



BRITISH COLUMBIA  
CENTRE *for* EXCELLENCE  
*in* HIV/AIDS

# HIV MONITORING QUARTERLY REPORT **FOR FRASER HEALTH**

THIRD QUARTER 2016



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



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## 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, BC Vital Statistics, 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](mailto:iday@cfenet.ubc.ca).

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# 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. James Nakagawa is responsible for compiling and publishing this report. Lilith Swetland is the editor of this report. Paul Sereda, Dr. Viviane Lima and Nada Gataric perform analysis of Indicators 5–13. This report was conceived and guided by Dr. Julio Montaner.



BC Centre for Disease Control  
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**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. Olga Mazo, Theodora Consolacion and Dr. Jason Wong 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 Health Service Delivery Areas (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, 2011 Q4–2016 Q3

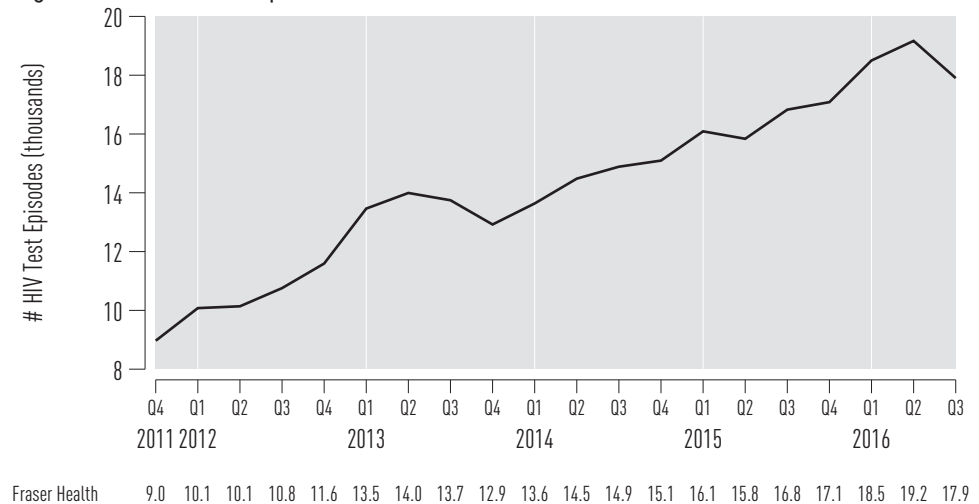


Figure 1.2 HIV Test Episodes by Gender for Fraser Health <sup>1</sup>

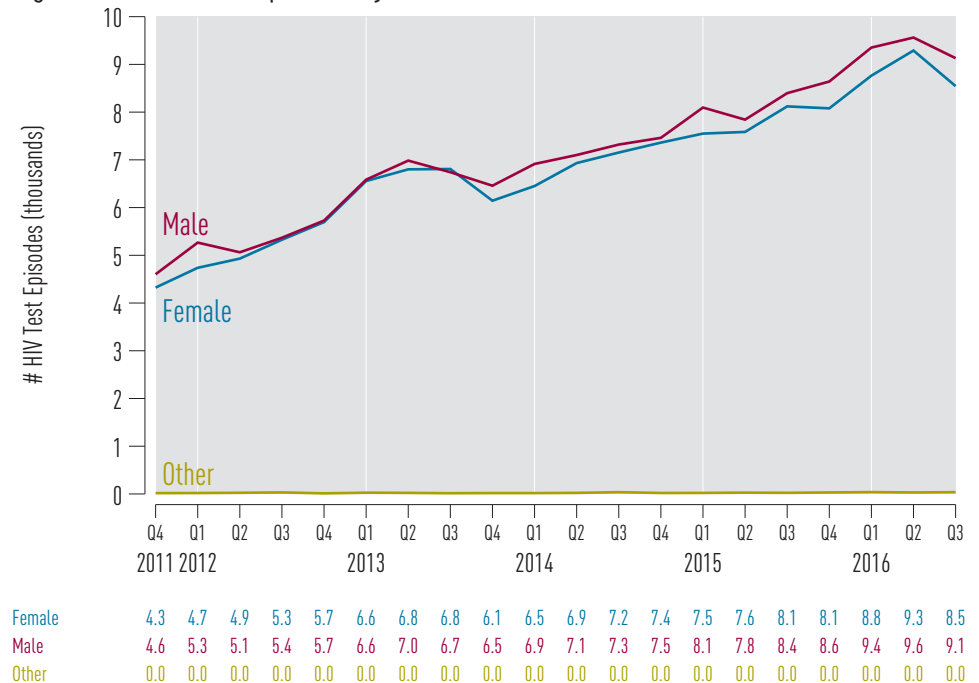


Figure 1.3 HIV Test Episodes by Age Category for Fraser Health <sup>1,2</sup>

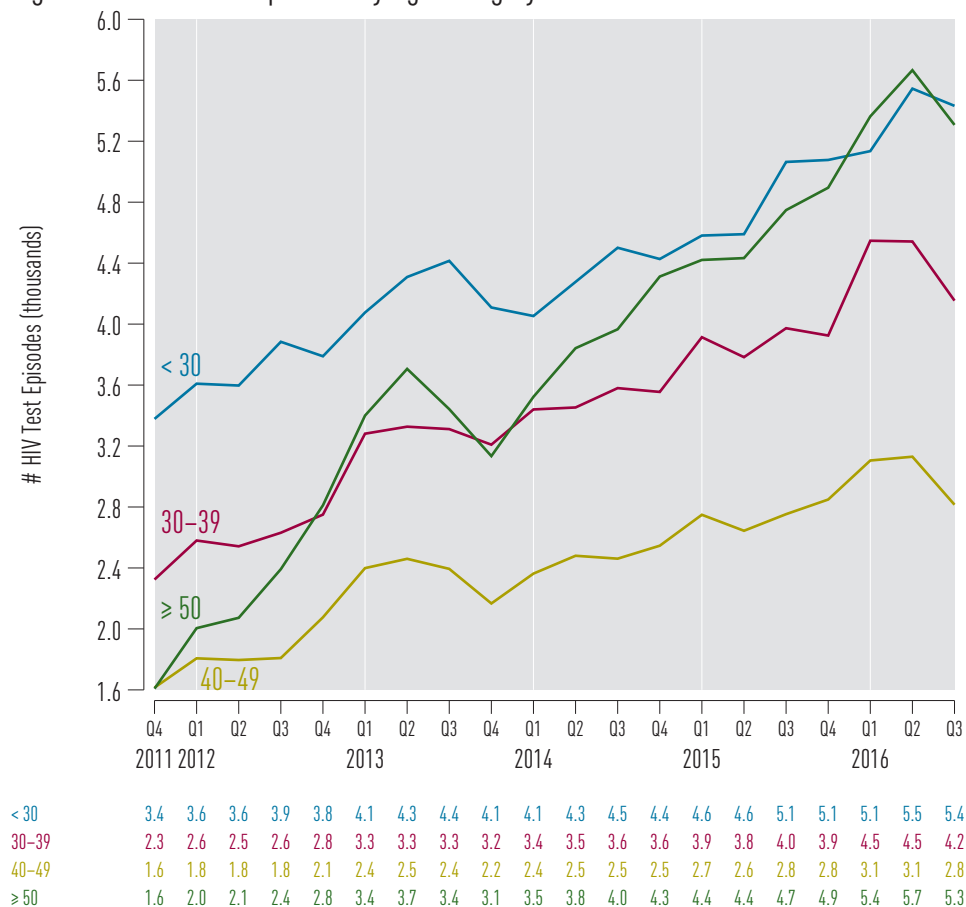
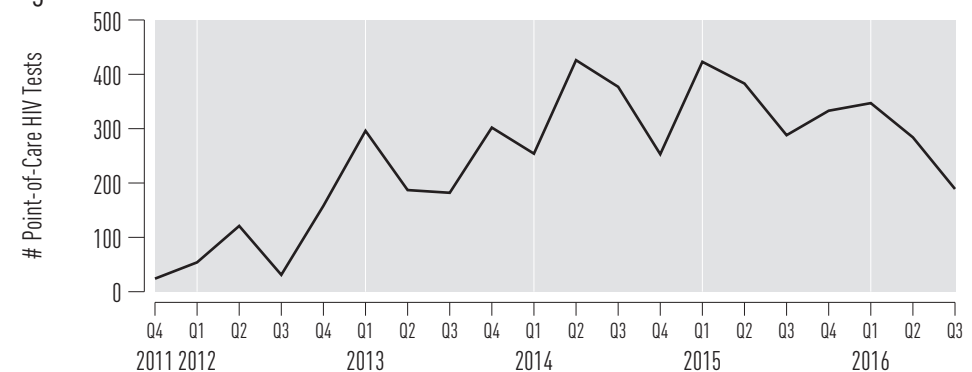


Figure 1.4 Point-of-Care HIV Tests for Fraser Health



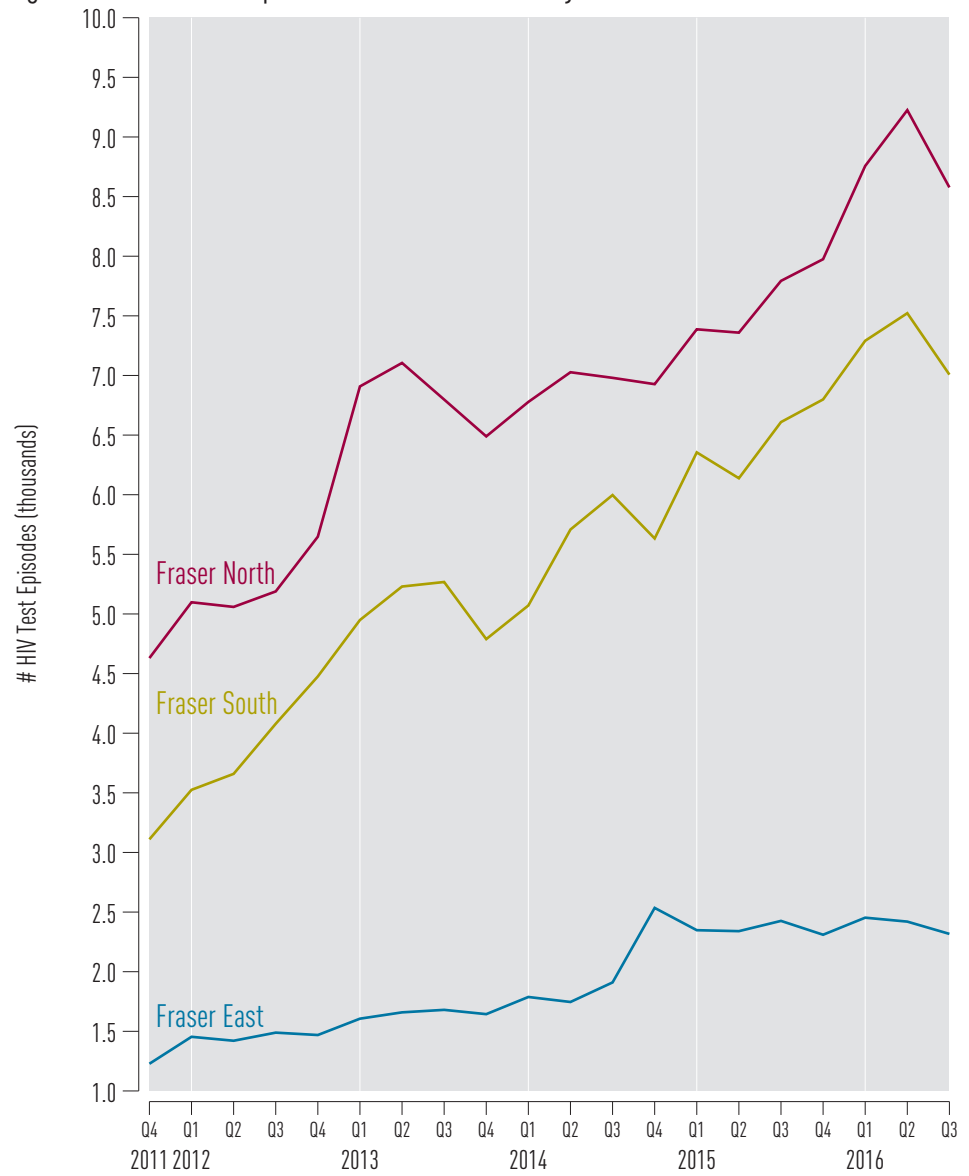
Fraser Health 24.0 54.0 121.0 31.0 158.0 296.0 187.0 182.0 302.0 254.0 426.0 377.0 253.0 423.0 383.0 288.0 333.0 347.0 284.0 189.0

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

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

2 Testing does not include point of care tests.

Figure 1.5 HIV Test Episodes for Fraser Health by HSDA, 2011 Q4–2016 Q3 <sup>1</sup>



Fraser East	1.2	1.5	1.4	1.5	1.5	1.6	1.7	1.7	1.6	1.8	1.7	1.9	2.5	2.3	2.3	2.4	2.3	2.5	2.4	2.3
Fraser North	4.6	5.1	5.1	5.2	5.6	6.9	7.1	6.8	6.5	6.8	7.0	7.0	6.9	7.4	7.4	7.8	8.0	8.8	9.2	8.6
Fraser South	3.1	3.5	3.7	4.1	4.5	4.9	5.2	5.3	4.8	5.1	5.7	6.0	5.6	6.4	6.1	6.6	6.8	7.3	7.5	7.0

Figure 1.6 HIV Test Episodes for Non-prenatal Females in Fraser Health by HSDA <sup>1</sup>

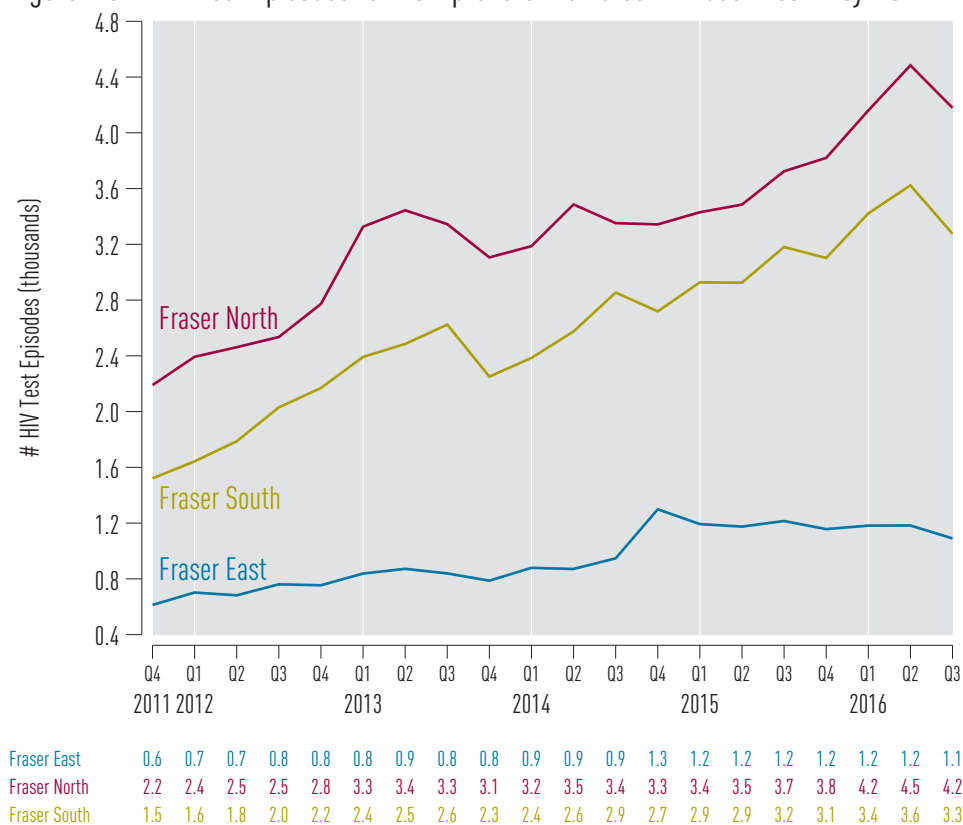
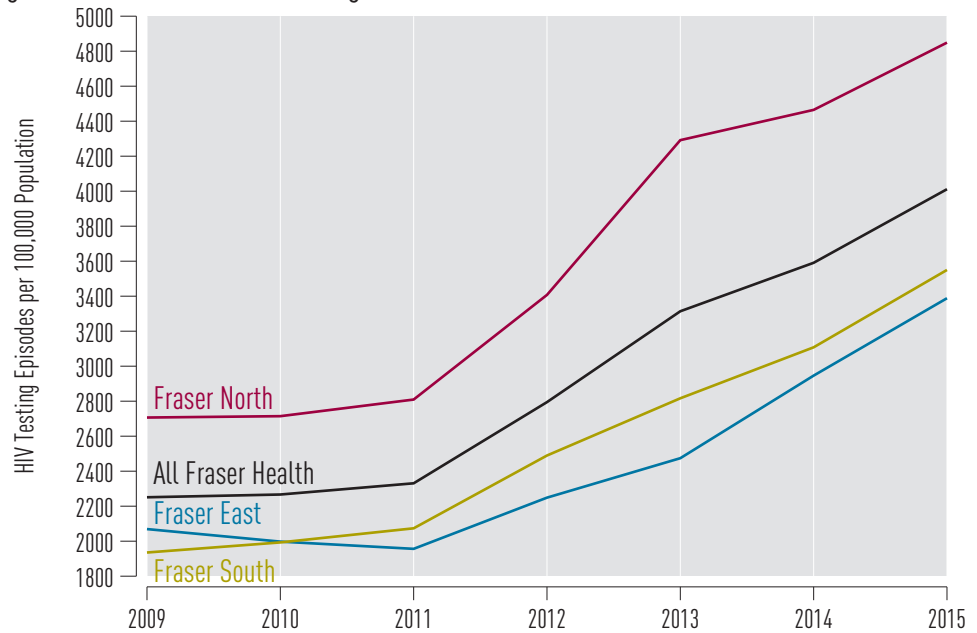


Figure 1.7 HIV Test Episodes for Males in Fraser Health by HSDA <sup>1</sup>



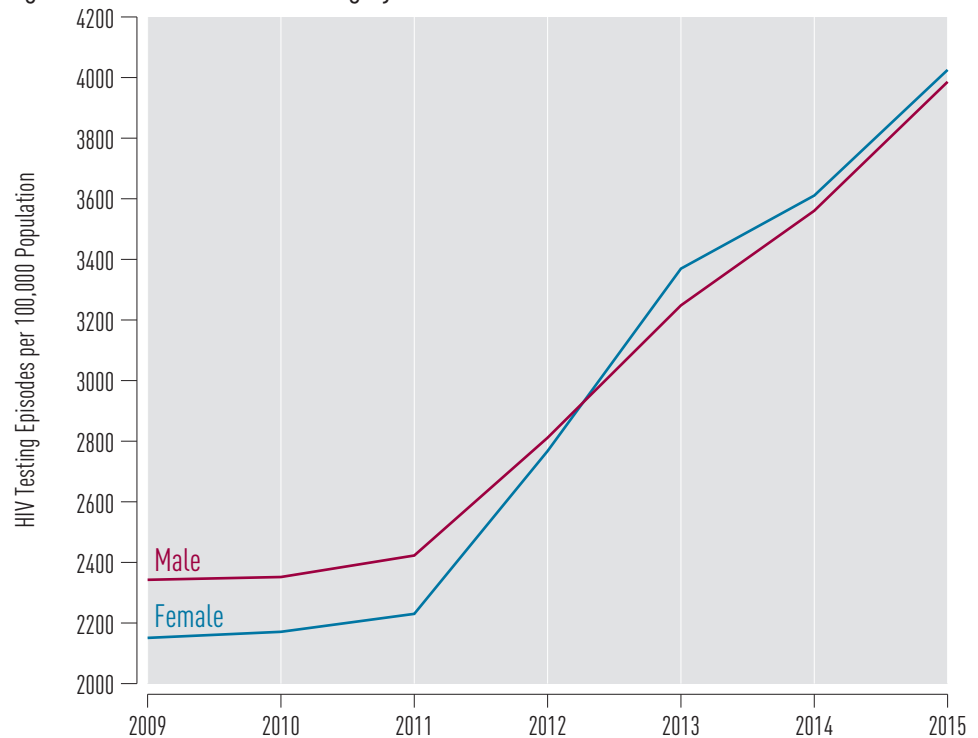
## Indicator 2. HIV Testing Rates

Figure 2.1 Rate of HIV Testing for Fraser Health and HSDAs <sup>2</sup>



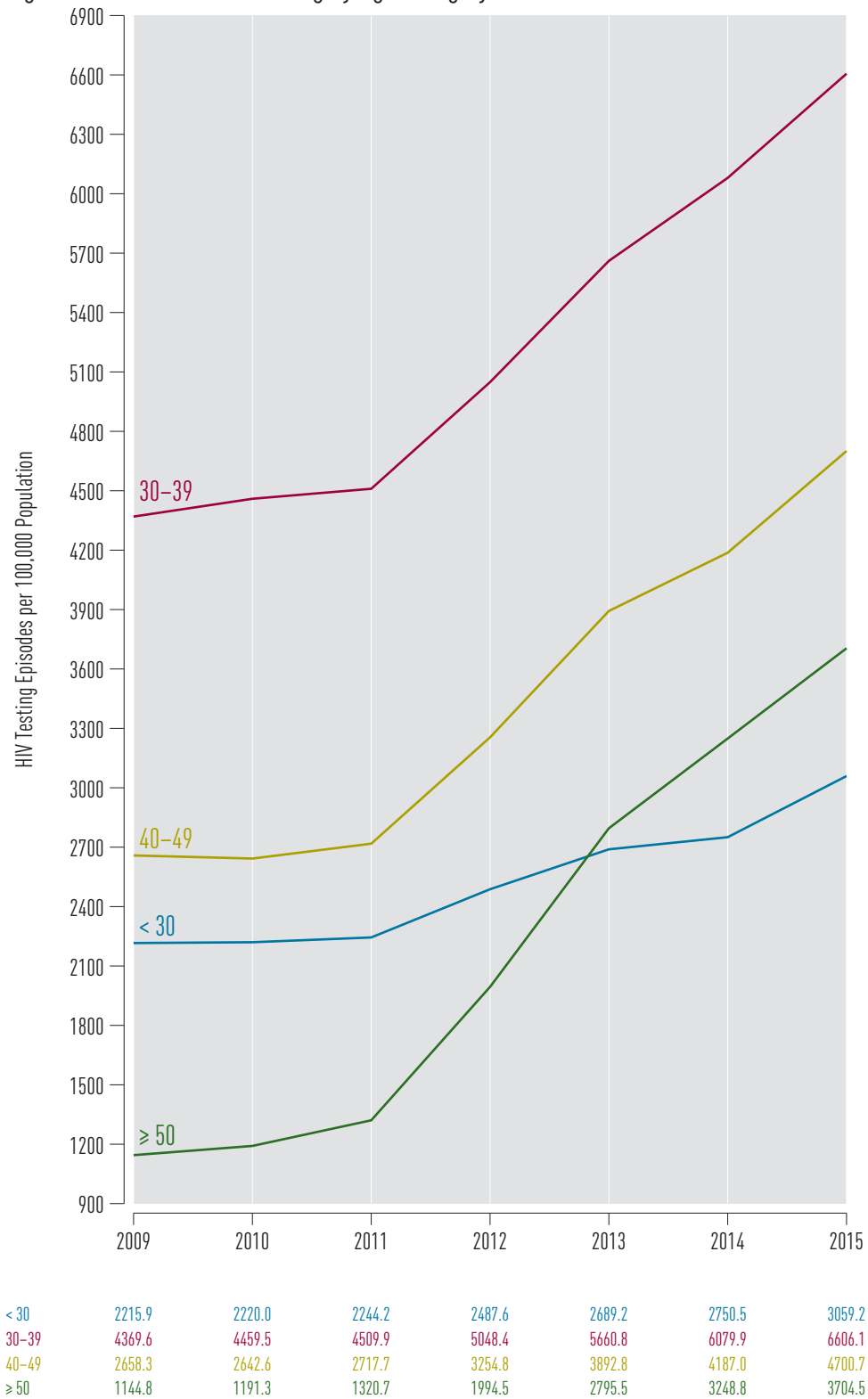
All Fraser Health	2251.0	2266.7	2330.8	2794.7	3313.9	3590.9	4011.4
Fraser East	2069.2	1997.6	1956.3	2248.8	2474.3	2946.2	3388.4
Fraser North	2706.6	2714.4	2809.4	3407.4	4291.7	4464.7	4849.0
Fraser South	1935.3	1993.0	2073.6	2489.6	2816.6	3107.9	3550.0

Figure 2.2 Rate of HIV Testing by Gender for Fraser Health <sup>2</sup>



Female	2150.9	2171.0	2230.2	2767.6	3369.4	3610.7	4025.3
Male	2342.6	2351.8	2422.8	2811.5	3248.2	3560.5	3985.9

Figure 2.3 Rate of HIV Testing by Age Category for Fraser Health <sup>2</sup>



<sup>2</sup> 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 <sup>3</sup>

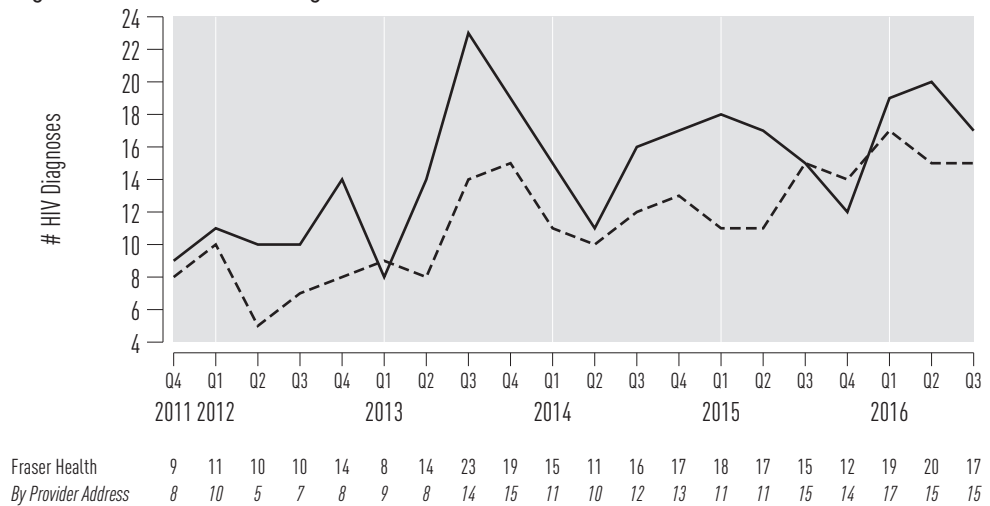
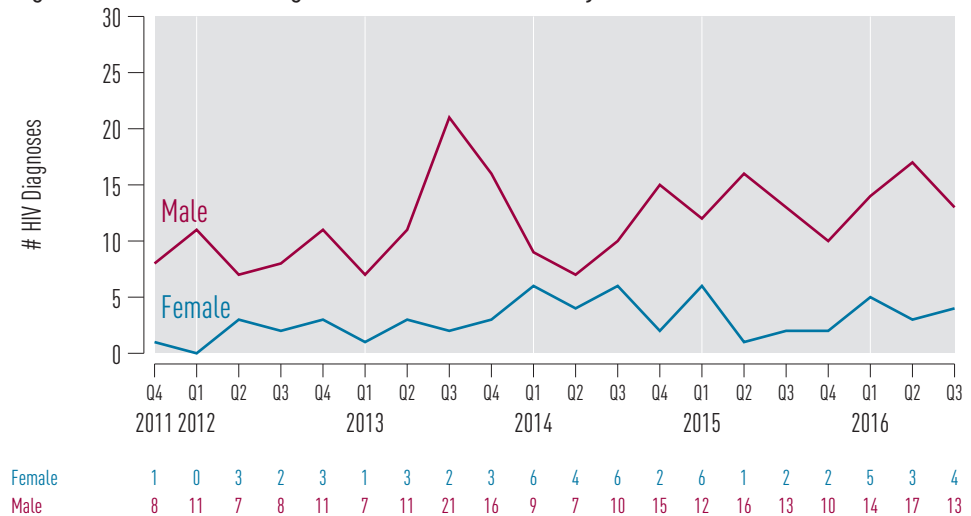


Figure 3.2 New HIV Diagnoses for Fraser Health by Gender <sup>3</sup>



<sup>3</sup> Data Source: BCCDC. When present, "By Provider Address" is graphed as dashed line in same colour.



Figure 3.3 New HIV Diagnoses for Fraser Health by Age Category<sup>3</sup>

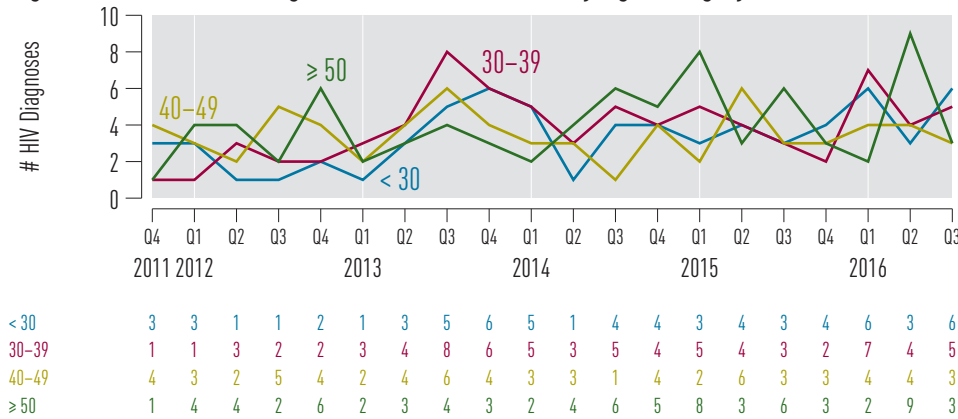


Figure 3.4 New HIV Diagnoses for Fraser Health by Exposure Category<sup>3,4</sup>

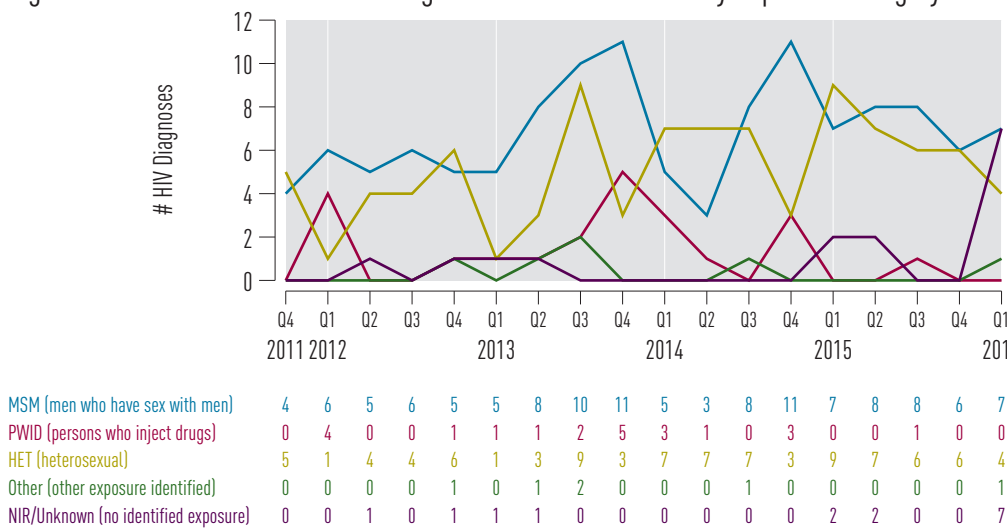
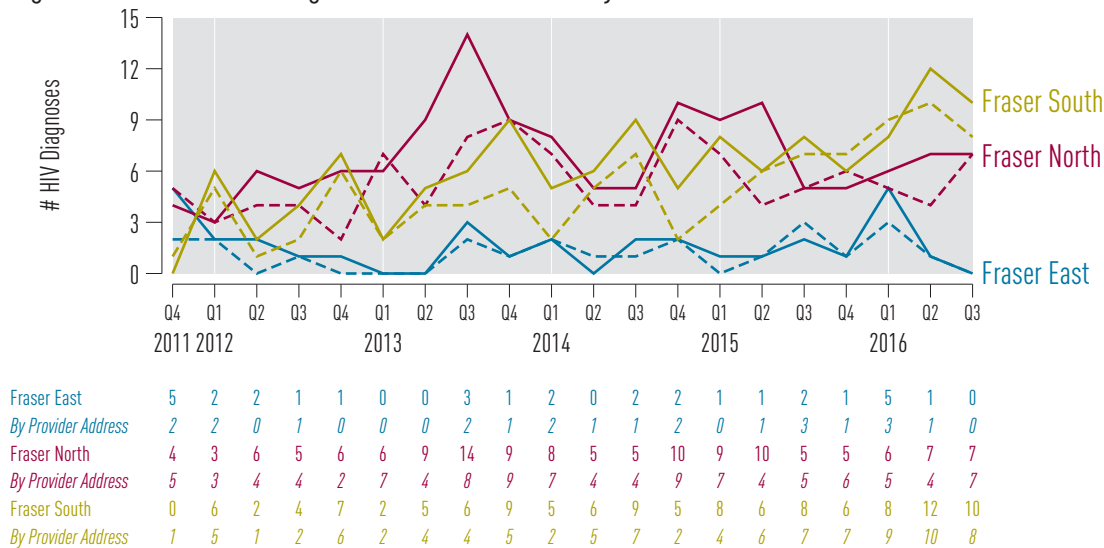


Figure 3.5 New HIV Diagnoses for Fraser Health by HSDA<sup>3</sup>



<sup>3</sup> Data Source: BCCDC. When present, "By Provider Address" is graphed as dashed line in same colour.

<sup>4</sup> MSM=men who have sex with men; PWID=people who inject drugs; 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 and laboratory results suggestive of acute HIV infection (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 <i>and</i>	CD4 ≥500
2a		CD4 350–499
2b		CD4 200–349
3		CD4 <200
Unknown		No available CD4

Updated 2016 Q1: AIDS diagnosis date is no longer used in this indicator.

Updated 2016 Q1: AIDS diagnosis date is no longer used in this indicator.

Figure 4.1 Stage of HIV Infection at Diagnosis for Fraser Health, 2011–2015<sup>5</sup>

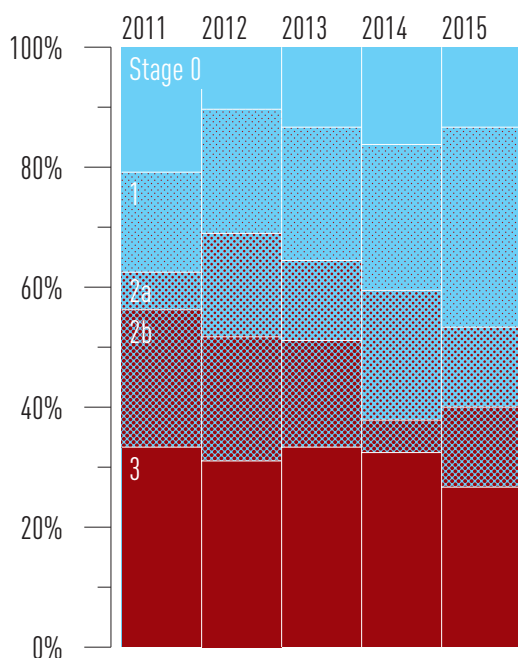
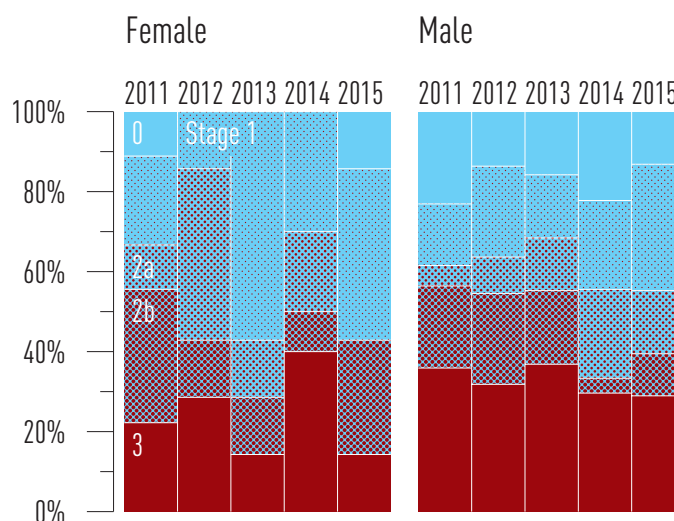


Figure 4.2 Stage of HIV Infection at Diagnosis by Gender for Fraser Health, 2011–2015<sup>5</sup>



	Fraser Health					Female					Male				
	2011	'12	'13	'14	'15	'11	'12	'13	'14	'15	'11	'12	'13	'14	'15
Stage 0	10	3	6	6	6	1	0	0	0	1	9	3	6	6	5
Stage 1	8	6	10	9	15	2	1	4	3	3	6	5	6	6	12
Stage 2a	3	5	6	8	6	1	3	1	2	0	2	2	5	6	6
Stage 2b	11	6	8	2	6	3	1	1	1	2	8	5	7	1	4
Stage 3	16	9	15	12	12	2	2	1	4	1	14	7	14	8	11
Unknown	1	2	2	10	7	1	0	0	4	1	0	2	2	6	6
Total (n=)	49	31	47	47	52	10	7	7	14	8	39	24	40	33	44

Figure 4.3 Stage of HIV Infection at Diagnosis by Age Category for Fraser Health, 2011–2015 <sup>5</sup>

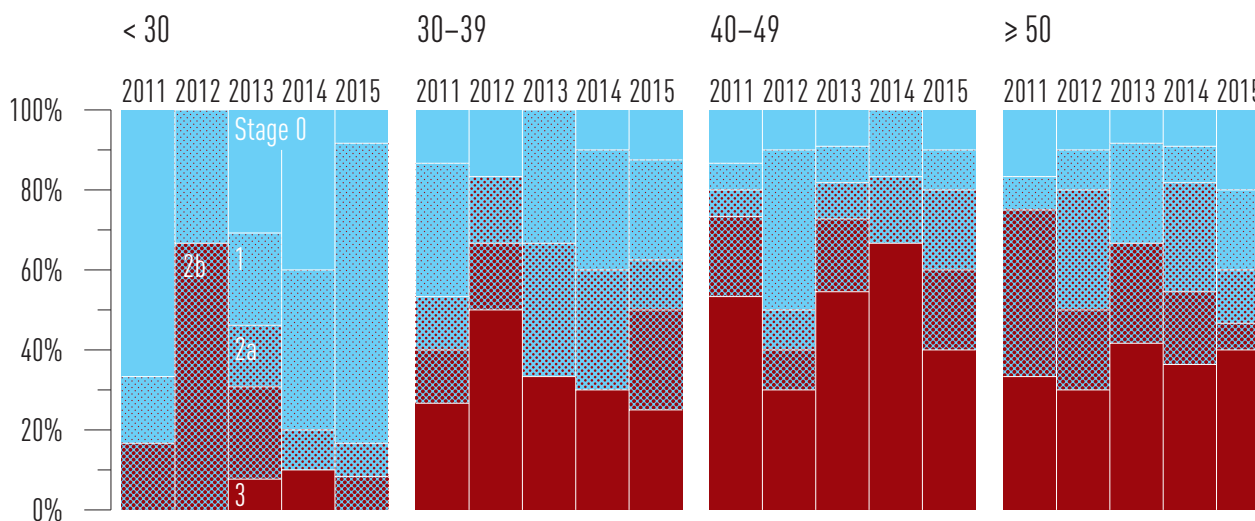
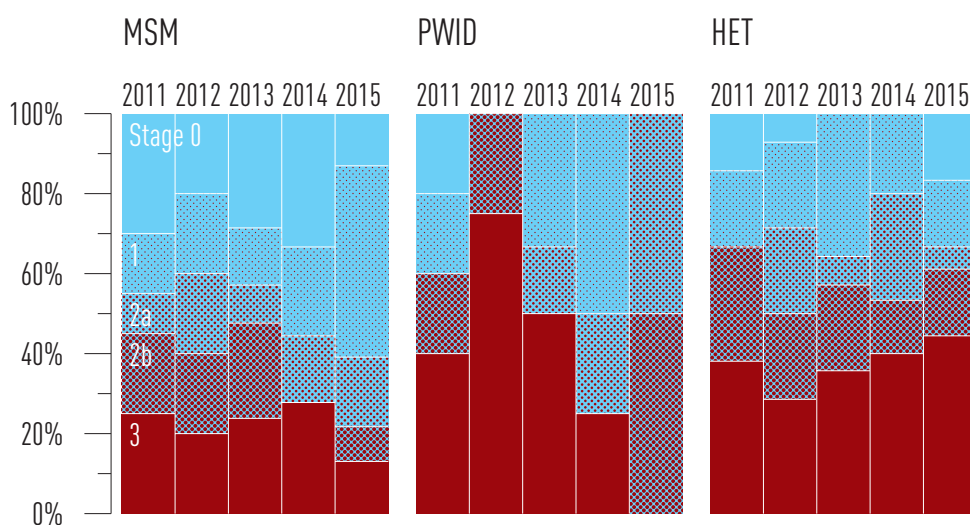


Figure 4.4 Stage of HIV Infection at Diagnosis by Exposure Category for Fraser Health, 2011–2015 <sup>5,6</sup>



	< 30 years					30–39 years					40–49 years					≥ 50 years					MSM					PWID					Heterosexual					Other					NIR/Unknown							
	2011	12	13	14	15	11	12	13	14	15	11	12	13	14	15	11	12	13	14	15	11	12	13	14	15	11	12	13	14	15	11	12	13	14	15	11	12	13	14	15	11	12	13	14	15			
Stage 0	4	0	4	4	1	2	1	0	1	1	2	1	1	0	1	2	1	1	1	3	6	2	6	6	3	1	0	0	0	0	3	1	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	
Stage 1	1	1	3	4	9	5	0	3	3	2	1	4	1	1	1	1	1	3	1	3	3	2	3	4	11	1	0	2	2	0	4	3	5	3	3	0	1	0	0	0	0	0	0	0	0	1		
Stage 2a	0	0	2	1	1	2	1	3	3	1	1	1	1	1	2	0	3	0	3	2	2	2	2	3	4	0	0	0	1	1	0	3	1	4	1	1	0	2	0	0	0	0	0	0	0	0		
Stage 2b	1	2	3	0	1	2	1	0	0	2	3	1	2	0	2	5	2	3	2	1	4	2	5	0	2	1	1	0	0	1	6	3	3	2	3	0	0	0	0	0	0	0	0	0	0	0	0	
Stage 3	0	0	1	1	0	4	3	3	3	2	8	3	6	4	4	4	3	5	4	6	5	2	5	5	3	2	3	3	1	0	8	4	5	6	8	1	0	1	0	0	0	0	1	0	1	0	1	
Unknown	1	1	0	2	0	0	0	0	2	2	0	1	2	5	4	0	0	0	1	1	0	1	0	4	3	0	0	0	0	2	0	1	0	2	4	4	0	0	0	0	0	0	0	0	1	0	0	0
Total (n=)	7	4	13	12	12	15	6	9	12	10	15	11	13	11	14	12	10	12	12	16	20	11	21	22	26	5	4	6	6	2	22	14	16	19	22	2	1	3	0	0	0	1	1	0	2			

<sup>5</sup> Data Source: BCCDC

<sup>6</sup> MSM=men who have sex with men; PWID=people who inject drugs; HET=heterosexual. NIR=No identified risk/exposure.

# HIV Cascade of Care

## 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. Linked to HIV care, 3. Retained in HIV care, 4. On ART, 5. Adherent to ART and 6. Achieving a suppressed VL; collectively, they are referred to as the cascade of care. Attrition 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 (i.e. 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 period 2015 Q4–2016 Q3 in Fraser Health and stratified by sex and age.

Figure 5.1 Estimated Cascade of Care for Fraser Health, Year Ending 2016 Q3 <sup>7</sup>

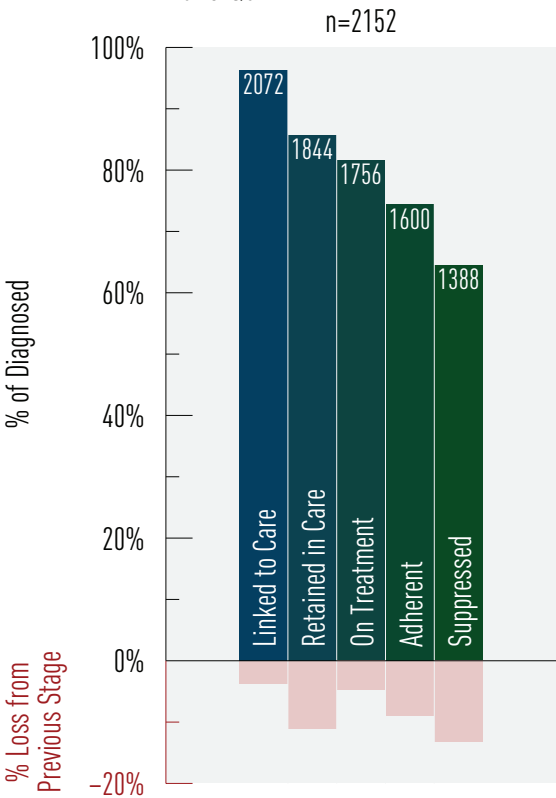
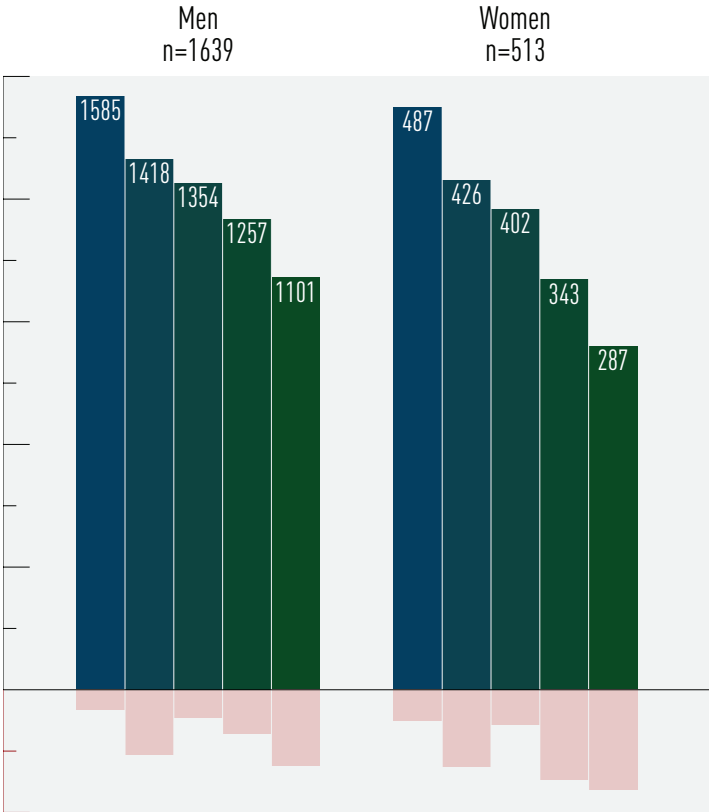


Figure 5.2 Estimated Cascade of Care for Fraser Health by Gender, Year Ending 2016 Q3 <sup>7</sup>



<sup>7</sup> Data is for the period 2015 Q4–2016 Q3.

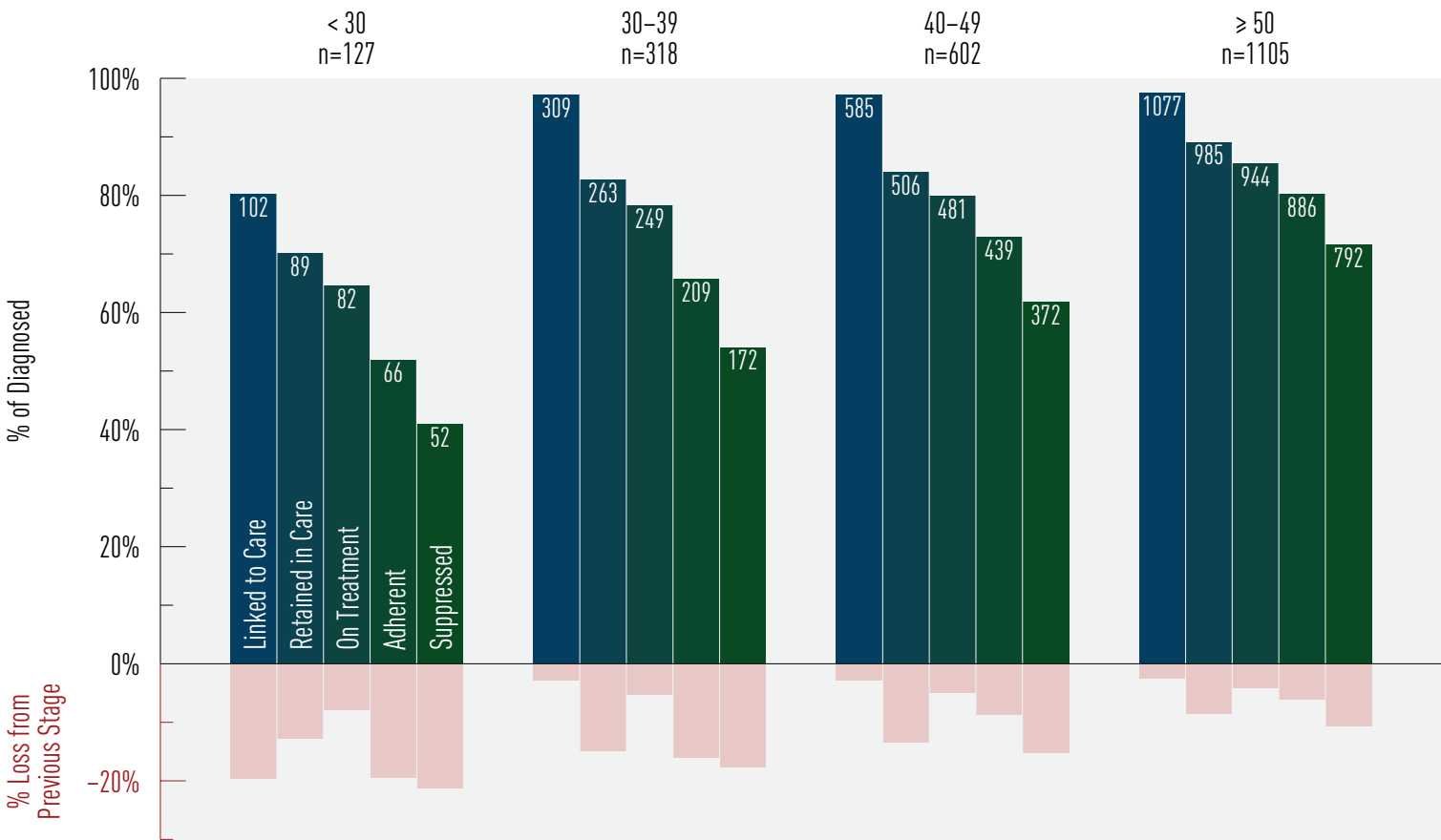
Data Sources:

- i British Columbia Centre for Excellence Drug Treatment Program (DTP) Database (ARV use, VL and CD4 count).
- ii 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.

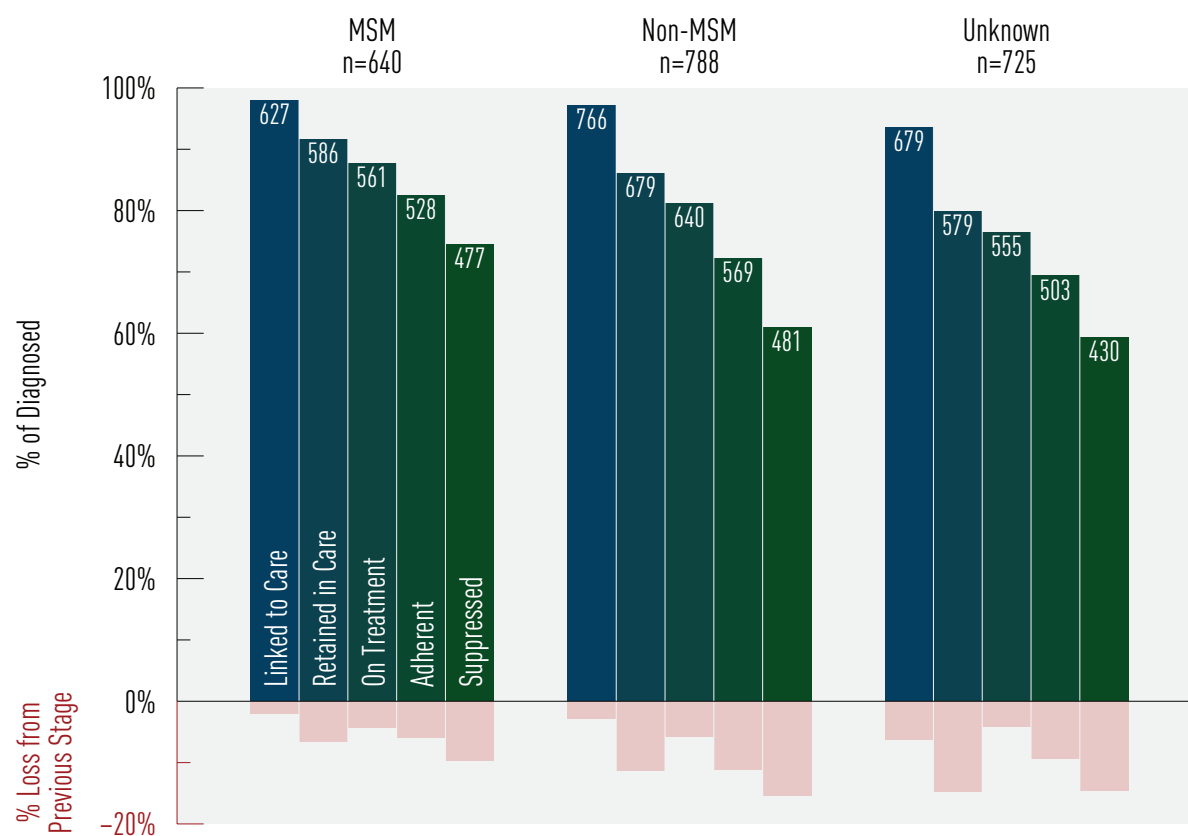
NB: Transgender have been assigned to their biological sex.

Figure 5.3      Estimated Cascade of Care for Fraser Health by Age Category, Year Ending 2016 Q3 <sup>8</sup>



<sup>8</sup> Data is for the period 2015 Q4–2016 Q3.  
Data Sources:  
i British Columbia Centre for Excellence Drug Treatment Program (DTP) Database (ARV use, VL and CD4 count).  
ii 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 2016 Q3 <sup>9</sup>



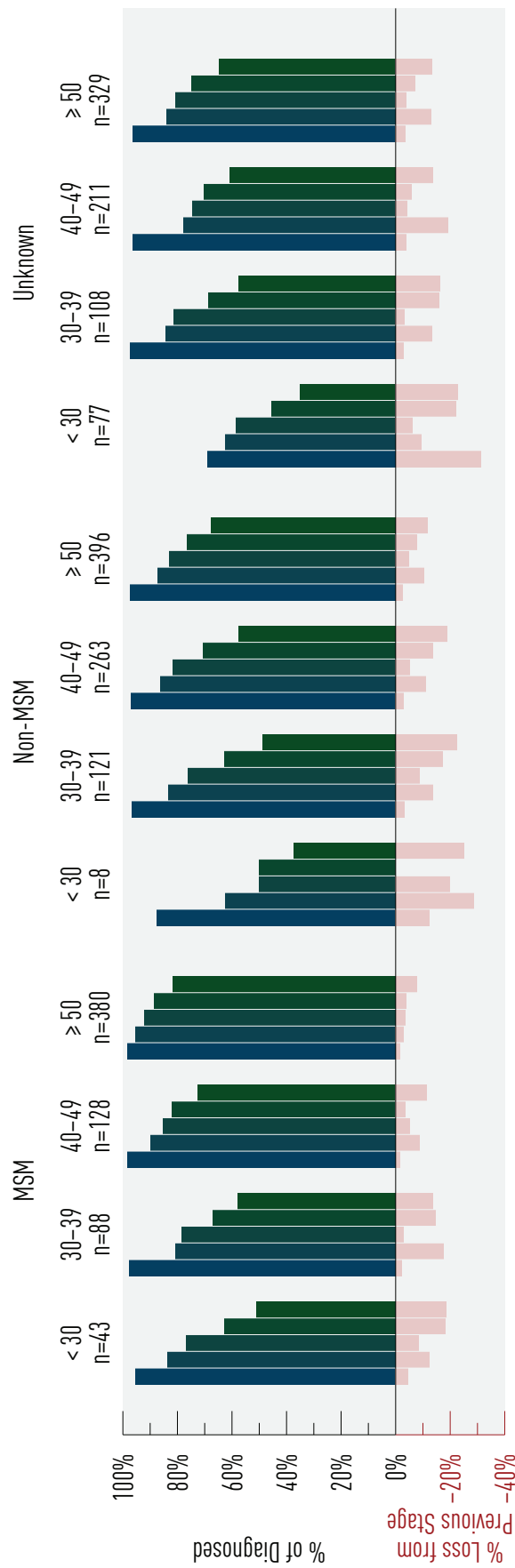
<sup>9</sup> Data is for the period 2015 Q4–2016 Q3.

Data Sources:

- i British Columbia Centre for Excellence Drug Treatment Program (DTP) Database (ARV use, VL and CD4 count).
- ii 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 2016 Q3 <sup>9</sup>



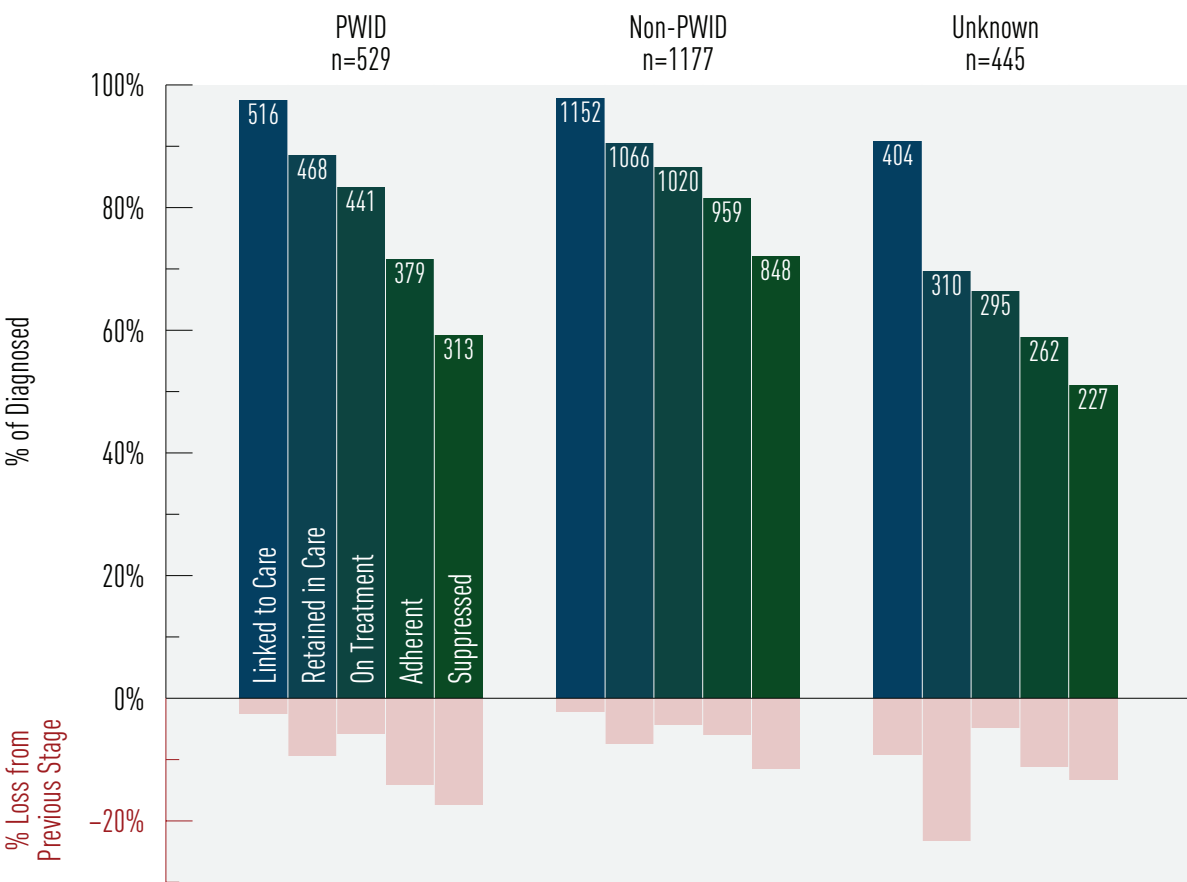
<sup>9</sup> Data is for the period 2015 Q4–2016 Q3.

Data Sources:

- i British Columbia Centre for Excellence Drug Treatment Program (DTP) Database (ARV use, VL and CD4 count).
- ii 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.

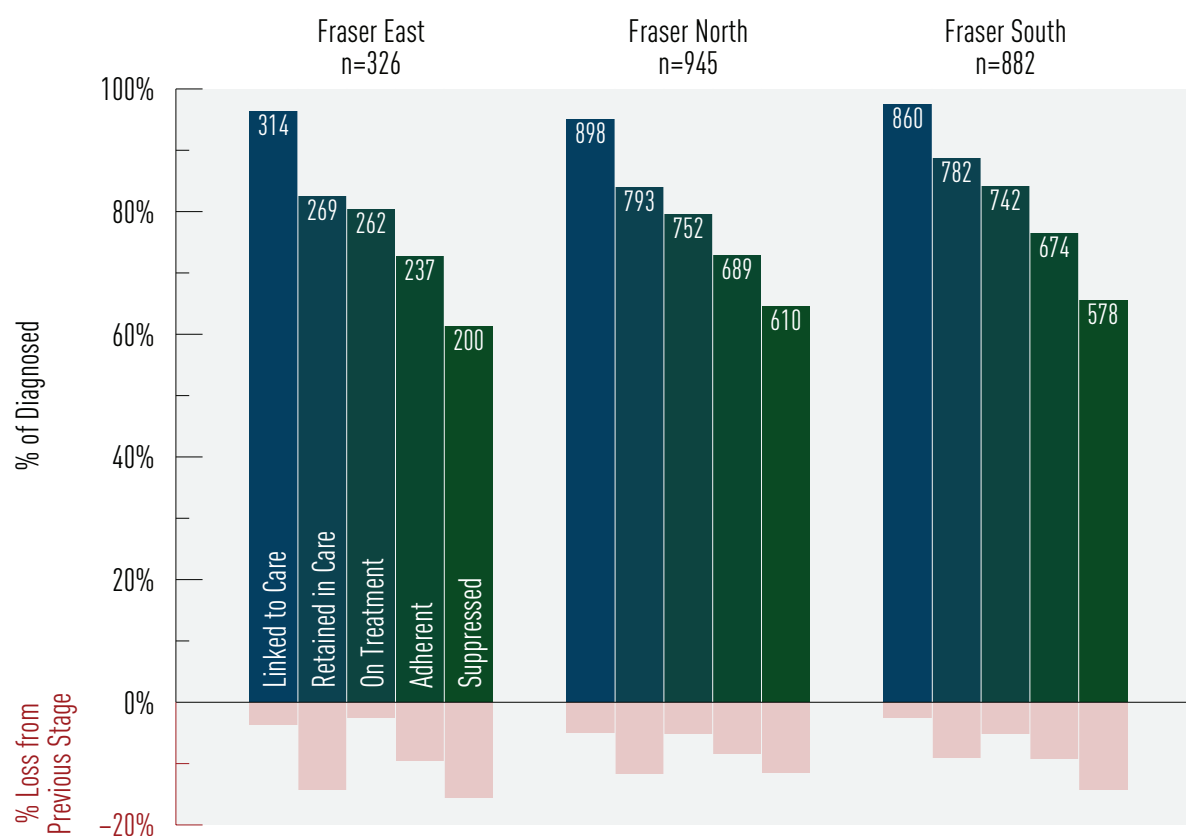
Figure 5.6 Estimated Cascade of Care for Fraser Health by PWID Status, Year Ending 2016 Q3 <sup>9</sup>



<sup>9</sup> Data is for the period 2015 Q4–2016 Q3.  
 Data Sources:  
 i British Columbia Centre for Excellence Drug Treatment Program (DTP) Database (ARV use, VL and CD4 count).  
 ii 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 2016 Q3 <sup>9</sup>



<sup>9</sup> Data is for the period 2015 Q4–2016 Q3.

Data Sources:

- i British Columbia Centre for Excellence Drug Treatment Program (DTP) Database (ARV use, VL and CD4 count).
- ii 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.

# Programmatic Compliance Score

## Indicator 6. 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 2 provides mortality, immunologic failure and virologic failure probabilities for given PCS scores. We interpret an individual with a  $PCS \geq 4$  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/ $\mu$ L; 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. 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, 2014 Q4–2016 Q3 <sup>10</sup>

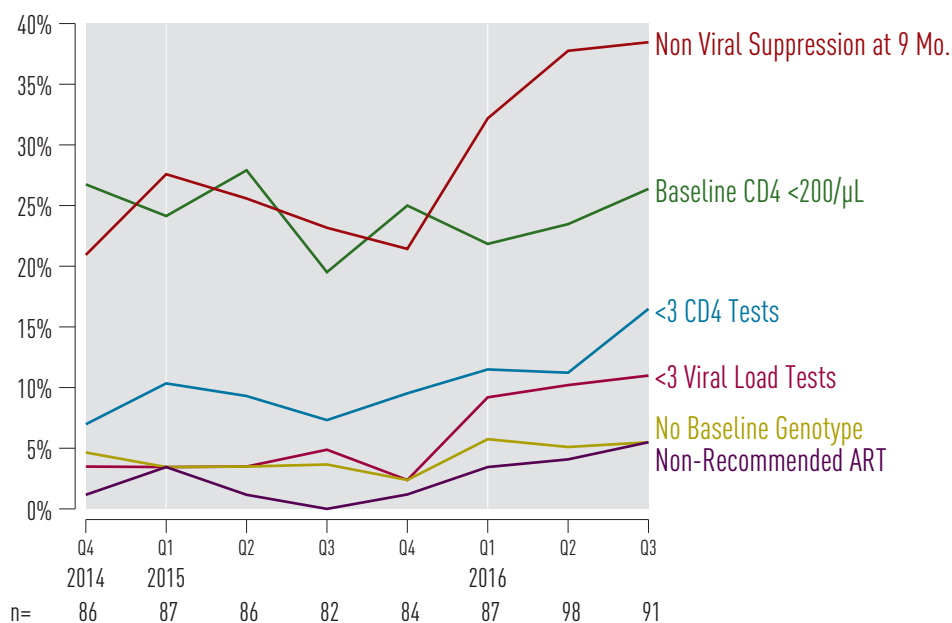
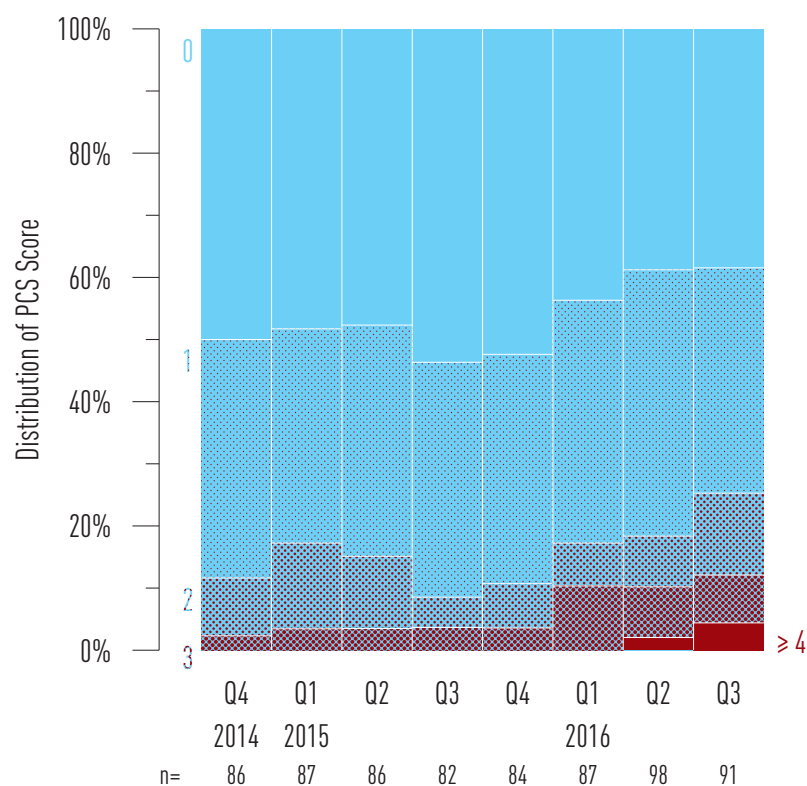


Figure 6.2 Historical Trends for PCS Score for Fraser Health, 2014 Q4–2016 Q3 <sup>10,11</sup>



<sup>10</sup> Data Source: British Columbia Centre for Excellence Drug Treatment Program (DTP) Database. Limitations: CD4 cell count capture is approximately 80%.

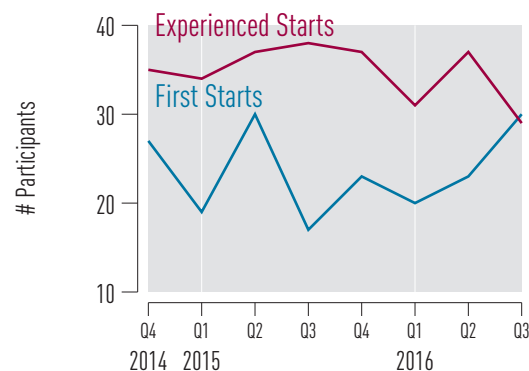
<sup>11</sup> Each quarter's data is calculated as the sum of the 4 quarters leading up to it. e.g. 2013 Q1 is calculated from 2012 Q2 – 2013 Q1. NB: A score of 0 is the best score and a score of 4 or more is the worst score.

# 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.

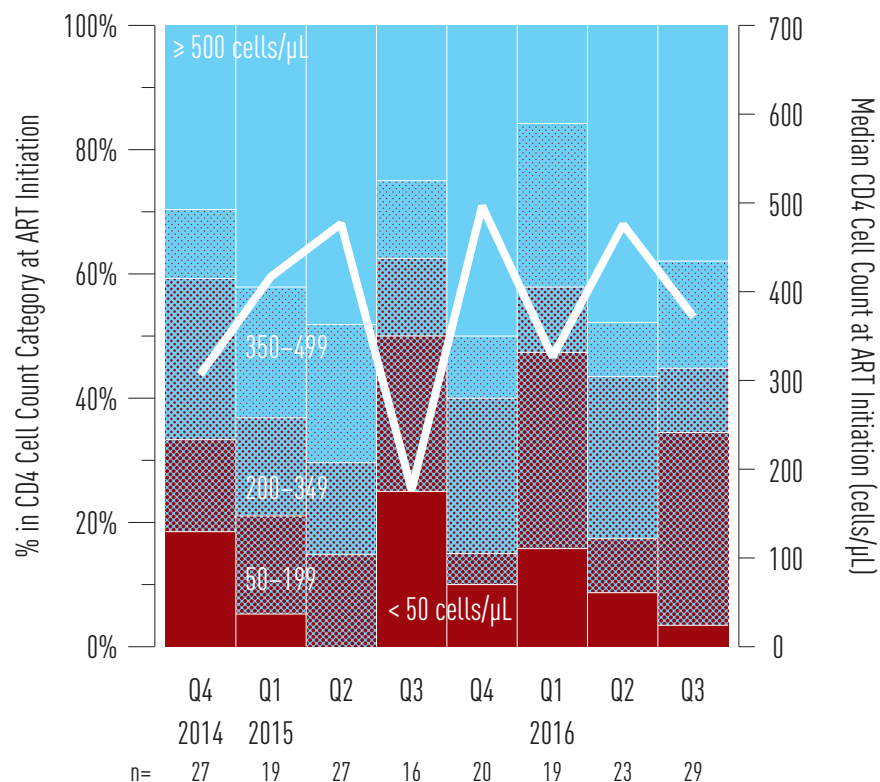
## Indicator 7. New Antiretroviral Therapy Starts in Fraser Health

Figure 7 BC-CfE Drug Treatment Program Enrollment: New ART Participants in Fraser Health, 2014 Q4–2016 Q3 <sup>12</sup>



## Indicator 8. CD4 Cell Count at ART Initiation

Figure 8 CD4 Cell Count at ART Initiation of ART-Naïve DTP Participants in Fraser Health, 2014 Q4–2016 Q3 <sup>13</sup>



<sup>12</sup> Data Source: Drug Treatment Program Database  
Limitation: DTP participants are designated to an HA based on most current residence provided by the participant.

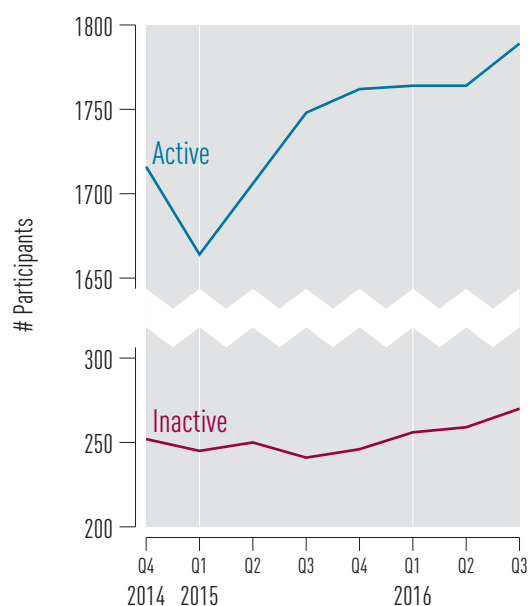
<sup>13</sup> Data Source: Drug Treatment Program Database  
Limitations: CD4 cell count data is approximately 80% complete.

## Indicator 9. Active and Inactive DTP Participants

Table 3. Distribution of People on ART for Fraser Health, 2016 Q3 <sup>14</sup>

Age	< 30	83
	30–39	265
	40–49	512
	≥ 50	929
Gender	Male	1391
	Female	398
Exposure	MSM	582
	PWID	440
Total		1789

Figure 9 Active and Inactive DTP Participants for Fraser Health, 2014 Q4–2016 Q3 <sup>15</sup>



<sup>14</sup> Data Source: Drug Treatment Program Database

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

Definition:

'On antiretroviral therapy' defined as being on treatment in the current quarter

<sup>15</sup> Active DTP participants: An individual who has had medication prescribed at least once in the preceding quarter.

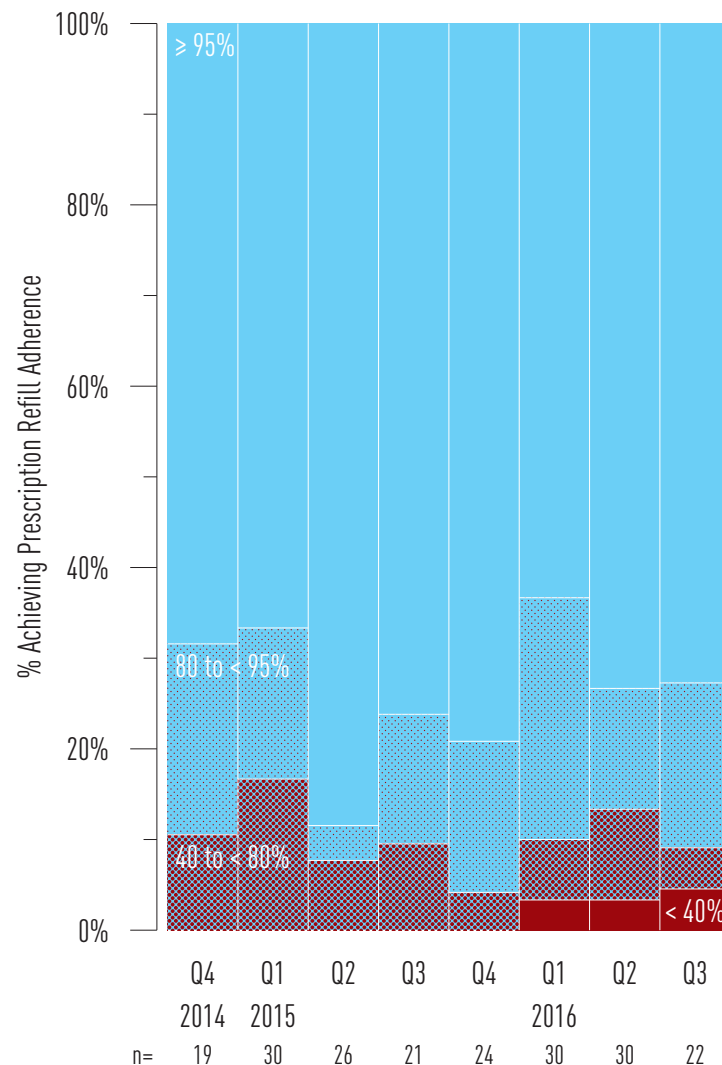
Inactive DTP participants: Persons no longer prescribed drugs through the HIV/AIDS Drug Treatment Program in the last quarter.

# 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.  $\geq 95\%$ ) to increase with time. Furthermore, it is important that trends in the proportion of ART users achieving prescription refill adherence of  $\geq 95\%$  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, 2014 Q4–2016 Q3 <sup>16</sup>



<sup>16</sup> Data Source: Drug Treatment Program Database

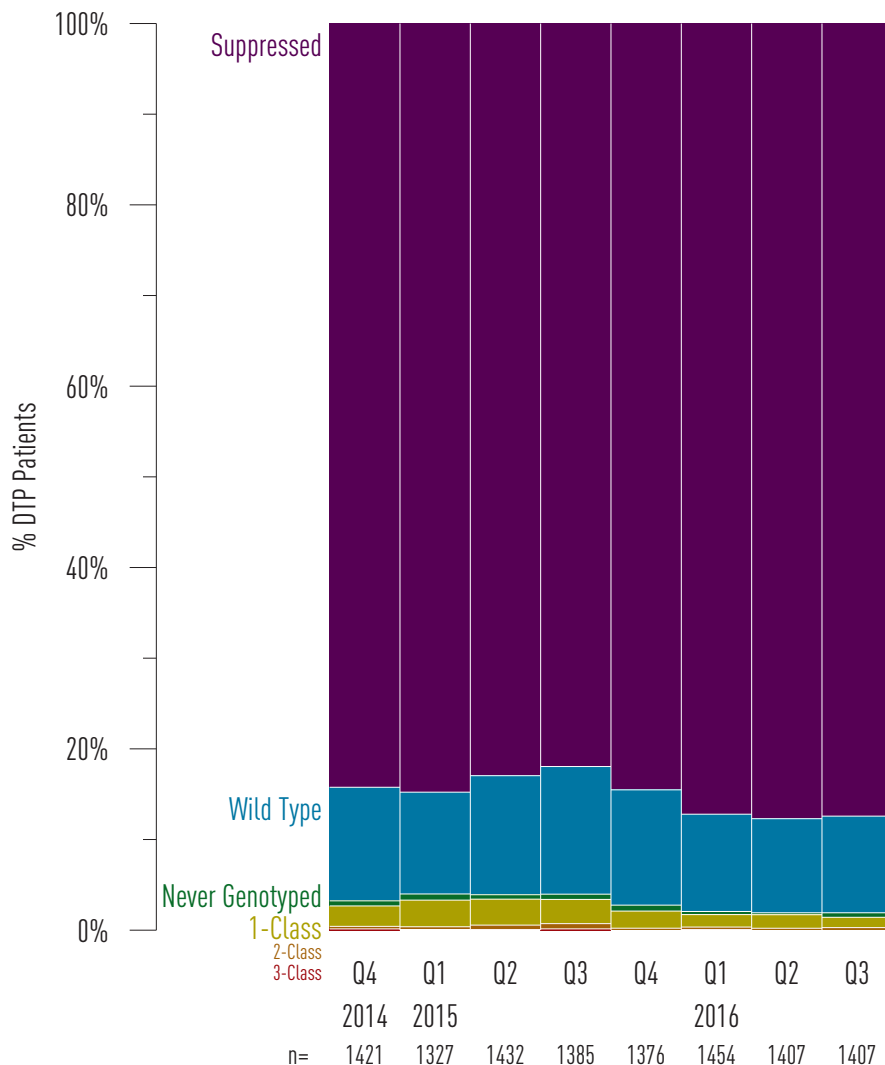
Limitation: Prescription refill adherence is used as a proxy for patient adherence.

# Resistance Testing and Results

## 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, three, or four** 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, 2014 Q4–2016 Q3 <sup>17</sup>



<sup>17</sup> Data Source: Drug Treatment Program Database

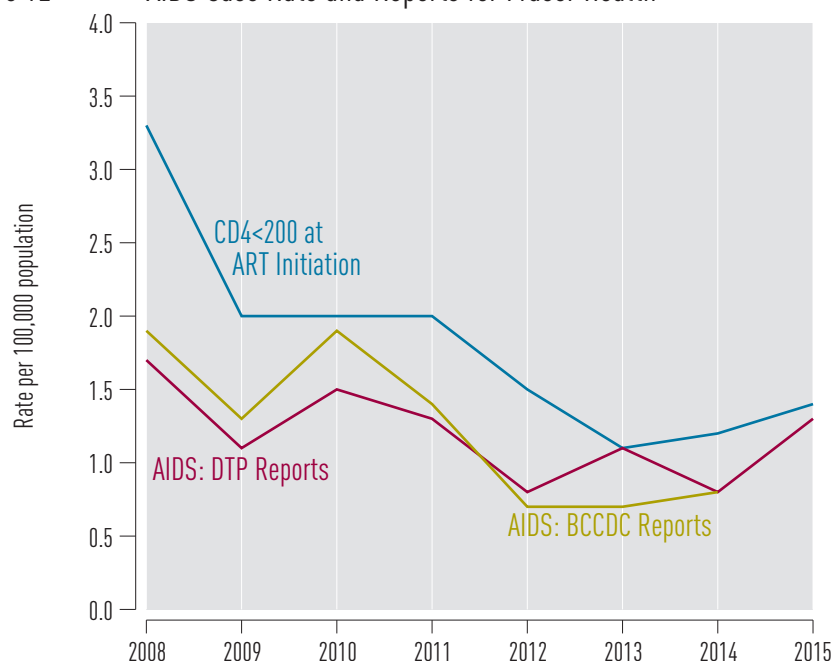
Limitation: DTP participants are designated to a HA based on most current residence provided by the participant.

# AIDS-Defining Illness

## 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 <sup>18</sup>



CD4<200 at ART initiation

CASES  
PER 100K

51 31 33 33 25 19 21 25  
3.3 2.0 2.0 2.0 1.5 1.1 1.2 1.4

AIDS: DTP Reports

CASES  
PER 100K

26 17 24 22 14 19 13 23  
1.7 1.1 1.5 1.3 0.8 1.1 0.8 1.3

AIDS: BCCDC Reports

CASES  
PER 100K

30 21 30 23 12 11 13 -  
1.9 1.3 1.9 1.4 0.7 0.6 0.8 -

<sup>18</sup> Data Source: DTP AIDS cases are obtained from the Drug Treatment Program Database; BCCDC AIDS cases are obtained from the BC-CDC; CD4<200 at ART initiation data came from the DTP database. Indicator 12 also reflects information from BC Vital Statistics. As this information is made available to BC-CFE, we use it to inform the development and refinement of this indicator.

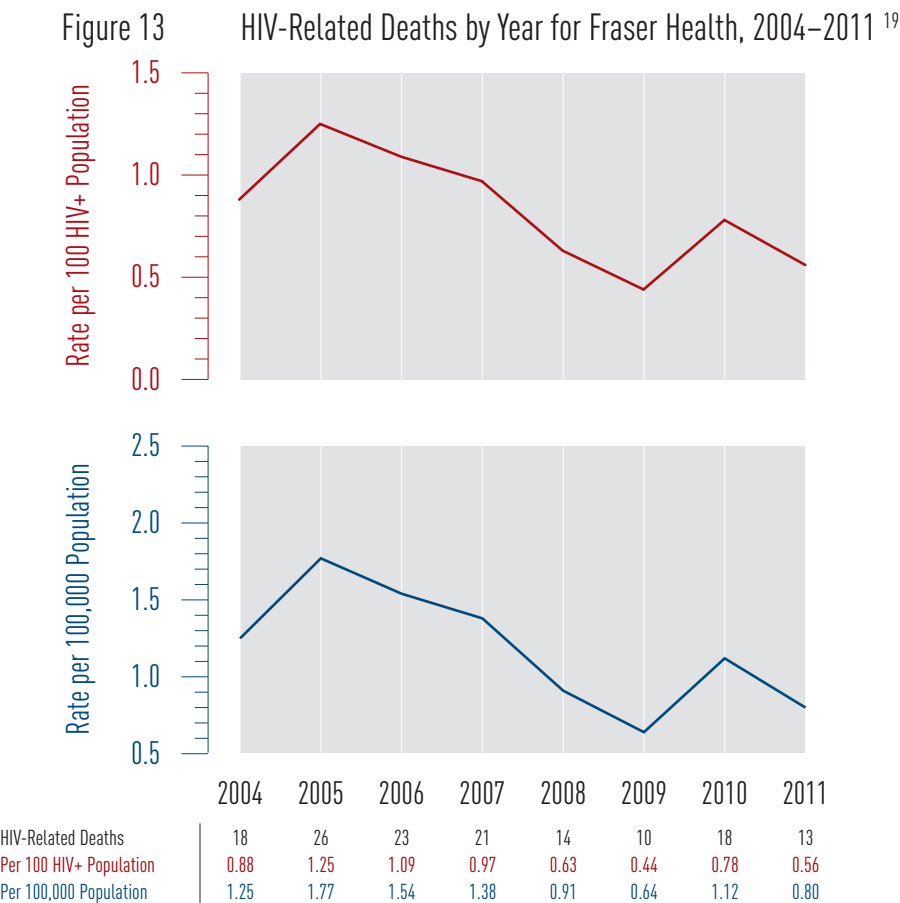
**Limitation:** AIDS case reporting was investigated using 3 definitions: First, using AIDS cases reported in AIDS case report forms from the DTP; Second, using AIDS cases reported via the BCCDC and third, using a CD4 cell count of <200 cells/μL at time of ART initiation using DTP data. AIDS case reporting 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.



# HIV-Related Mortality

## 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.



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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.

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## APPENDICES

Indicator 1: Test Episodes (thousands)		2012				2013				2014				2015				2016			
		Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3
Fraser Health		9.0	10.1	10.1	10.8	11.6	13.5	14.0	13.7	12.9	13.6	14.5	14.9	15.1	16.1	15.8	16.8	17.1	18.5	19.2	17.9
Gender	Female	4.3	4.7	4.9	5.3	5.7	6.6	6.8	6.8	6.1	6.5	6.9	7.2	7.4	7.5	7.6	8.1	8.1	8.8	9.3	8.5
	Male	4.6	5.3	5.1	5.4	5.7	6.6	7.0	6.7	6.5	6.9	7.1	7.3	7.5	8.1	7.8	8.4	8.6	9.4	9.6	9.1
	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
Age	< 30	3.4	3.6	3.6	3.9	3.8	4.1	4.3	4.4	4.1	4.1	4.3	4.5	4.4	4.6	4.6	5.1	5.1	5.1	5.5	5.4
	30–39	2.3	2.6	2.5	2.6	2.8	3.3	3.3	3.3	3.2	3.4	3.5	3.6	3.6	3.9	3.8	4.0	3.9	4.5	4.5	4.2
	40–49	1.6	1.8	1.8	1.8	2.1	2.4	2.5	2.4	2.2	2.4	2.5	2.5	2.5	2.7	2.6	2.8	2.8	3.1	3.1	2.8
	≥ 50	1.6	2.0	2.1	2.4	2.8	3.4	3.7	3.4	3.1	3.5	3.8	4.0	4.3	4.4	4.4	4.7	4.9	5.4	5.7	5.3
POC Tests ( <i>not in thousands</i> )		24	54	121	31	158	296	187	182	302	254	426	377	253	423	383	288	333	347	284	189
Fraser East		1.2	1.5	1.4	1.5	1.5	1.6	1.7	1.7	1.6	1.8	1.7	1.9	2.5	2.3	2.3	2.4	2.3	2.5	2.4	2.3
	Female	0.6	0.7	0.7	0.8	0.8	0.8	0.9	0.8	0.8	0.9	0.9	0.9	1.3	1.2	1.2	1.2	1.2	1.2	1.2	1.1
	Male	0.6	0.7	0.7	0.7	0.7	0.7	0.8	0.8	0.8	0.9	0.8	0.9	1.2	1.1	1.1	1.2	1.1	1.2	1.2	1.2
Fraser North		4.6	5.1	5.1	5.2	5.6	6.9	7.1	6.8	6.5	6.8	7.0	6.9	7.4	7.4	7.8	8.0	8.8	9.2	8.6	
	Female	2.2	2.4	2.5	2.5	2.8	3.3	3.4	3.3	3.1	3.2	3.5	3.4	3.3	3.4	3.5	3.7	3.8	4.2	4.5	4.2
	Male	2.4	2.7	2.5	2.6	2.8	3.4	3.6	3.4	3.3	3.5	3.4	3.5	3.5	3.8	3.7	3.9	4.1	4.5	4.6	4.3
Fraser South		3.1	3.5	3.7	4.1	4.5	4.9	5.2	5.3	4.8	5.1	5.7	6.0	5.6	6.4	6.1	6.6	6.8	7.3	7.5	7.0
	Female	1.5	1.6	1.8	2.0	2.2	2.4	2.5	2.6	2.3	2.4	2.6	2.9	2.7	2.9	2.9	3.2	3.1	3.4	3.6	3.3
	Male	1.6	1.9	1.8	2.0	2.2	2.4	2.6	2.5	2.3	2.6	2.8	2.9	2.8	3.2	3.0	3.3	3.5	3.7	3.7	3.6

Indicator 2: Rate of HIV Testing per 100,000		2009	2010	2011	2012	2013	2014	2015
All Fraser Health		2251.0	2266.7	2330.8	2794.7	3313.9	3590.9	4011.4
Fraser East		2069.2	1997.6	1956.3	2248.8	2474.3	2946.2	3388.4
Fraser North		2706.6	2714.4	2809.4	3407.4	4291.7	4464.7	4849.0
Fraser South		1935.3	1993.0	2073.6	2489.6	2816.6	3107.9	3550.0
Gender	Female	2150.9	2171.0	2230.2	2767.6	3369.4	3610.7	4025.3
	Male	2342.6	2351.8	2422.8	2811.5	3248.2	3560.5	3985.9
Age	< 30	2215.9	2220.0	2244.2	2487.6	2689.2	2750.5	3059.2
	30–39	4369.6	4459.5	4509.9	5048.4	5660.8	6079.9	6606.1
	40–49	2658.3	2642.6	2717.7	3254.8	3892.8	4187.0	4700.7
	≥ 50	1144.8	1191.3	1320.7	1994.5	2795.5	3248.8	3704.5

Indicator 3: New HIV Diagnoses		2012				2013				2014				2015				2016			
		Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3
Fraser Health		9	11	10	10	14	8	14	23	19	15	11	16	17	18	17	15	12	19	20	17
	By Client Residence	8	10	5	7	8	9	8	14	15	11	10	12	13	11	11	15	14	17	15	15
Gender	Female	1	0	3	2	3	1	3	2	3	6	4	6	2	6	1	2	2	5	3	4
	Male	8	11	7	8	11	7	11	21	16	9	7	10	15	12	16	13	10	14	17	13
Age	< 30	3	3	1	1	2	1	3	5	6	5	1	4	4	3	4	3	4	6	3	6
	30–39	1	1	3	2	2	3	4	8	6	5	3	5	4	5	4	3	2	7	4	5
	40–49	4	3	2	5	4	2	4	6	4	3	3	1	4	2	6	3	3	4	4	3
	≥ 50	1	4	4	2	6	2	3	4	3	2	4	6	5	8	3	6	3	2	9	3
Exposure	MSM	4	6	5	6	5	5	8	10	11	5	3	8	11	7	8	8	6	7		
	PWID	0	4	0	0	1	1	1	2	5	3	1	0	3	0	0	1	0	0		
	HET	5	1	4	4	6	1	3	9	3	7	7	7	3	9	7	6	6	4		
	Other	0	0	0	0	1	0	1	2	0	0	0	1	0	0	0	0	0	1		
	NIR/Unknown	0	0	1	0	1	1	1	0	0	0	0	0	0	2	2	0	0	7		
Fraser East		5	2	2	1	1	0	0	3	1	2	0	2	2	1	1	2	1	5	1	0
	By Client Residence	2	2	0	1	0	0	0	2	1	2	1	1	2	0	1	3	1	3	1	0
Fraser North		4	3	6	5	6	6	9	14	9	8	5	5	10	9	10	5	5	6	7	7
	By Client Residence	5	3	4	4	2	7	4	8	9	7	4	4	9	7	4	5	6	5	4	7
Fraser South		0	6	2	4	7	2	5	6	9	5	6	9	5	8	6	8	6	8	12	10
	By Client Residence	1	5	1	2	6	2	4	4	5	2	5	7	2	4	6	7	7	9	10	8

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

	Fraser Health					Female					Male					< 30 years					30-39 years					40-49 years				
	'11	'12	'13	'14	'15	'11	'12	'13	'14	'15	'11	'12	'13	'14	'15	'11	'12	'13	'14	'15	'11	'12	'13	'14	'15	'11	'12	'13	'14	'15
Stage 0	10	3	6	6	6	1	0	0	0	1	9	3	6	6	5	4	0	4	4	1	2	1	0	1	1	2	1	1	0	1
1	8	6	10	9	15	2	1	4	3	3	6	5	6	6	12	1	1	3	4	9	5	0	3	3	2	1	4	1	1	1
2a	3	5	6	8	6	1	3	1	2	0	2	2	5	6	6	0	0	2	1	1	2	1	3	3	1	1	1	1	1	2
2b	11	6	8	2	6	3	1	1	1	2	8	5	7	1	4	1	2	3	0	1	2	1	0	0	2	3	1	2	0	2
3	16	9	15	12	12	2	2	1	4	1	14	7	14	8	11	0	0	1	1	0	4	3	3	3	2	8	3	6	4	4
Unknown	1	2	2	10	7	1	0	0	4	1	0	2	2	6	6	1	1	0	2	0	0	0	0	2	2	0	1	2	5	4
Total	49	31	47	47	52	10	7	7	14	8	39	24	40	33	44	7	4	13	12	12	15	6	9	12	10	15	11	13	11	14

	≥ 50 years					MSM					Heterosexual					PWID					Other Exposure					NIR/Unknown				
	'11	'12	'13	'14	'15	'11	'12	'13	'14	'15	'11	'12	'13	'14	'15	'11	'12	'13	'14	'15	'11	'12	'13	'14	'15	'11	'12	'13	'14	'15
Stage 0	2	1	1	1	3	6	2	6	6	3	1	0	0	0	0	3	1	0	0	3	0	0	0	0	0	0	0	0	0	0
1	1	1	3	1	3	3	2	3	4	11	1	0	2	2	0	4	3	5	3	3	0	1	0	0	0	0	0	0	0	1
2a	0	3	0	3	2	2	2	2	3	4	0	0	1	1	1	0	3	1	4	1	1	0	2	0	0	0	0	0	0	0
2b	5	2	3	2	1	4	2	5	0	2	1	1	0	0	1	6	3	3	2	3	0	0	0	0	0	0	0	0	0	0
3	4	3	5	4	6	5	2	5	5	3	2	3	3	1	0	8	4	5	6	8	1	0	1	0	0	0	0	1	0	1
Unknown	0	0	0	1	1	0	1	0	4	3	0	0	0	2	0	1	0	2	4	4	0	0	0	0	0	0	1	0	0	0
Total	12	10	12	12	16	20	11	21	22	26	5	4	6	6	2	22	14	16	19	22	2	1	3	0	0	0	1	1	0	2

Indicator 5: <b>HIV Cascade of Care</b>			Diagnosed	Linked	Retained	On ARVs	Adherent	Suppressed
Fraser Health			2152	2072	1844	1756	1600	1388
Gender	Men		1639	1585	1418	1354	1257	1101
	Women		513	487	426	402	343	287
Age Category	< 30		127	102	89	82	66	52
	30-39		318	309	263	249	209	172
	40-49		602	585	506	481	439	372
	≥ 50		1105	1077	985	944	886	792
MSM Status	MSM		640	627	586	561	528	477
	Non-MSM		788	766	679	640	569	481
	Unknown		725	679	579	555	503	430
Age Category and MSM Status	MSM	< 30	43	41	36	33	27	22
		30-39	88	86	71	69	59	51
		40-49	128	126	115	109	105	93
		≥ 50	380	374	363	350	337	311
	Non-MSM	< 30	8	7	5	4	4	3
		30-39	121	117	101	92	76	59
		40-49	263	255	227	215	186	151
		≥ 50	396	386	346	329	303	268
	Unknown	< 30	77	53	48	45	35	27
		30-39	108	105	91	88	74	62
		40-49	211	203	164	157	148	128
		≥ 50	329	317	276	265	246	213
PWID Status	PWID		529	516	468	441	379	313
	Non-PWID		1177	1152	1066	1020	959	848
	Unknown		445	404	310	295	262	227
HSDA	Fraser East		326	314	269	262	237	200
	Fraser North		945	898	793	752	689	610
	Fraser South		882	860	782	742	674	578

Indicator 6: Programmatic Compliance Score (PCS)		2015				2016		
	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3
< 3 CD4 Tests	10.3%	9.3%	7.0%	7.3%	9.5%	11.5%	11.2%	16.5%
< 3 Viral Load Tests	3.4%	3.5%	3.5%	4.9%	2.4%	9.2%	10.2%	11.0%
No Baseline Genotype	3.4%	3.5%	4.7%	3.7%	2.4%	5.7%	5.1%	5.5%
Baseline CD4 < 200 cells/μL	24.1%	27.9%	26.7%	19.5%	25.0%	21.8%	23.5%	26.4%
Non-Recommended ART	3.4%	1.2%	1.2%	0.0%	1.2%	3.4%	4.1%	5.5%
Non Viral Suppression at 9 Mo.	27.6%	25.6%	20.9%	23.2%	21.4%	32.2%	37.8%	38.5%
PCS Score: 0	42	41	43	44	44	38	38	35
PCS Score: 1	30	32	33	31	31	34	42	33
PCS Score: 2	12	10	8	4	6	6	8	12
PCS Score: 3	3	3	2	3	3	9	8	7
PCS Score: 4 or more	0	0	0	0	0	0	2	4
<b>Total (n=)</b>	<b>87</b>	<b>86</b>	<b>86</b>	<b>82</b>	<b>84</b>	<b>87</b>	<b>98</b>	<b>91</b>

#### Indicator 7: New DTP ARV Participants

First Starts	19	30	27	17	23	20	23	30
Experienced Starts	34	37	35	38	37	31	37	29

#### Indicator 8: CD4 Cell Count Initiation for ARV-Naïve DTP Participants

CD4 ≥ 500	8	13	8	4	10	3	11	11
CD4 350-499	4	6	3	2	2	5	2	5
CD4 200-349	3	4	7	2	5	2	6	3
CD4 50-199	3	4	4	4	1	6	2	9
CD4 < 50	1	0	5	4	2	3	2	1
CD4 MED	420	480	310	180	500	330	479	375
<b>Total (n=)</b>	<b>19</b>	<b>27</b>	<b>27</b>	<b>16</b>	<b>20</b>	<b>19</b>	<b>23</b>	<b>29</b>

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

Active DTP Participants	1664	1706	1716	1748	1762	1764	1764	1789
Inactive DTP Participants	245	250	252	241	246	256	259	270

#### Indicator 10: Antiretroviral Adherence

≥ 95%	20	23	13	16	19	19	22	16
80% to < 95%	5	1	4	3	4	8	4	4
40% to < 80%	5	2	2	2	1	2	3	1
< 40%	0	0	0	0	0	1	1	1
<b>Total (n=)</b>	<b>30</b>	<b>26</b>	<b>19</b>	<b>21</b>	<b>24</b>	<b>30</b>	<b>30</b>	<b>22</b>

#### Indicator 11: Resistance Testing and Results

Suppressed	1125	1188	1197	1135	1163	1268	1234	1230
Wild Type	149	188	178	195	175	156	146	150
Never Genotyped	9	7	8	8	9	5	3	7
1-Class	39	41	32	37	26	20	21	16
2-Class	4	7	4	8	3	4	3	4
3-Class	1	1	2	2	0	1	0	0
4-Class	0	0	0	0	0	0	0	0
<b>Total (n=)</b>	<b>1327</b>	<b>1432</b>	<b>1421</b>	<b>1385</b>	<b>1376</b>	<b>1454</b>	<b>1407</b>	<b>1407</b>

#### Indicator 12: AIDS-Defining Illness

	2008	2009	2010	2011	2012	2013	2014	2015
CD4 < 200 at ART initiation	Cases	51	31	33	33	25	19	25
	<i>Rate per 100,000</i>	3.3	2.0	2.0	2.0	1.5	1.1	1.4
AIDS Cases (DTP Reports)	Cases	26	17	24	22	14	19	23
	<i>Rate per 100,000</i>	1.7	1.1	1.5	1.3	0.8	1.1	1.3
AIDS Cases (BCCDC Reports)	Cases	30	21	30	23	12	13	-
	<i>Rate per 100,000</i>	1.9	1.3	1.9	1.4	0.7	0.7	-

#### Indicator 13: HIV-Related Mortality

	2004	2005	2006	2007	2008	2009	2010	2011
British Columbia	105	146	142	100	79	63	54	59
Per 100 HIV+ Population	1.03	1.40	1.34	0.93	0.72	0.56	0.47	0.50
Per 100,000 Population	2.50	3.43	3.29	2.28	1.80	1.41	1.19	1.29