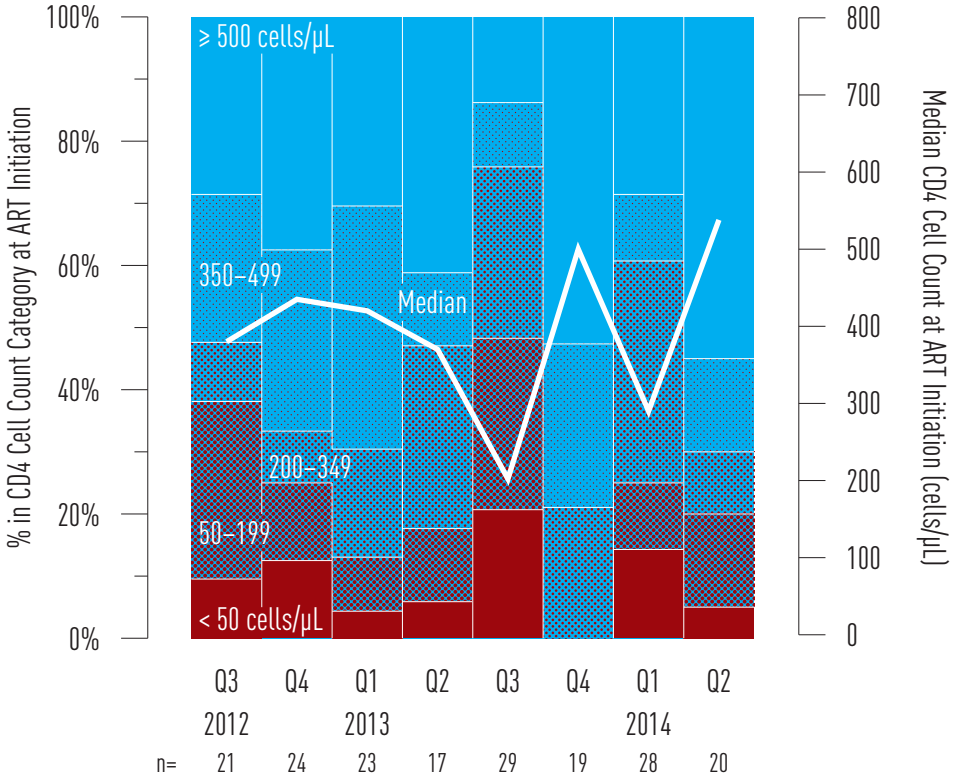
Indicator 7. New Antiretroviral Therapy Starts in Fraser Health

Figure 7 BC-CfE Drug Treatment Program Enrollment: New ART Participants in Fraser Health, 2012 Q3–2014 Q2 [16]



Indicator 8. CD4 Cell Count at ART Initiation

Figure 8 CD4 Cell Count at ART Initiation of ART-Naïve DTP Participants in Fraser Health, 2012 Q3–2014 Q2 [17]



16 *Data Source: Drug Treatment Program Database*
Limitation: DTP participants are designated to an HA based on most current residence provided by the participant.

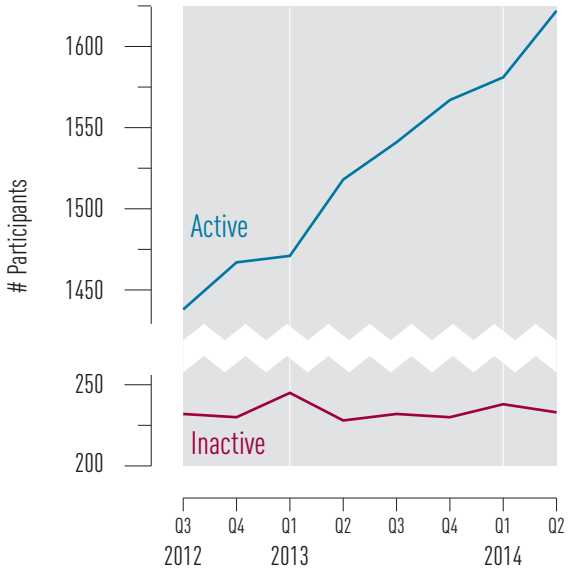
17 *Data Source: Drug Treatment Program Database*
Limitations: CD4 cell count data is approximately 80% complete.

Indicator 9. Active and Inactive DTP Participants

Table 3. Distribution of People on ART for Fraser Health, 2014 Q2 [18]

Age	< 30	75
	30–39	256
	40–49	543
	≥ 50	748
Gender	Male	1257
	Female	365
Exposure	MSM	460
	IDU	444
Total		1622

Figure 9 Active and Inactive DTP Participants in Fraser Health, 2012 Q3–2014 Q2 [19]



18 *Data Source: Drug Treatment Program Database*
Limitation: DTP participants are designated to an HA based on most current residence provided by the participant.

Definitions:
'On antiretroviral therapy' defined as being on treatment in the current quarter
'Unknown/not stated' defined as being on treatment in the current quarter, and city of residence unknown

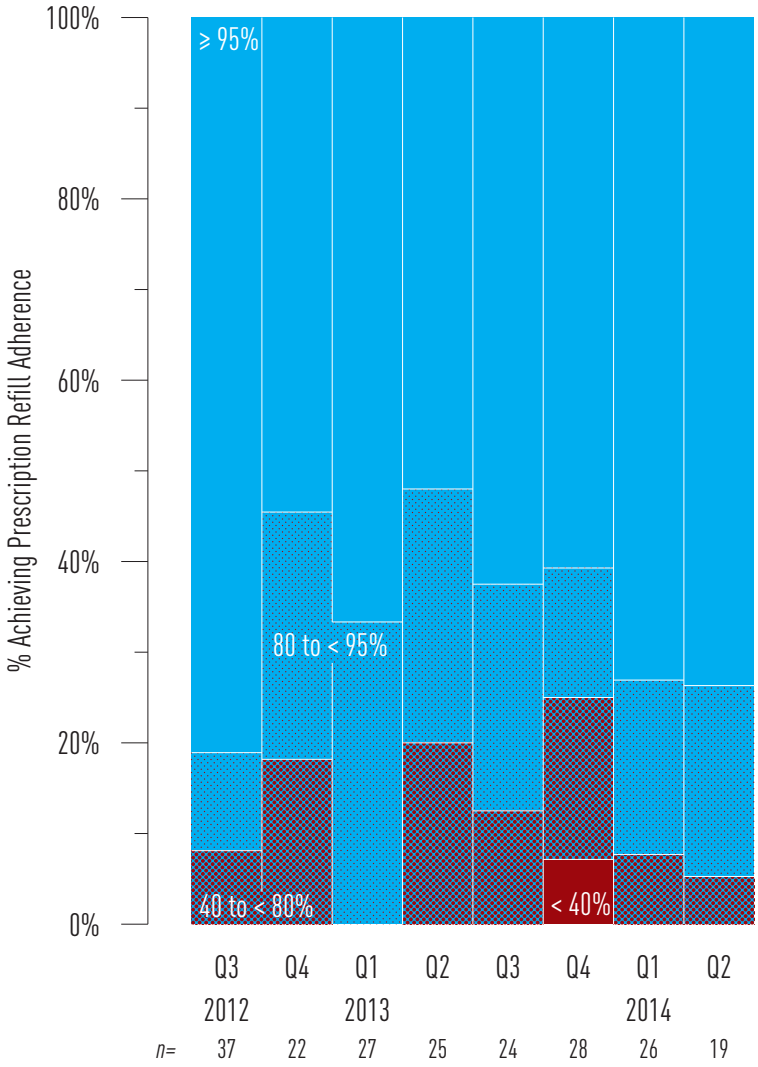
19 *Active DTP participants: are those who are prescribed one or more drugs in the last six months.*
Inactive DTP Participants: Persons no longer prescribed drugs through the HIV/AIDS Drug Treatment Program in the last quarter.

Antiretroviral Adherence Level

In this section we present trends in prescription refill adherence levels for individuals in their first year of treatment. Given that the benefits of ART are compromised in the presence of imperfect ART adherence, we expect to see the proportion of persons on ART achieving near perfect adherence (ie. ≥95%) to increase with time. Furthermore, it is important that trends in the proportion of ART users achieving prescription refill adherence of ≥95% keep pace with new ART starts and increase among those continuing on ART.

Indicator 10. Antiretroviral Adherence

Figure 10 Distribution of Individuals by Adherence Level in 1st Year of Therapy, Based on Pharmacy Refill Compliance for Fraser Health, 2012 Q3–2014 Q2 [20]

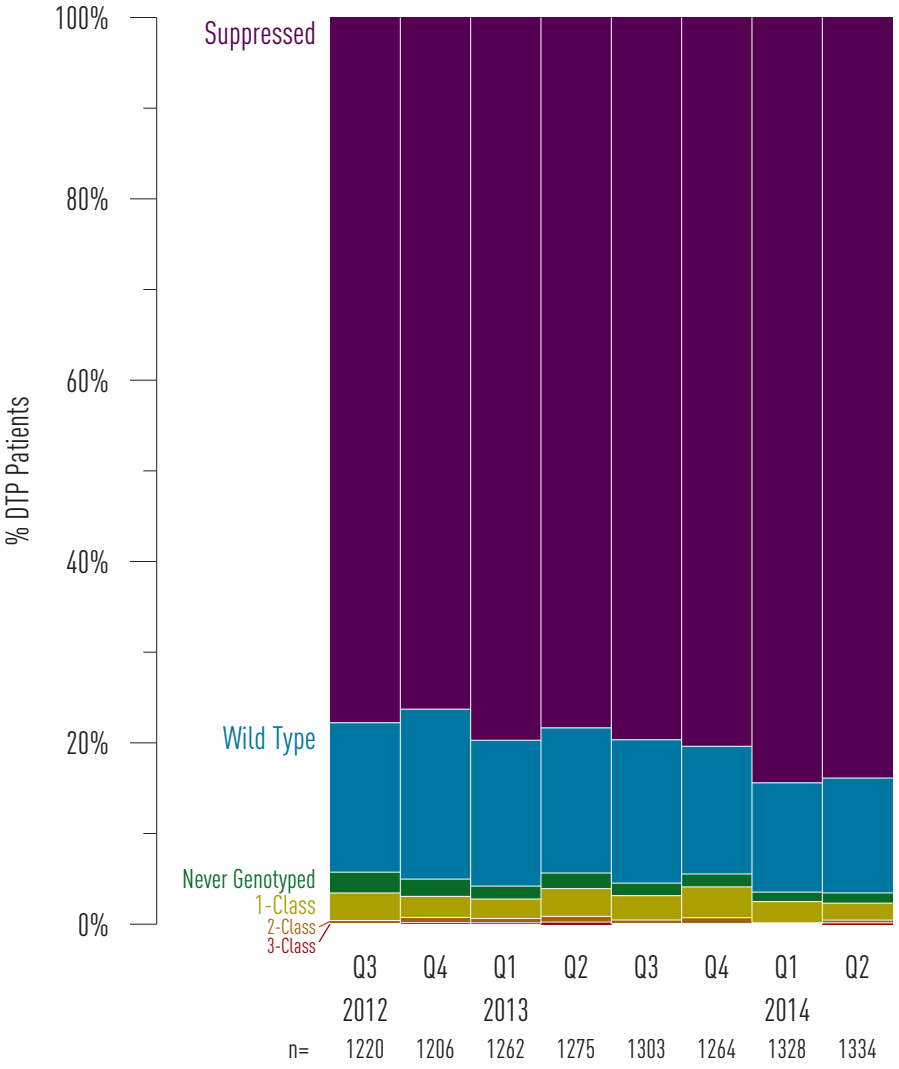


20 *Data Source: Drug Treatment Program Database*
Limitation: Prescription refill adherence is used as a proxy for patient adherence.

Indicator 11. Resistance Testing and Results

In this section, we present trends in cumulative resistance testing by resistance category: Suppressed (where a DTP participant's viral load is too low to be genotyped); Wild Type (where no HIV treatment resistances were discovered), Never Genotyped, and Resistances to one, two or three HIV treatment classes. Resistance testing prior to ART initiation is recommended in the BC HIV treatment primary care guidelines. Thus, it is expected that trends over time should find all persons enrolled in the DTP to have been genotyped. Trends over time should also show an increase in the proportion of DTP participants achieving a suppressed status and an increase in resistance testing should not lead to an increase in the number of ART resistances occurring.

Figure 11 Cumulative Resistance Testing Results by Resistance Category for Fraser Health, 2012 Q3–2014 Q2 [21]



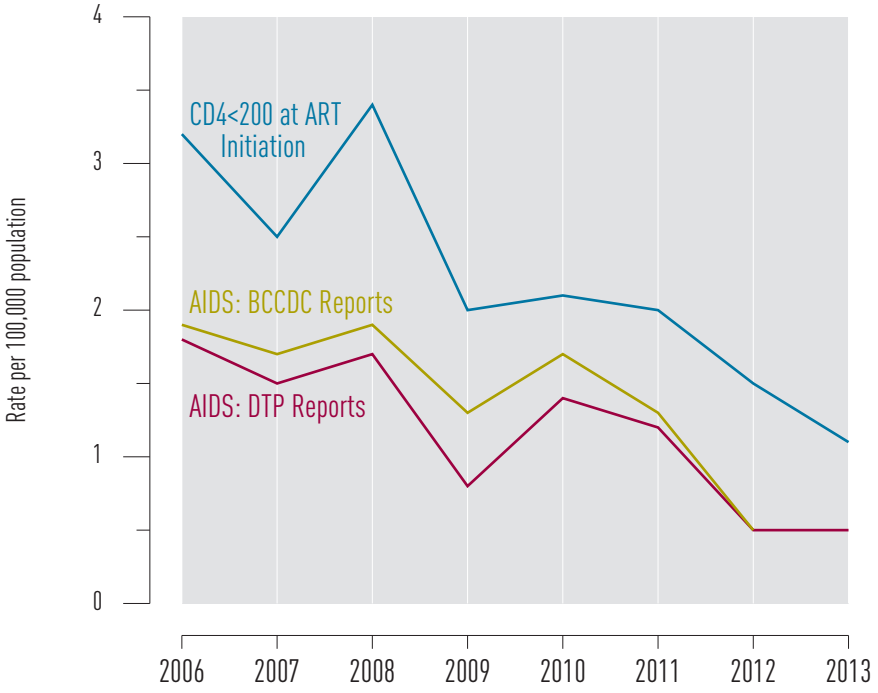
21 *Data Source: Drug Treatment Program Database*

Limitation: DTP participants are designated to an HA based on most current residence provided by the participant.

Indicator 12. AIDS-Defining Illness

Improvements in ART and the expansion of ART province-wide has led to very low numbers of recorded AIDS cases across BC. However, interpreting trends in AIDS cases is challenging as AIDS reporting is passive in BC and it is likely that they are under reported across all Health Authorities. In addition to under reporting, methods of reporting AIDS cases are inconsistent across HA's and do not truly reflect the current reality of new AIDS diagnoses. Efforts will need to be made to improve under and inconsistent reporting of AIDS cases across all HA's. The table below shows AIDS cases using three definitions. First, AIDS cases were defined as the number of physician-reported AIDS defining illness (ADI) in a given year. AIDS case reporting is a passive process and physicians can voluntarily report AIDS cases to the BCCDC or DTP. As such, we have plotted both BCCDC reports and DTP reported AIDS cases. We also show the proportion of persons initiating ART with a CD4<200 cells/μL.

Figure 12 AIDS Case Rate and Reports for Fraser Health, 2006–2013 [22]



		2006	2007	2008	2009	2010	2011	2012	2013
CD4<200 at ART initiation	CASES	47	38	52	31	33	33	25	19
	PER 100K	3.2	2.5	3.4	2.0	2.1	2.0	1.5	1.1
AIDS: DTP Reports	CASES	26	22	26	12	22	19	9	9
	PER 100K	1.8	1.5	1.7	0.8	1.4	1.2	0.5	0.5
AIDS: BCCDC Reports	CASES	28	25	30	21	28	22	9	–
	PER 100K	1.9	1.7	1.9	1.3	1.7	1.3	0.5	–

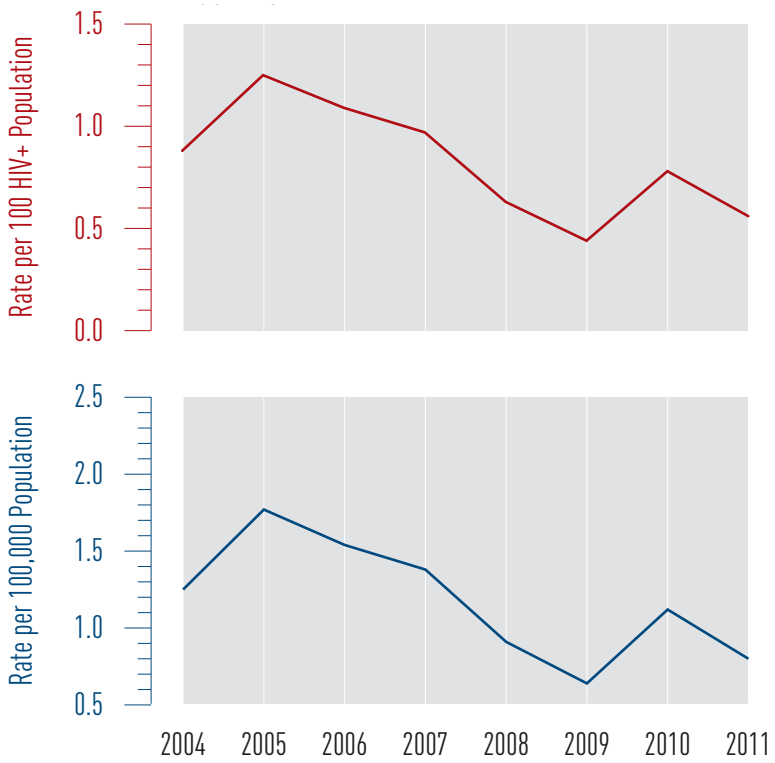
22 *Data Source: DTP AIDS cases are obtained from the Drug Treatment Program Database; BCCDC AIDS cases are obtained from the BCCDC; CD4<200 at ART initiation data came from the DTP database.*

Limitation: AIDS case reporting was investigated using 3 definitions: First, using AIDS cases reported in AIDS case report forms from the DTP; Second, using AIDS cases reported via the BCCDC and third, using a CD4 cell count of <200 cells/μL at time of ART initiation using DTP data. AIDS case reporting is passive in BC, thus; AIDS case reporting is not well captured. The DTP sends out AIDS reporting forms to physicians annually. The BCCDC uses DTP AIDS case reports as well as physician AIDS case reports made directly to the BCCDC. Interpreting AIDS case reports should be done with these limitations in mind. AIDS data is updated annually as very few AIDS cases reports are reported in general and trends would be difficult to notice if reported quarterly.

Indicator 13. HIV-Related Mortality

Evidence indicates that individuals who initiate treatment with recommended ART in a timely fashion may live near normal lifespans. Excess mortality among HIV positive persons is, therefore, an important measure of HIV care with a goal of minimizing HIV-related mortality in British Columbia.

Figure 13 HIV-Related Deaths by Year for Fraser Health, 2004–2011 [23]



	2004	2005	2006	2007	2008	2009	2010	2011
HIV-Related Deaths	18	26	23	21	14	10	18	13
Per 100 HIV+ Population	0.88	1.25	1.09	0.97	0.63	0.44	0.78	0.56
Per 100,000 Population	1.25	1.77	1.54	1.38	0.91	0.64	1.12	0.80

23 *Data Source: BC Vital Statistics*

Limitation:
1. DTP participants are designated to an HA based on most current residence provided by the participant.
2. Mortality data is updated annually.
3. The most recent available data was used.

Appendices

Indicator 1: **Test Episodes (thousands)**		2009 Q3	Q4	2010 Q1	Q2	Q3	Q4	2011 Q1	Q2	Q3	Q4	2012 Q1	Q2	Q3	Q4	2013 Q1	Q2	Q3	Q4	2014 Q1	Q2
Fraser Health		12.3	11.6	13.0	12.3	12.5	12.5	13.1	12.2	13.0	13.0	14.4	14.2	15.1	15.6	17.9	18.1	17.9	17.0	18.0	18.6
Gender	Female	7.9	7.6	8.5	7.8	8.1	8.1	8.4	7.9	8.3	8.4	9.1	9.0	9.6	9.7	11.0	10.9	10.9	10.2	10.8	11.0
	Male	4.4	3.9	4.5	4.4	4.4	4.4	4.7	4.3	4.7	4.6	5.3	5.1	5.5	5.7	6.6	7.0	6.7	6.5	6.9	7.1
	Other	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Female (Prenatal)		3.9	4.0	4.2	3.9	4.1	4.2	4.4	4.0	3.9	4.1	4.4	4.0	4.1	4.0	4.4	4.1	4.1	4.1	4.3	4.1
Female (Non-prenatal)		4.0	3.6	4.2	4.0	4.0	3.9	4.0	3.9	4.3	4.3	4.7	4.9	5.4	5.7	6.6	6.8	6.8	6.1	6.4	6.9
Age	< 30	5.2	4.9	5.1	5.0	5.3	5.3	5.0	4.9	5.4	5.3	5.3	5.2	5.7	5.5	5.8	5.9	6.2	5.8	5.6	5.9
	30–39	4.1	3.9	4.6	4.2	4.2	4.1	4.7	4.2	4.4	4.3	5.0	4.8	4.9	4.8	5.8	5.6	5.5	5.4	6.0	5.7
	40–49	1.7	1.6	1.9	1.7	1.7	1.7	1.9	1.7	1.8	1.8	2.0	2.0	2.0	2.3	2.6	2.7	2.6	2.3	2.6	2.7
	≥ 50	1.3	1.2	1.5	1.3	1.3	1.3	1.5	1.3	1.4	1.6	2.0	2.1	2.4	2.8	3.4	3.7	3.5	3.1	3.5	3.8
POC HIV Tests (not in thousands)							0	12	37	57	24	54	121	31	158	296	187	188	302	254	426
Fraser East		2.2	2.0	2.2	2.1	2.1	2.0	2.2	2.0	2.1	2.0	2.3	2.2	2.3	2.3	2.5	2.5	2.5	2.4	2.7	2.6
Fraser North		5.6	5.2	6.0	5.6	5.6	5.6	5.7	5.4	6.1	6.0	6.7	6.4	6.7	7.1	8.4	8.5	8.3	7.9	8.3	8.5
Fraser South		4.6	4.3	4.8	4.6	4.8	4.8	5.2	4.8	4.9	5.0	5.4	5.5	6.0	6.3	7.0	7.0	7.1	6.6	6.9	7.5

Indicator 2: **Rate of HIV Testing per 100,000**

		2009	2010	2011	2012	2013
Fraser Health		3387.2	3384.2	3439.2	3895.2	4270.7
Fraser East		3250.3	3140.9	3091.6	3335.8	3431.9
Fraser North		3755.3	3731.9	3830.1	4475.1	5232.6
Fraser South		3126.6	3184.3	3244.7	3624.3	3787.9
Gender	Female	4371.8	4354.3	4386.7	4870.7	5229.5
	Male	2384.3	2394.2	2472.8	2898.3	3288.8
Age	< 30	3506.4	3469.1	3447.7	3610.7	3733.9
	30–39	8526.3	8688.8	8873.2	9503.6	9688.7
	40–49	2996.2	2981.3	3083.5	3644.2	4254.3
	≥ 50	1144.4	1193.8	1311.1	1980.5	2745.6

Indicator 3: **New HIV Diagnoses**		2009 Q3	Q4	2010 Q1	Q2	Q3	Q4	2011 Q1	Q2	Q3	Q4	2012 Q1	Q2	Q3	Q4	2013 Q1	Q2	Q3	Q4	2014 Q1	Q2
Fraser Health	By Client Residence	21	12	17	19	19	17	12	18	15	9	11	10	10	14	8	14	24	20	14	13
	By Provider Address	*17*	*7*	*14*	*15*	*13*	*15*	*10*	*20*	*9*	*8*	*10*	*5*	*7*	*8*	*9*	*8*	*14*	*15*	*11*	*12*
Gender	Female	9	4	6	8	3	5	1	5	4	1	0	3	2	3	1	3	2	4	5	4
	Male	12	8	11	11	16	12	11	13	11	8	11	7	8	11	7	11	22	16	9	9
Age	< 30	2	5	3	5	9	1	1	3	3	3	3	1	1	2	1	3	5	6	4	1
	30–39	7	3	6	2	2	6	3	9	3	1	1	3	2	2	3	4	8	7	5	4
	40–49	6	3	6	6	5	5	2	5	4	4	3	2	5	4	2	4	6	4	3	4
	≥ 50	6	1	2	6	3	5	6	1	5	1	4	4	2	6	2	3	5	3	2	4
Exposure	MSM	5	3	4	3	11	4	7	5	8	4	6	5	6	5	6	8	10	10	–	–
	IDU	5	2	2	4	3	2	1	4	0	0	4	0	0	1	1	1	2	6	–	–
	HET	9	6	9	10	3	8	3	7	7	5	1	4	4	6	1	3	9	3	–	–
	Other	1	1	2	0	1	1	1	2	0	0	0	0	0	1	0	1	3	0	–	–
	NIR/Unknown	1	0	0	2	1	2	0	0	0	0	0	1	0	1	0	1	0	1	–	–
Fraser East	By Client Residence	4	1	2	1	2	2	4	4	2	5	2	2	1	1	0	0	3	1	2	0
	By Provider Address	*3*	*1*	*4*	*1*	*1*	*1*	*4*	*4*	*2*	*2*	*2*	*0*	*1*	*0*	*0*	*0*	*2*	*1*	*2*	*1*
Fraser North	By Client Residence	7	8	7	6	6	6	6	6	7	4	3	6	5	6	6	9	15	9	7	5
	By Provider Address	*9*	*3*	*5*	*5*	*2*	*6*	*3*	*7*	*4*	*5*	*3*	*4*	*4*	*2*	*7*	*4*	*8*	*9*	*7*	*4*
Fraser South	By Client Residence	10	3	8	12	11	9	2	8	6	0	6	2	4	7	2	5	6	10	5	8
	By Provider Address	*5*	*3*	*5*	*9*	*10*	*8*	*3*	*9*	*3*	*1*	*5*	*1*	*2*	*6*	*2*	*4*	*4*	*5*	*2*	*7*

Indicator 4: **Stage of HIV Infection at Baseline**

	Fraser Health				Female				Male				< 30 years				30–39 years				40–49 years			
	'10	'11	'12	'13	'10	'11	'12	'13	'10	'11	'12	'13	'10	'11	'12	'13	'10	'11	'12	'13	'10	'11	'12	'13
Stage 0	8	10	3	6	2	1	0	0	6	9	3	6	5	4	0	4	0	2	1	0	3	2	1	1
Stage 1	14	8	6	9	5	2	1	4	9	6	5	5	8	1	1	3	1	5	0	2	5	1	4	1
Stage 2a	5	2	5	5	1	1	3	1	4	1	2	4	3	0	0	2	0	2	1	2	1	0	1	1
Stage 2b	9	7	6	9	2	2	1	1	7	5	5	8	1	1	2	3	4	1	1	0	1	1	1	3
Stage 3	17	21	9	15	6	3	2	1	11	18	7	14	0	0	0	1	2	5	3	3	10	11	3	6
Unknown	2	1	2	4	0	1	0	0	2	0	2	4	1	1	1	0	0	0	0	2	1	0	1	2
Total	55	49	31	48	16	10	7	7	39	39	24	41	18	7	4	13	7	15	6	9	21	15	11	14

	≥ 50 years				MSM				IDU				Heterosexual				Other Exposure				NIR/Unknown			
	'10	'11	'12	'13	'10	'11	'12	'13	'10	'11	'12	'13	'10	'11	'12	'13	'10	'11	'12	'13	'10	'11	'12	'13
Stage 0	0	2	1	1	4	6	2	6	2	1	0	0	2	3	1	0	0	0	0	0	0	0	0	0
Stage 1	0	1	1	3	5	3	2	3	2	1	0	1	7	4	3	5	0	0	1	0	0	0	0	0
Stage 2a	1	0	3	0	2	1	2	2	2	0	0	0	1	0	3	1	0	1	0	2	0	0	0	0
Stage 2b	3	4	2	3	3	2	2	6	1	1	1	0	4	4	3	3	1	0	0	0	0	0	0	0
Stage 3	5	5	3	5	5	8	2	5	2	2	3	4	6	10	4	5	3	1	0	1	1	0	0	0
Unknown	0	0	0	0	1	0	1	0	0	0	0	2	1	1	0	2	0	0	0	0	0	0	1	0
Total	9	12	10	12	20	20	11	22	9	5	4	7	21	22	14	16	4	2	1	3	1	0	1	0

Indicator 5: **HIV Cascade of Care**			DIAGNOSED	LINKED	RETAINED	ON ART	ADHERENT	SUPPRESSED
Fraser Health			1918	1830	1698	1588	1450	1225
Age Category	< 30		116	90	86	76	69	53
	30–39		285	277	258	233	201	162
	40–49		623	598	552	514	461	388
	≥ 50		893	866	802	765	719	622
Age Category and MSM Status	MSM	< 30	22	20	20	17	17	12
		30–39	49	48	44	42	40	34
		40–49	128	125	122	114	105	94
		≥ 50	305	297	292	280	272	244
	Non-MSM	< 30	14	14	14	12	11	8
		30–39	119	115	108	94	77	60
		40–49	269	261	245	228	200	160
		≥ 50	324	315	294	279	250	209
	Unknown	< 30	81	56	51	47	41	33
		30–39	117	114	105	97	84	68
		40–49	226	212	185	172	156	134
		≥ 50	264	254	217	206	197	169
Gender	Male		1460	1400	1302	1225	1138	971
	Female		458	431	396	363	312	254
Injection Drug Use	IDU		517	503	481	444	382	302
	Non-IDU		997	969	931	883	832	732
	Unknown		403	358	286	261	236	191
MSM Status	MSM		503	490	478	453	434	384
	Non-MSM		726	704	661	613	538	437
	Unknown		688	636	559	522	478	404
Health Authority	Fraser East		299	284	241	231	209	170
	Fraser North		857	814	752	707	645	539
	Fraser South		764	735	705	650	596	516

Indicator 6: **Programmatic Compliance Score (PCS)**

	2012 Q3	Q4	2013 Q1	Q2	Q3	Q4	2014 Q1	Q2
< 3 CD4 Tests	23.5%	21.7%	20.4%	16.0%	15.7%	17.4%	19.4%	24.4%
< 3 Viral Load Tests	4.9%	4.7%	6.8%	5.7%	6.7%	5.4%	2.2%	3.5%
No Baseline Genotype	3.9%	3.8%	7.8%	6.6%	7.9%	7.6%	3.2%	3.5%
Baseline CD4 < 200 cells/μL	31.4%	30.2%	29.1%	25.5%	19.1%	19.6%	19.4%	23.3%
Non-Recommended ART	5.9%	3.8%	2.9%	3.8%	6.7%	9.8%	10.8%	10.5%
Non Viral suppression at 9 Mo.	32.4%	29.2%	25.2%	26.4%	24.7%	21.7%	23.7%	29.1%
PCS Score: 0	44	48	52	57	49	47	44	34
PCS Score: 1	28	28	21	20	20	26	31	32
PCS Score: 2	16	20	19	21	12	11	13	12
PCS Score: 3	12	9	9	6	5	6	4	7
PCS Score: 4 or more	2	1	2	2	3	2	1	1
Total (n=)	**102**	**106**	**103**	**106**	**89**	**92**	**93**	**86**

Indicator 7: **New DTP ARV Participants**

First Starts	21	24	23	17	29	20	29	21
Experienced Starts	29	29	20	39	24	36	21	41

Indicator 8: **CD4 Cell Count at ART Initiation for ARV-Naïve DTP Participants**

CD4 ≥ 500	6	9	7	7	4	10	8	11
CD4 350–499	5	7	9	2	3	5	3	3
CD4 200–349	2	2	4	5	8	4	10	2
CD4 50–199	6	3	2	2	8	0	3	3
CD4 < 50	2	3	1	1	6	0	4	1
CD4 Median (cells/μL)	*380*	*435*	*420*	*370*	*202*	*500*	*290*	*538*
Total (n=)	**21**	**24**	**23**	**17**	**29**	**19**	**28**	**20**

Indicator 9: **Active and Inactive DTP Participants**

Active DTP Participants	1438	1467	1471	1518	1541	1567	1581	1622
Inactive DTP Participants	232	230	245	228	232	230	238	233

Indicator 10: **Antiretroviral Adherence**

≥ 95%	30	12	18	13	15	17	19	14
80% to < 95%	4	6	9	7	6	4	5	4
40% to < 80%	3	4	0	5	3	5	2	1
< 40%	0	0	0	0	0	2	0	0
Total (n=)	**37**	**22**	**27**	**25**	**24**	**28**	**26**	**19**

Indicator 11: **Resistance Testing and Results**

Suppressed	949	920	1006	999	1038	1016	1121	1119
Wild Type	201	226	203	204	206	178	160	169
Never Genotyped	28	23	18	22	18	18	14	15
1-Class	37	28	27	39	35	43	31	25
2-Class	4	7	6	8	5	8	1	4
3-Class	1	2	2	3	1	1	1	2
Total (n=)	**1220**	**1206**	**1262**	**1275**	**1303**	**1264**	**1328**	**1334**

Indicator 12: **AIDS-Defining Illness**		2006	2007	2008	2009	2010	2011	2012	2013
CD4 < 200 at	Cases	47	38	52	31	33	33	25	19
ART initiation	*Rate per 100,000*	*3.2*	*2.5*	*3.4*	*2.0*	*2.1*	*2.0*	*1.5*	*1.1*
AIDS Cases	Cases	26	22	26	12	22	19	9	9
(DTP Reports)	*Rate per 100,000*	*1.8*	*1.5*	*1.7*	*0.8*	*1.4*	*1.2*	*0.5*	*0.5*
AIDS Cases	Cases	28	25	30	21	28	22	9	–
(BCCDC Reports)	*Rate per 100,000*	*1.9*	*1.7*	*1.9*	*1.3*	*1.7*	*1.3*	*0.5*	–

Indicator 13: **HIV-Related Mortality**	2004	2005	2006	2007	2008	2009	2010	2011
Fraser Health	18	26	23	21	14	10	18	13
Per 100 HIV+ Population	0.88	1.25	1.09	0.97	0.63	0.44	0.78	0.56
Per 100,000 Population	1.25	1.77	1.54	1.38	0.91	0.64	1.12	0.80