IX INTERNATIONAL WORKSHOP

POCT and Rapid Tests Outside the Lab

Brasilia, DF, BRAZIL
September 3, 2019

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MAP Centre for Urban Health Solutions

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Acknowledgement of Indigenous Traditional Territory

Colourful Headress
drawing by artist Jasmine Wemigwans, Toronto

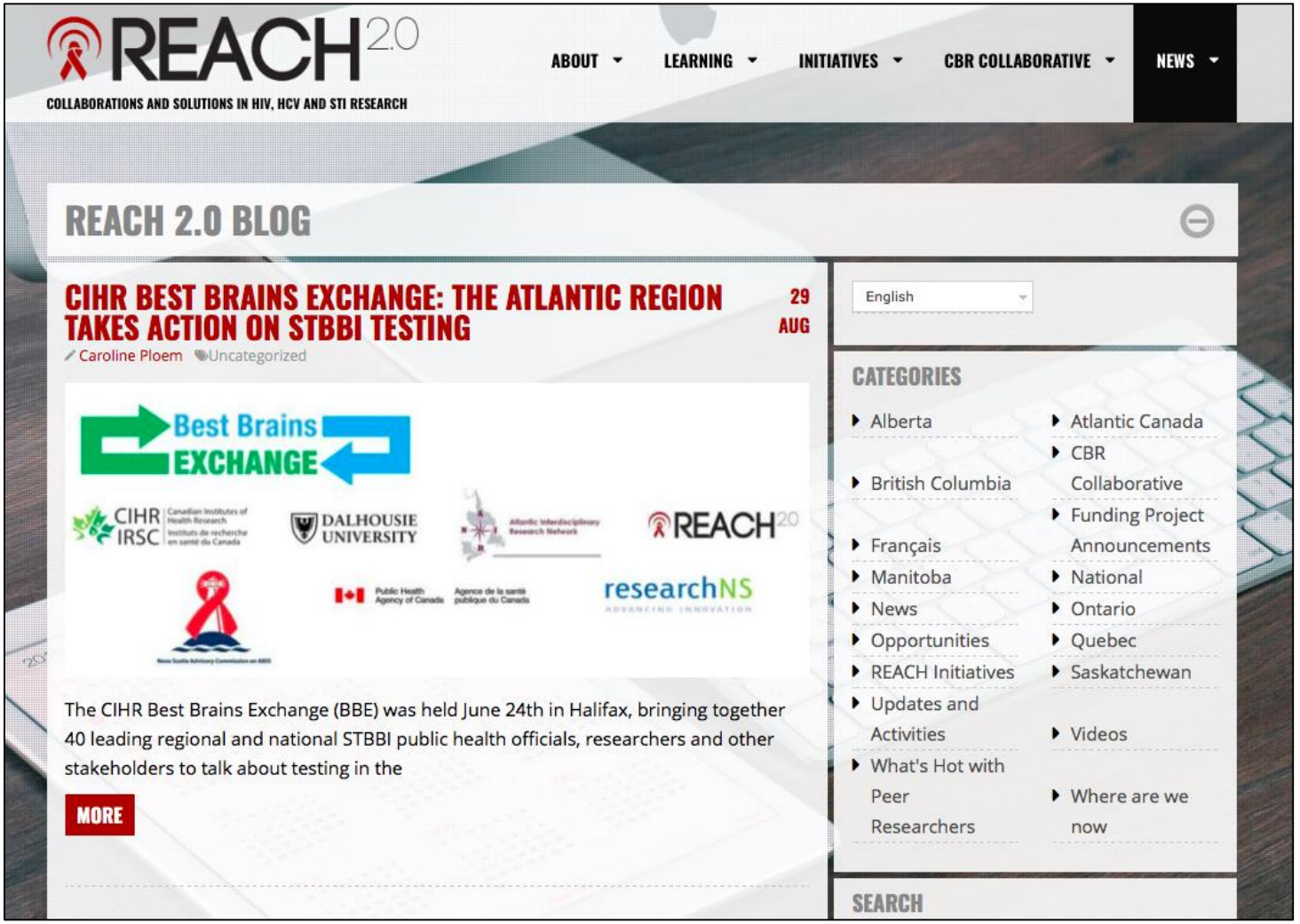
I have been impressed with the urgency of doing.
Knowing is not enough; we must apply.
Willing is not enough; we must do.

Leonardo da Vinci (artist and scientist)

Ideas are great;
Execution is everything

John Doerr – Measure What Matters

CIHR Centre for REACH 3.0 – National Network / Pragmatic Solutions for HIV



Outline

1. Setting the stage – Canadian Context / Challenges / Opportunities
2. Bringing new STBBI tests to market in Canada
3. HIV self-testing implementation and linkages to care
4. Community-based dried blood spot (DBS) testing
5. Community-based POC testing with peers
6. Pharmacy-based STBBI testing / scale-up
7. App development for testing / linkages and peer navigation/support
8. HIV testing awareness campaigns and PSAs
9. Health economics of innovative and responsive testing in Canada
10. Health policy work – targets, funding and sustainability

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HIV Epidemic in Canada

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HIV IN CANADA

In 2016, an estimated **63,110** people were living with HIV

Canada's progress to meet **HIV 90-90-90 targets** by 2020:

In 2016

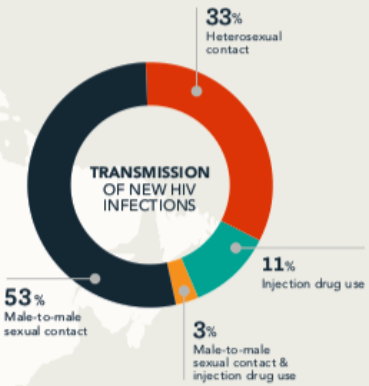
86% of Canadians living with HIV **were diagnosed**

81% of Canadians diagnosed with HIV **were on treatment**

91% of HIV positive Canadians on treatment had achieved **viral suppression**

In 2016, an estimated **2,165 NEW** HIV infections occurred

6 Canadians were infected with HIV **every day**



To learn more about HIV and what you can do to prevent the virus, visit:
Canada.ca and *search* **HIV/AIDS**

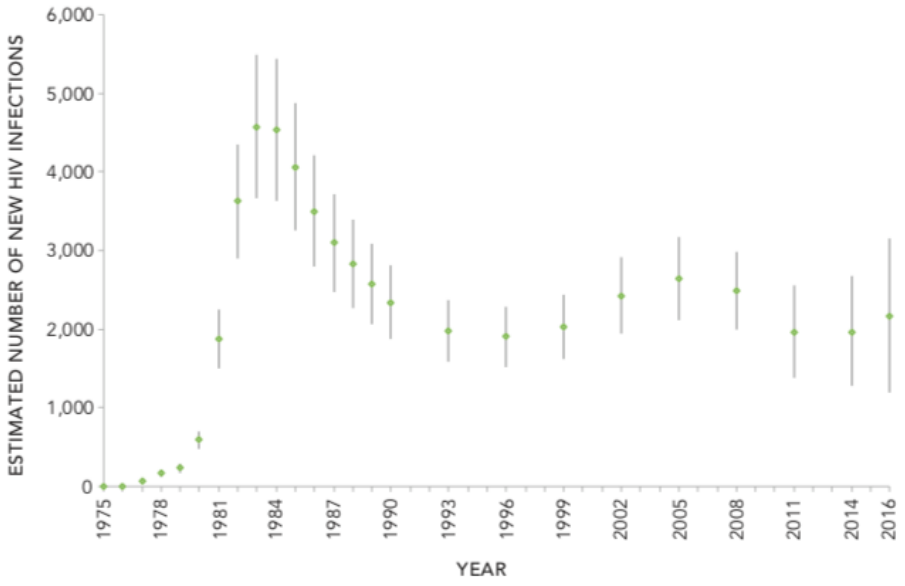
Public Health Agency of Canada | Agence de la santé publique du Canada

Canada

ESTIMATE OF THE NUMBER OF NEW HIV INFECTIONS IN 2016

The Agency estimates that 2,165 new infections (range between 1,200–3,150) occurred in Canada in 2016. This estimate is a slight increase from the estimate for 2014 (1,960; range between 1,270 and 2,670) (Table 1, Figure 4). The resulting estimated incidence rate in Canada for 2016 was 6.0 per 100,000 population (range between 3.3 and 8.7 per 100,000 population) which is a slight increase from the estimate for 2014 (5.5/100,000 population; range between 3.6 and 7.5 per 100,000 population).

FIGURE 4: HIV incidence: Estimated number of new HIV infections in Canada for selected years (including plausible ranges for point estimates).



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Progress on UAIDS 90-90-90 Targets

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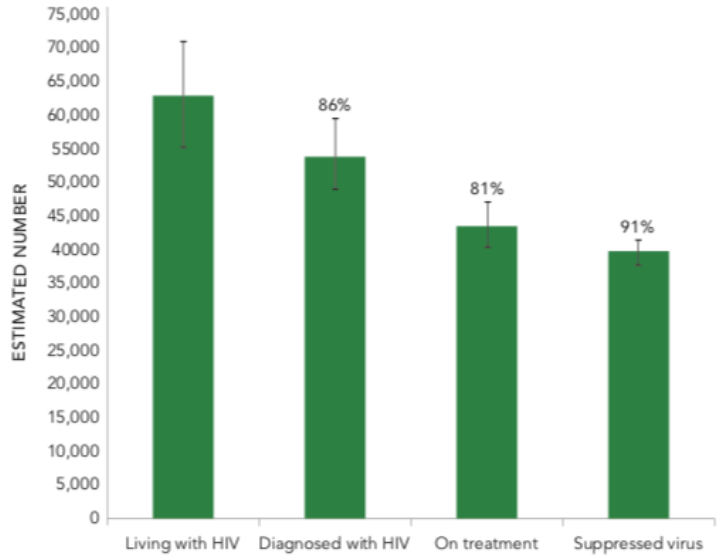
CANADA'S PROGRESS ON MEETING THE 90-90-90 HIV TARGETS

In Canada at the end of 2016, 86% (plausible range 78–94%) of the estimated 63,110 (plausible range 55,500–70,720) persons living with HIV were diagnosed. Of those diagnosed, 81% were estimated to be on treatment (plausible range 75% to 87%) and an estimated 91% of persons on treatment had suppressed viral load (plausible range 87% to 95%) (Figure 1).

FIGURE 1: Estimated number and percentage of persons living with HIV, diagnosed, on treatment, and virally suppressed in Canada at the end of 2016 (vertical bars represent plausible ranges).



Estimated % Plausible range (%)	-- --	86% 78–94%	81% 75–87%	91% 87–95%
Estimated # Plausible range (n)	63,110 55,500–70,720	54,020 49,200–53,320	43,680 40,520–47,000	39,960 38,000–41,500

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Not too long ago Canada was missing on the map – 2016 Paper

BMJ Global Health

Can the UNAIDS 90-90-90 target be achieved? A systematic analysis of national HIV treatment cascades

Jacob Levi,[1] Alice Raymond,[1] Anton Pozniak,[2] Pietro Vernazza,[3] Philipp Kohler,[3] Andrew Hill[2]

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► Additional material is available. To view please visit the journal (http://dx.doi.org/10.1136/bmjgh-2015-000010).

JL and AR have collaborated and contributed equally and would like to be acknowledged as joint first author.

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ABSTRACT

Background: In 2014, the Joint United Nations Programme on HIV and AIDS (UNAIDS) and partners set the '90-90-90 targets'; aiming to diagnose 90% of all HIV positive people, provide antiretroviral therapy (ART) for 90% of those diagnosed and achieve viral suppression for 90% of those treated, by 2020. This results in 81% of all HIV positive people on treatment and 73% of all HIV positive people achieving viral suppression. We aimed to analyse how effective national HIV treatment programmes are at meeting these targets, using HIV care continuums or cascades.

Methods: We searched for HIV treatment cascades for 196 countries in published papers, conference presentations, UNAIDS databases and national reports. Cascades were constructed using reliable, generalisable, recent data from national, cross-sectional and longitudinal study cohorts. Data were collected for four stages; total HIV positive people, diagnosed, on treatment and virally suppressed. The cascades were categorised as complete (four stages) or partial (3 stages), and analysed for 'break points' defined as a drop >10% in coverage between consecutive 90-90-90 targets.

Results: 69 country cascades were analysed (32 complete, 37 partial). Diagnosis (target one —90%) ranged from 87% (the Netherlands) to 11% (Yemen). Treatment coverage (target two—81% on ART) ranged from 71% (Switzerland) to 3% (Afghanistan). Viral suppression (target three—73% virally suppressed) was between 68% (Switzerland) and 7% (China).

Conclusions: No country analysed met the 90-90-90 targets. Diagnosis was the greatest break point globally, but the most frequent key break point for individual countries was providing ART to those diagnosed. Large disparities were identified between countries. Without commitment to standardised reporting methodologies, international comparisons are complex.

Key questions

What is already known about this topic?
- Cascades of HIV care have been used for a few years by national treatment programmes to depict the effectiveness of coverage of care. For most countries, where cascade reports have been published annually, progress has been seen.
- The Joint United Nations Programme on HIV and AIDS (UNAIDS) calls for countries to improve diagnosis of HIV, access to antiretroviral therapy (ART) and achievement of viral suppression with the 90-90-90 targets.

What are the new findings?
- Cascade reporting methods are relatively heterogeneous; however, with the new UNAIDS 90-90-90 targets, WHO treatment guidelines and reporting indicator requirements, more and more countries should begin to report cascades more uniformly.
- Large disparities exist between countries. While some are close to meeting the UNAIDS 2020 goals already, others will require a great deal of progress over the coming years.

Recommendations for policy
- Countries should be clear and precise when reporting the stages of a cascade, so that progress can be monitored as we move towards 2020 and resources can be targeted towards the stages in the cascade, where the most attrition occurs.
- This research was constructed using the most recent publicly available data as of September 2015. We would warmly welcome any more recent or more reliable national-level data, from all countries not yet included, or updates to the 69 included countries, for a follow-up to this project.

BACKGROUND

In 2014, the Joint United Nations Programme on HIV and AIDS (UNAIDS) and partners launched three ambitious 90-90-90 targets for 2020 as a commitment to improve access to antiretroviral therapy (ART)[1] as a life-saving treatment,[1 2] a transmission prevention measure[3] and a human right.[4] These three targets are as follows: target one is successfully diagnosing 90% of all HIV positive people. Target two involves delivering antiretroviral therapy (ART) to 90% of those diagnosed, and finally, target

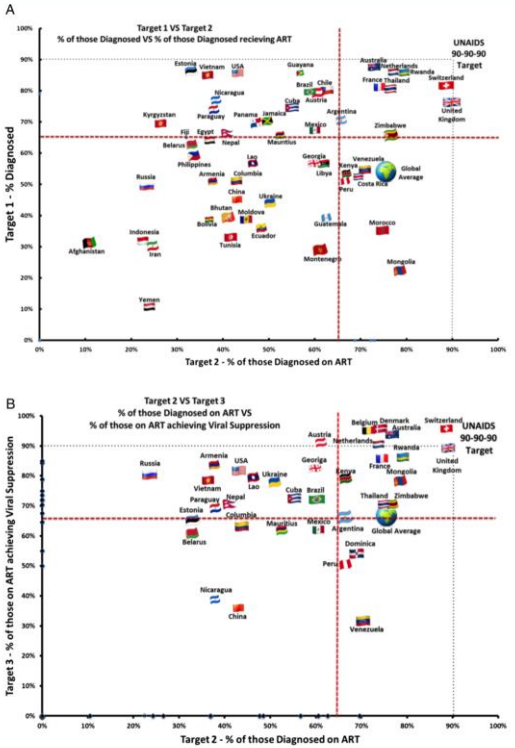


Figure 3 (A) Target 1 vs Target 2 - % of those diagnosed vs % of those diagnosed receiving ART. (B) Target 2 vs Target 3 - % of those diagnosed on ART vs % of those on ART achieving viral suppression.

upper and lower left quadrants of figure 3B need to develop creative strategies to link, retain and treat those diagnosed. The RapIT study found, immediate or same day ART initiation following diagnosis is very effective in low-resource settings.[40]

Linkage to care, retention in healthcare systems[34] and eligibility for ART (as directed by national guidelines) impact the step from diagnosis to successful treatment.[41] However, due to lack of consistency in definitions across countries, these steps between testing and ART initiation are not possible to accurately compare due to heterogeneity. For example, in Russia[23] 'linkage' was constituted by 'one visit to an AIDS centre within 12 months of diagnosis'. Contrastingly, in the USA, linkage was defined more stringently as 'one CD4 test performed within 3 months of diagnoses.[18] The number of people 'on ART' is also an imprecise value, even if calculated from prescription records, not everyone prescribed ART

"I have been impressed with the urgency of doing.
Knowing is not enough; we must apply.
Willing is not enough; we must do."

LEONARDO DA VINCI
(ARTIST AND SCIENTIST)

The Context

Unlike other G7 countries, Canada is not seeing a reduction in the number of new people being diagnosed with HIV, notwithstanding significant investments over the past many years.

Recent data from the Public Health Agency of Canada (PHAC) indicate that in 2016 an estimated 2,165 people became infected with HIV in Canada.[1] This is one new infection every four hours. Our numbers are almost 10% higher than in 2014.

Jurisdictions around the world have launched new, highly targeted initiatives to end HIV, including "Getting to Zero" and the UNAIDS strategy to end AIDS by 2030. Although Canada has endorsed the UNAIDS 90-90-90 target[2] (90% diagnosed, 90% of those on treatment and in care, and 90% of those who are suppressed), we lag behind others in reaching these targets. But with strategic interventions, we believe that in the next five years we can "bend the curve" and end the HIV epidemic in Canada. New cases of HIV will become rare events.

How is Canada Doing?

It is estimated that there are 63,110 people living with HIV in Canada,[1] but only 86% of those are diagnosed (1st 90 target) – **this represents 9,090 individuals who have undiagnosed HIV infection across the country who are not adequately connected to our health care system.** While many G7 countries are seeing progressive declines in the numbers of those undiagnosed – we are not in Canada.

For those people diagnosed with HIV, 81% are now on antiretroviral treatment (2nd 90 target), and of those, 91% have suppressed viral load (3rd 90 target).

While we have reached one of three key UNAIDS targets, we cannot lose sight that there are 23,150 people who are still falling through the cracks along the cascade (see chart on right)[1]. All of these people are not benefitting from appropriate prevention, treatment and ongoing care and supportive services to support their own health. And we can prevent the further transmission of HIV if our public health, community-based and health care systems can support these individuals to get tested, diagnosed, be on treatment and achieve viral suppression.

We have to change our approach.

In contrast to most other developed countries, we do not have the leadership in place or a national coordinated approach that is needed. But with targeted and pragmatic interventions for testing, reaching those who are undiagnosed, and supporting more people to manage and adhere to treatment, and achieve viral suppression, we can achieve (and exceed) Canada's UNAIDS commitment to all three of the 90-90-90 targets – and Canada can effectively end its HIV epidemic in the next five years.

Who Are the 23,150 People We're Missing?

9,090
People living with HIV in Canada who remain undiagnosed

+

10,340
People diagnosed who are not on treatment

+

3,720
People diagnosed and on treatment who have not achieved viral suppression

23,150

HIV Testing and Diagnosis in Canada

MAP Centre for Urban Health Solutions

Canadian Population: 37 million

2016 Incidence: 6.0 per 100,000 people (range 3.3-8.7/100,000)

Government of Canada 2030 Goal: 0.6 per 100,000 people

Number of Tests: Annual HIV diagnostic tests in Canada = 1.5-1.7 million*

*includes 59,000 INSTI POC tests in 2018 (our only POCT approved in Canada)

To end the HIV Epidemic in Canada – How many HIV tests are required to reach those who need them??

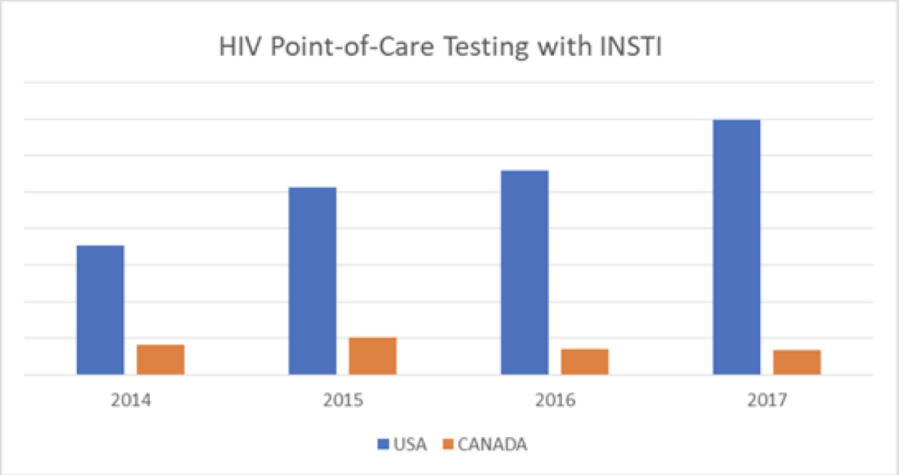
Canada has been losing ground with POC testing

Centre for Urban Health Solutions

INSTI HIV Test Kit Distribution in Canada and US, 2014-2017

- In addition to INSTI The US has 6 FDA approved, CLIA waived HIV POC tests: Determine HIV Ag/Ab Combo; Oraquick; Stat Pak, Sure-Check, DPP; Unigold.
- In Canada, only INSTI is approved for POC testing with fingerstick blood
- Graph represents distribution in 100k increments

Canada purchased 59,000 INSTI POC test kits in 2018 – **33% reduction from 2011**



Source: bioLytical Laboratories

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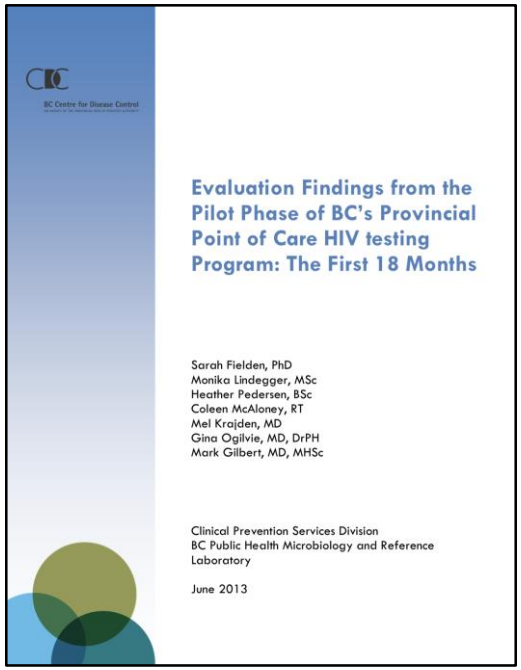
Effectiveness of POC HIV Testing in BC (2013)



BC Centre for Disease Control

Evaluation Findings from the Pilot Phase of BC's Provincial Point of Care HIV testing Program: The First 18 Months

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Gina Ogilvie, MD, DrPH
Mark Gilbert, MD, MHSc

Clinical Prevention Services Division
BC Public Health Microbiology and Reference Laboratory

June 2013

INSTI (POC) (which represented only 5% of all HIV testing in BC) identified about **4 times** more HIV infections than standard lab testing approach

Table 5: Number of new HIV diagnoses by POC as compared to standard lab testing by Health Authority (HA) / Region, Apr 2011-Sept 2012

HA	Point of Care Testing			Standard Laboratory Testing			% New Diagnosis by POC
	New Diagnosis	# Tests Done	Diagnosis Rate	New Diagnosis	# Tests Ordered	Diagnosis Rate	
VCHA	118	15,982	0.7%	163	137,471	0.1%	41.6
NHA	6	358	1.7%	26	17,682	0.1%	18.8
FHA	2	324	0.6%	58	81,592	0.1%	3.3
VIHA	0	226	0.0%	26	31,675	0.1%	0.0
IHA	0	139	0.0%	18	34,288	0.1%	0.0
Total	*126*	*17,029*	*0.7%*	*291*	*302,708*	*0.1%*	*30.2*

Notes:
- New Diagnosis by POC: true positive only and only those with no previous positive HIV test

Table 6: POC tests as a percentage of total HIV tests by Health Authority (HA), Apr 2011- Sept 2012

HA	# POC Tests	# Standard HIV Tests	All HIV Tests	% POC of All HIV Tests
VCH	15982	137,471	153,453	10.4
NHA	358	17,682	18,040	2.0
FHA	324	81,592	81,916	0.4
VIHA	226	31,675	31,901	0.7
IHA	139	34,288	34,427	0.4
Total	*17029*	*302,708*	*319,737*	*5.3*

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Why is this happening ? What's missing ?

What has history taught us about previous leadership efforts?

Leading Together (2005-2010)

Why did it fail?

A CALL FOR ACTION

More than 20 years after the first AIDS case was diagnosed, HIV is still with us. Despite progress in both prevention and treatment, HIV continues to cause great harm and loss. A virus that many hoped would be eradicated in the 1980s has now infected and killed millions around the world. Faced with the catastrophic impact of HIV globally and rising rates of infection at home, we in Canada are at a turning point in our fight against HIV.

Do we accept that AIDS will be with us always – a debilitating illness that continues to steal people's health and lives – or do we redouble our efforts to stop the ravages of this preventable disease?

We have chosen to renew our efforts. *Leading Together: Canada Takes Action on HIV/AIDS (2005-2010)* is a hopeful new phase in our collective response to AIDS. It sets out an ambitious coordinated nationwide approach to tackling not just HIV but the underlying health and social issues that contribute to new infections and have devastating effects on people who are infected.

We know what has to be done. Now is the time to act.

Together we can: Leadership in a world of AIDS,
Joint United Nations Programme on HIV/AIDS (UNAIDS),
June 2001

This made-in-Canada response to HIV is a call for action.

What was missing with Leading Together:

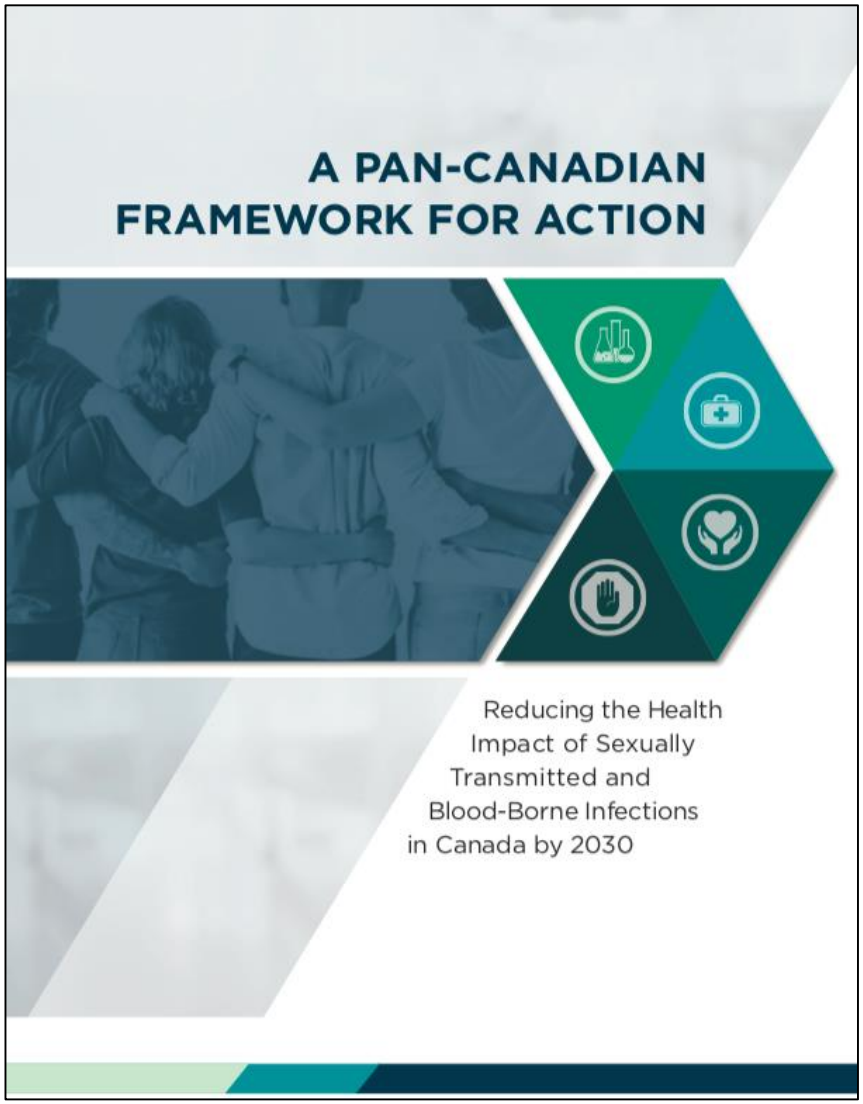
Leadership – Government set up **Leading Together championing committee** (I was a Co-Chair) – but it had no support / authority / decision-making / or resources to:

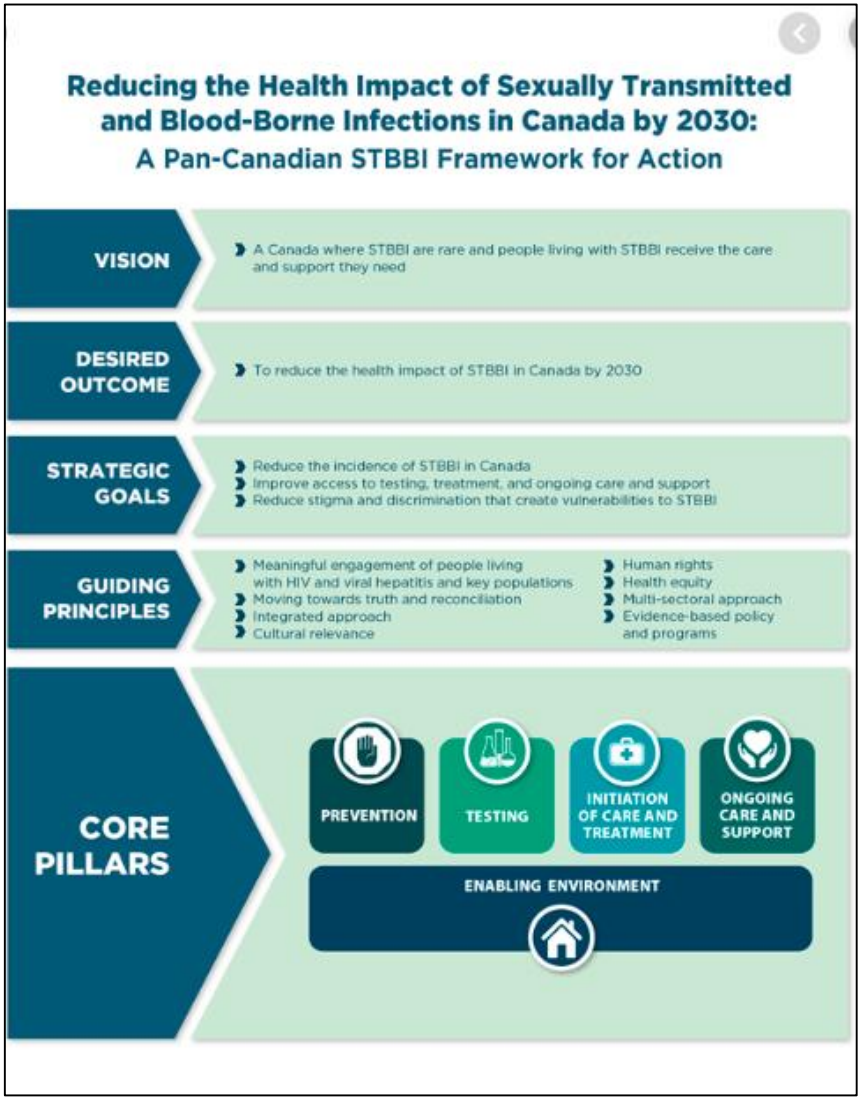
- Bring key sectors (and expertise) together to build cohesion and partnerships for common goals;
- Be pragmatic / solution-focused / take collective impact approach - to get work underway;

There were no accountability framework.

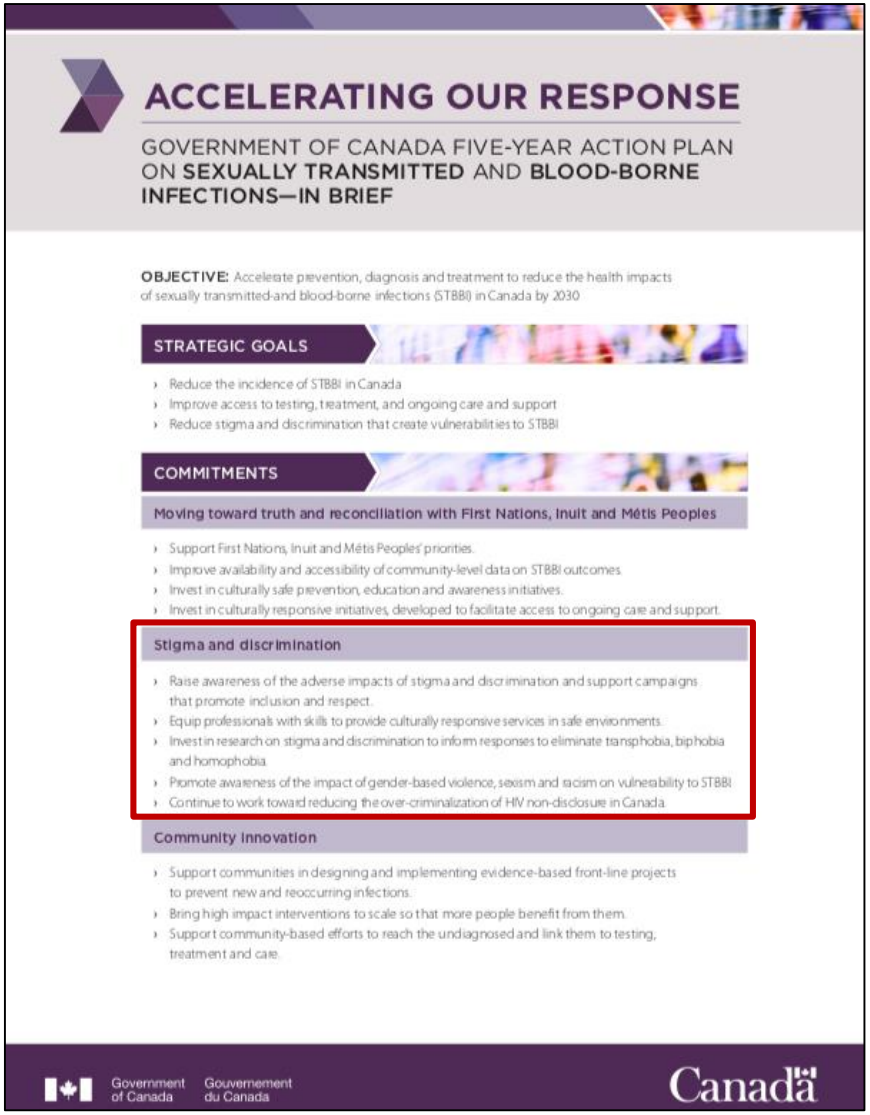
There was **no commitment** to targets and roadmap (or monitoring and evaluating progress) – mainly because this would have resulted in allocating / reallocating resources for those efforts.

2016-present: Now focus on addressing STBBI Epidemics in Canada





Government of Canada Action Plan - Launched July 18, 2019



ACCELERATING OUR RESPONSE

GOVERNMENT OF CANADA FIVE-YEAR ACTION PLAN ON **SEXUALLY TRANSMITTED** AND **BLOOD-BORNE INFECTIONS—IN BRIEF**

OBJECTIVE: Accelerate prevention, diagnosis and treatment to reduce the health impacts of sexually transmitted and blood-borne infections (STBBI) in Canada by 2030

STRATEGIC GOALS

- Reduce the incidence of STBBI in Canada
- Improve access to testing, treatment, and ongoing care and support
- Reduce stigma and discrimination that create vulnerabilities to STBBI

COMMITMENTS

Moving toward truth and reconciliation with First Nations, Inuit and Métis Peoples

- Support First Nations, Inuit and Métis Peoples' priorities.
- Improve availability and accessibility of community-level data on STBBI outcomes.
- Invest in culturally safe prevention, education and awareness initiatives.
- Invest in culturally responsive initiatives, developed to facilitate access to ongoing care and support.

Stigma and discrimination

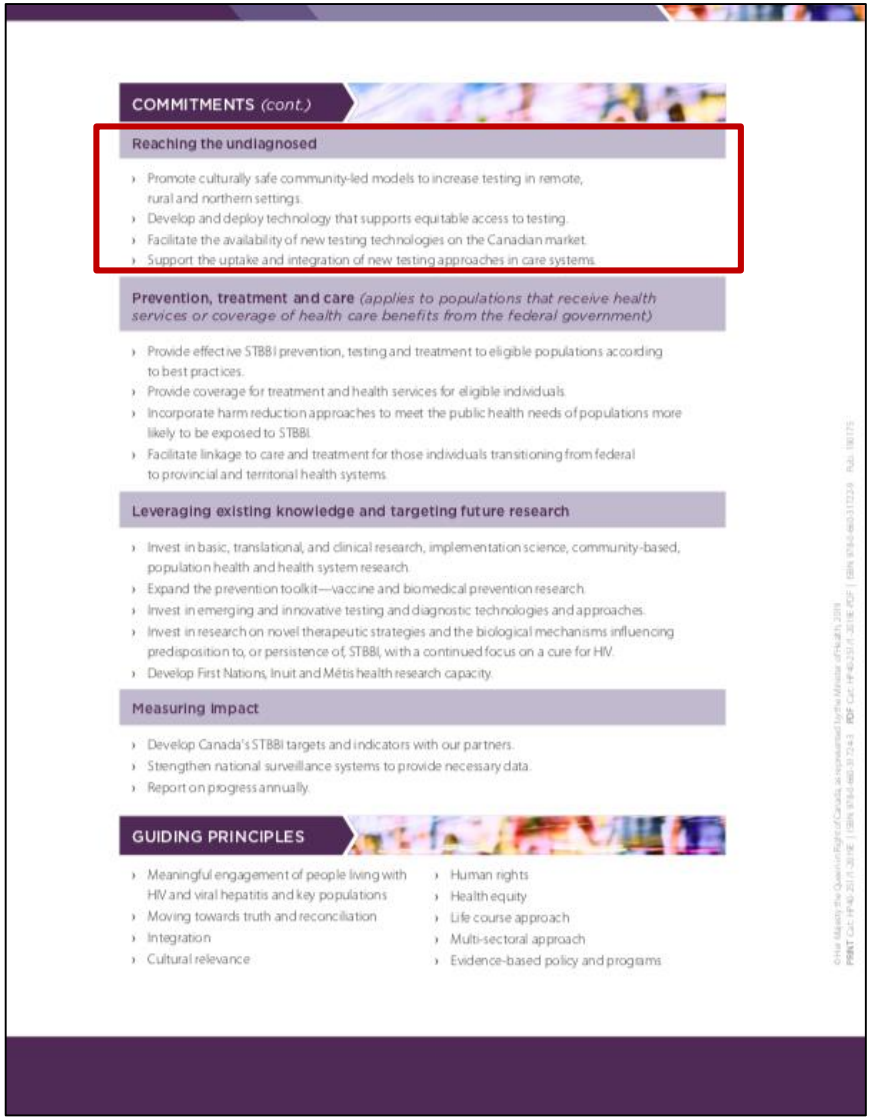
- Raise awareness of the adverse impacts of stigma and discrimination and support campaigns that promote inclusion and respect.
- Equip professionals with skills to provide culturally responsive services in safe environments.
- Invest in research on stigma and discrimination to inform responses to eliminate transphobia, biphobia and homophobia.
- Promote awareness of the impact of gender-based violence, sexism and racism on vulnerability to STBBI.
- Continue to work toward reducing the over-criminalization of HIV non-disclosure in Canada.

Community innovation

- Support communities in designing and implementing evidence-based front-line projects to prevent new and reoccurring infections.
- Bring high impact interventions to scale so that more people benefit from them.
- Support community-based efforts to reach the undiagnosed and link them to testing, treatment and care.

Government of Canada / Gouvernement du Canada

Canada



COMMITMENTS *(cont.)*

Reaching the undiagnosed

- Promote culturally safe community-led models to increase testing in remote, rural and northern settings.
- Develop and deploy technology that supports equitable access to testing.
- Facilitate the availability of new testing technologies on the Canadian market.
- Support the uptake and integration of new testing approaches in care systems.

Prevention, treatment and care *(applies to populations that receive health services or coverage of health care benefits from the federal government)*

- Provide effective STBBI prevention, testing and treatment to eligible populations according to best practices.
- Provide coverage for treatment and health services for eligible individuals.
- Incorporate harm reduction approaches to meet the public health needs of populations more likely to be exposed to STBBI.
- Facilitate linkage to care and treatment for those individuals transitioning from federal to provincial and territorial health systems.

Leveraging existing knowledge and targeting future research

- Invest in basic, translational, and clinical research, implementation science, community-based, population health and health system research.
- Expand the prevention toolkit—vaccine and biomedical prevention research.
- Invest in emerging and innovative testing and diagnostic technologies and approaches.
- Invest in research on novel therapeutic strategies and the biological mechanisms influencing predisposition to, or persistence of, STBBI, with a continued focus on a cure for HIV.
- Develop First Nations, Inuit and Métis health research capacity.

Measuring impact

- Develop Canada's STBBI targets and indicators with our partners.
- Strengthen national surveillance systems to provide necessary data.
- Report on progress annually.

GUIDING PRINCIPLES

- Meaningful engagement of people living with HIV and viral hepatitis and key populations
- Moving towards truth and reconciliation
- Integration
- Cultural relevance
- Human rights
- Health equity
- Life course approach
- Multi-sectoral approach
- Evidence-based policy and programs

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Good Progress now on suppression rates in many provinces (3rd 90)

ONTARIO NEARING UN AIDS 90-90-90 TARGETS FOR HIV CARE

According to a recent study following over 5,000 people living with HIV, Ontario is successfully engaging people with HIV in care and providing sustained, effective treatment. The study, **Engagement in HIV Care Among Persons Enrolled in a Clinical Care Cohort in Ontario, Canada, 2001-2011**, was in the *Journal of Acquired Immune Deficiency Syn* authored by Ann Burchell, Sandra Gardner, Sean other members of the OHTN Cohort Study Tean

KEY FINDINGS OF THIS STUDY

- Most study participants living with HIV are engag care.
- Over three-quarters of people living with HIV are treated with antiretroviral drugs; almost all have g reduced amounts of HIV in their bodies as a resul
- Over the past few years, Ontario has made steady towards achieving international targets.
- More effort is required to reach groups of people who are less likely to be in care, including young people who use substances and heterosexual me

Articles

The cascade of HIV care in British Columbia, Canada, 1996–2011: a population-based retrospective cohort study

Bohdan Nosyk, Julio S G Montaner, Guillaume Colley, Viviane D Lima, Keith Chan, Katherine Heath, Benita Yip, Hasina Samji, Mark Gilbert, Rolando Barrios, Réka Gustafson, Robert S Hogg, for the STOP HIV/AIDS Study Group

Summary

Background The cascade of HIV care has become a focal point for implementation efforts to maximise the individual and public health benefits of antiretroviral therapy. We aimed to characterise longitudinal changes in engagement with the cascade of HIV care in British Columbia, Canada, from 1996 to 2011.

Methods We used estimates of provincial HIV prevalence from the Public Health Agency of Canada and linked provincial population-level data to define, longitudinally, the numbers of individuals in each of the eight stages of the cascade of HIV care (HIV infected, diagnosed, linked to HIV care, retained in HIV care, highly active antiretroviral therapy (HAART) indicated, on HAART, adherent to HAART, and virologically suppressed) in British Columbia from 1996 to 2011. We used sensitivity analyses to determine the sensitivity of cascade-stage counts to variations in their definitions.

EPIDEMIOLOGY AND PREVENTION

The Impact of Transfer Patients on the Local Cascade of HIV Care Continuum

Hartmut B. Krentz, PhD,† Judy MacDonald, MD,‡ and M. John Gill, MD*†*

Background: The Cascade of Care (COC) visualizes stages of HIV care progression within a population. It is predicated on a local population model and thus may not address the impact on the COC of HIV-experienced individuals diagnosed and cared for elsewhere who move into the area.

Methods: All individuals with a confirmed HIV+ test in Calgary, Canada, between January 1, 2006, and January 1, 2013 were included. Individuals were categorized as "local" if diagnosed within the area, or "transfer" if diagnosed elsewhere. Subgroups were separately placed within the COC and then aggregated.

Results: Of 1019 new cases, 47% were transfers. Transfer patients were more likely female (35% vs. 23%; $P < 0.01$), non-white (61% vs. 46%; $P < 0.001$), heterosexual (56% vs. 38%; $P < 0.001$), and have higher CD4 counts (400 vs. 282/mm³) with undetectable viremia in 57% [63% on antiretroviral therapy (ART)] at baseline. Engagement was higher at every stage for transfer patients: 94% of transfer vs. 92% of local patients linked to HIV care, 90% vs. 76% ($P < 0.001$) were retained, 86% vs. 67% ($P < 0.001$) received ART, and at study's end, 75% vs. 58% ($P < 0.001$) had undetectable viremia. When patients were aggregated, linkage increased by 1%, retention by 6%, patient use of ART by 8%, and patients with viral suppression by 7%.

Conclusions: The COC of local and transfer patients differs so significantly that both need to be considered separately in measuring COC, adding a previously under-recognized level of complexity. Use of aggregate COC without considering different levels of engagement could lead to imprecise information for public health initiatives and program metrics.

Key Words: HIV/AIDS, cascade of care, mobility, migration, accessing care, Canada

(*J Acquir Immune Defic Syndr* 2015;68:236–240)

INTRODUCTION

The Cascade of Care (COC) has been developed as a potent tool for the presentation of summary statistics on the number of individuals within a population who are infected with HIV, diagnosed with HIV, linked to HIV-specific care, retained in care, on antiretroviral treatment (ART), and with suppressed HIV replication.[1–3] The COC is presented as a continuum of care displaying discrete stages and the percentage of the population falling into each stage. It offers great value for identifying critical areas for measuring and improving both service delivery as well as the population's health.[4–6]

Although seldom stated, the COC is usually predicated on a model of a local population documenting progression of new patients from diagnosis to viral suppression. Although powerful in assessing the success of the local programs in service delivery, the use of a COC to reflect the dynamics of care of the whole local HIV community may be misleading, as it may fail to account for the impact of patient migration. If a sizeable number of HIV-experienced patients (ie, previously retained in care and on ART) transfer into a community at different stages of their HIV infection, they can introduce uncertainty, bias, or inaccuracy into the COC in that community. The widespread use of ART, which has resulted in a dramatic improvement in the quality and quantity of life, has enabled migration both for personal choice or economic necessity leading to an associated transfer of HIV care.[10–14] Migration or geographic mobility may be "internal" (ie, within a country) or "external" (immigration between countries sometimes due to forced displacement).[16–19] Movement between communities and HIV care centers has been reported to have negative consequences on the individuals' HIV health.[15,16,20–23]

The status of transfer patients within the local COC remains problematic. Individuals who acquire their HIV infection elsewhere but are first diagnosed locally would be considered a "locally diagnosed" patient in public health metrics. Those diagnosed who accessed care elsewhere before moving are included in the regional COC model although at a different entry point from locally diagnosed individuals. The time spent in the local community before accessing HIV care also is often not taken into consideration. HIV-experienced transfer patients thus are neither "newly diagnosed" HIV cases, nor are they nonlinked, nonretained, lost to follow-up (LTFU), nor necessarily treatment naive. Buskin et al[24] recently discussed the difficulties in the estimation of the cascade due to the challenges of migration, noting that proportions in and out of care can substantially vary depending on the status of individuals in the area. Use of an aggregate community COC including a large transfer population with characteristics different from the local population

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JIAS JOURNAL OF THE INTERNATIONAL AIDS SOCIETY

RESEARCH ARTICLE

Progress towards the United Nations 90-90-90 and 95-95-95 targets: the experience in British Columbia, Canada

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Abstract

Introduction: Antiretroviral therapy (ART) scale-up is central to the global strategy to control the HIV/AIDS pandemic. To accelerate efforts towards ending the AIDS epidemic, the Joint United Nations Programme on HIV/AIDS released the 90-90-90 and 95-95-95 targets, which have recently been approved by the United Nations (UN). This study characterizes the province of British Columbia (BC)'s progress towards achieving the UN targets, predicts a trajectory up to 2030 according to each of the individual steps (i.e. %Diagnosed, %On ART and %Virologically Suppressed), and identifies the population subgroups at higher risk of not achieving these targets.

Methods: The analyses were based on linked individual-level datasets of people living with HIV (PLWH) in BC, aged ≥18 months, from 2000 to 2013. Using past trends in HIV prevalence and of each individual UN targets, we forecasted these outcomes until 2030 via generalized additive models. We ran a second set of analyses to assess the associations between individual demographic and behavioural factors and each of the individual steps of the UN targets. Lastly, we performed sensitivity analyses to account for uncertainty associated with prevalence estimates and suppression definitions.

Results: Among the estimated 10666 PLWH in BC in 2013, 82% were diagnosed, 76% of those diagnosed were on ART and 83% of those on ART were virologically suppressed. We identified that females, PLWH aged <30 years and those with unknown risk or who self-identify as having a history of injection drug use were the population subgroups that experienced the most challenge in engaging on ART and achieving viral suppression. Our model projections suggest that BC will achieve 90%-91%-90% and 97%-99%-97% by 2020 and 2030 respectively.

Conclusions: As we approach 2020, BC is rapidly moving towards achieving the UN targets. However, region-specific challenges persist. Identification of remaining regional challenges will be essential to achieving the proposed UN targets and therefore fulfilling the promise to end AIDS as a pandemic by 2030.

Keywords: UNAIDS target; UN target; 90-90-90; 95-95-95; Diagnosis; Antiretroviral Therapy; Viral Suppression; Risk Factors; British Columbia

To access the supplementary material to this article please see Supplementary Files under Article Tools online.

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1 | INTRODUCTION

Expanded access to antiretroviral therapy (ART) has a significant role to play in the global strategy to control the HIV/AIDS pandemic and alleviate its impact on people living with HIV (PLWH) [1]. There is ample scientific evidence suggesting that early ART initiation not only reduces morbidity and mortality, but also reduces incidence rates of HIV, resulting in the concept of "Treatment as Prevention (TasP)" [2]. Definitive evidence of the effect of ART on HIV transmission via heterosexual contact was provided by the HTPN 052 randomized control trial [3]. This finding was verified among men who have sex with men in the PARTNER study [4], and further supported by a number of observational and modelling population-based studies [5–7].

In order to achieve maximum benefits from the expansion of TasP, it is crucial that PLWH are diagnosed early in the course of their HIV infection, linked and retained in HIV care, offered treatment at diagnosis, and highly adherent to attain and sustain full virologic suppression [8]. As a result, monitoring engagement in the "HIV cascade of care" is now widely recognized as a critical element of HIV surveillance, aimed at ensuring PLWH can fully benefit from existing management strategies, including immediate access to ART to prevent disease progression to AIDS and premature death, and to minimize the risk of ongoing HIV transmission.

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"I have been impressed with the urgency of doing.
Knowing is not enough; we must apply.
Willing is not enough; we must do."

LEONARDO DA VINCI
(ARTIST AND SCIENTIST)

The Context

Unlike other G7 countries, Canada is not seeing a reduction in the number of new people being diagnosed with HIV, notwithstanding significant investments over the past many years.

Recent data from the Public Health Agency of Canada (PHAC) indicate that in 2016 an estimated 2,165 people became infected with HIV in Canada.[1] This is one new infection every four hours. Our numbers are almost 10% higher than in 2014.

Jurisdictions around the world have launched new, highly targeted initiatives to end HIV, including "Getting to Zero" and the UNAIDS strategy to end AIDS by 2030. Although Canada has endorsed the UNAIDS 90-90-90 target[2] (90% diagnosed, 90% of those on treatment and in care, and 90% of those who are suppressed), we lag behind others in reaching these targets. But with strategic interventions, we believe that in the next five years we can "bend the curve" and end the HIV epidemic in Canada. New cases of HIV will become rare events.

How is Canada Doing?

It is estimated that there are 63,110 people living with HIV in Canada,[1] but only 86% of those are diagnosed (1st 90 target) – **this represents 9,090 individuals who have undiagnosed HIV infection across the country who are not adequately connected to our health care system.** While many G7 countries are seeing progressive declines in the number of those undiagnosed – we are not in Canada.

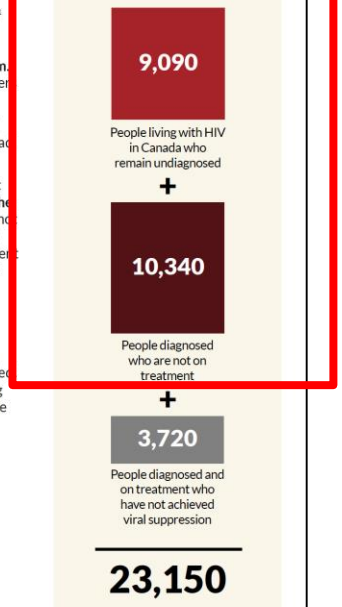
For those people diagnosed with HIV, 81% are now on antiretroviral treatment (2nd 90 target), and of those, 91% have suppressed viral load (3rd 90 target).

While we have reached one of three key UNAIDS targets, we cannot lose sight that there are 23,150 people who are still falling through the cracks along the cascade (see chart on right)[1]. All of these people are not benefitting from appropriate prevention, treatment and ongoing care and supportive services to support their own health. And we can prevent the further transmission of HIV if our public health, community-based and health care systems can support these individuals to get tested, diagnosed, be on treatment and achieve viral suppression.

We have to change our approach.

In contrast to most other developed countries, we do not have the leadership in place or a national coordinated approach that is needed. But with targeted and pragmatic interventions for testing, reaching those who are undiagnosed, and supporting more people to manage and adhere to treatment, and achieve viral suppression, we can achieve (and exceed) Canada's UNAIDS commitment to all three of the 90-90-90 targets – and Canada can effectively end its HIV epidemic in the next five years.

Who Are the 23,150 People We're Missing?



Key challenges that need to be solved – particularly for 1st / 2nd 90's

1. **Number of new HIV infections (incidence) has decreased only slightly in past few years**
2. **Point-of-care testing is flatlined, and self-testing is not available**
3. HIV prevention has become more complex
4. Too many with HIV are diagnosed late and not linked quickly to care
5. HIV continues to have a devastating effect on members of a number of priority / marginalized populations
6. People with or at risk of HIV often have complex social/health needs
7. Health care systems expect greater accountability for and return on investment from public resources
8. Competition for government and private funding has increased
9. Canadians have become complacent about HIV
10. HIV continues to be a very stigmatizing condition, #1 concern

New Infections and the undiagnosed / Not in care ?

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Gray RT et al. *Journal of the International AIDS Society* 2018, **21**:e25104
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RESEARCH ARTICLE

Undiagnosed HIV infections among gay and bisexual men increasingly contribute to new infections in Australia

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Abstract

Introduction: We determined the contribution of undiagnosed HIV to new infections among gay and bisexual men (GBM) over a 12-year period in Australia where there has been increasing focus on improving testing and HIV treatment coverage.

Methods: We generated annual estimates for each step of the HIV cascade and the number of new HIV infections for GBM in Australia over 2004 to 2015 using relevant national data. Using Bayesian melding we then fitted a quantitative model to the cascade and incidence estimates to infer relative transmission coefficients associated with being undiagnosed, diagnosed and not on ART, on ART with unsuppressed virus, or on ART with suppressed virus.

Results: Between 2004 and 2015, we estimated the percentage of GBM with HIV in Australia who were unaware of their status to have decreased from 14.5% to 7.5% during the same period. There was a substantial increase in the number and proportion of GBM living with HIV on treatment, increasing from around 3900 (30.2% of all GBM with HIV) in 2015. Despite the increase in viral suppression, 760 over this period. Our results have a wide cients. Nevertheless, undiagnosed GBM increa attributable to undiagnosed GBM almost doub nated from GBM with suppressed virus.

Discussion: Our study suggests that an increa transmission from people living with HIV. How GBM has increased substantially. These findin tralian GBM at high risk of HIV.

Keywords: Australia; gay and bisexual men; ma

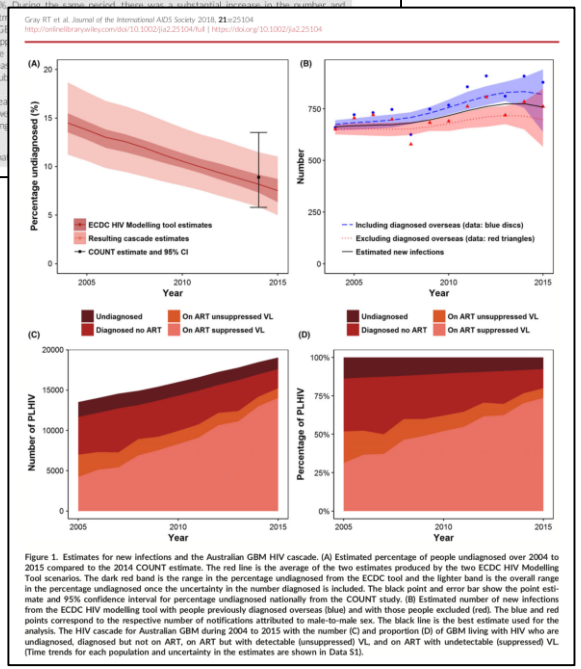

Figure 1. Estimates for new infections and the Australian GBM HIV cascade. (A) Estimated percentage of people undiagnosed over 2004 to 2015 compared to the 2014 COUNT estimate. The red line is the average of the two estimates produced by the two ECDC HIV Modelling Tool scenarios. The dark red band is the range in the percentage undiagnosed from the ECDC tool and the lighter band is the overall range in the percentage undiagnosed once the uncertainty in the number diagnosed is included. The black point and error bar show the point estimate and 95% confidence interval for percentage undiagnosed nationally from the COUNT study. (B) Estimated number of new infections from the ECDC HIV modelling tool with people previously diagnosed overseas (blue) and with those people excluded (red). The blue and red points correspond to the respective number of notifications attributed to male-to-male sex. The black line is the best estimate used for the analysis. The HIV cascade for Australian GBM during 2004 to 2015 with the number (C) and proportion (D) of GBM living with HIV who are undiagnosed, diagnosed but not on ART, on ART but with detectable (unsuppressed) VL, and on ART with undetectable (suppressed) VL. (Time trends for each population and uncertainty in the estimates are shown in Data S1).

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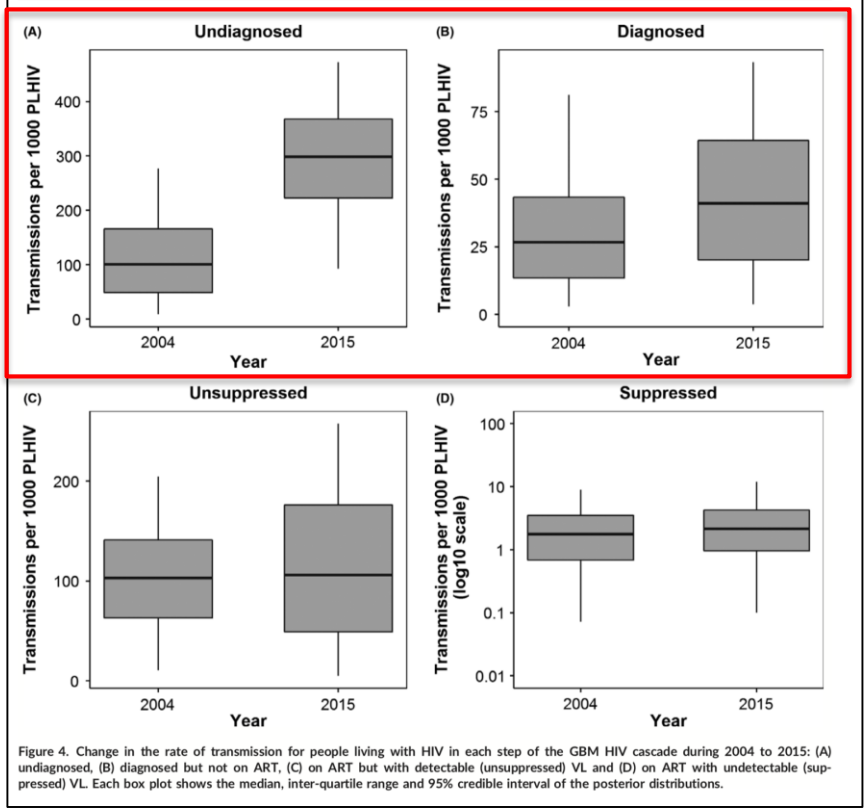

Figure 4. Change in the rate of transmission for people living with HIV in each step of the GBM HIV cascade during 2004 to 2015: (A) undiagnosed, (B) diagnosed but not on ART, (C) on ART but with detectable (unsuppressed) VL and (D) on ART with undetectable (suppressed) VL. Each box plot shows the median, inter-quartile range and 95% credible interval of the posterior distributions.

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Modelling HIV Transmissions Along Care Continuum

Centre for Urban Health Solutions

Morbidity and Mortality Weekly Report

Vital Signs: HIV Transmission Along the Continuum of Care — United States, 2016

Zihao Li, PhD[1]; David W. Purcell, JD, PhD[1]; Stephanie L. Sansom, PhD[1]; Demorah Hayes, MA[1]; H. Irene Hall, PhD[1]

On March 18, 2019, this report was posted as an MMWR *Early Release on the* MMWR *website (https://www.cdc.gov/mmwr).*

Abstract

Background: In 2016, an estimated 1.1 million persons had human immunodeficiency virus (HIV) infection in the United States; 38,700 were new infections. Knowledge of HIV infection status, behavior change, and antiretroviral therapy (ART) all prevent HIV transmission. Persons who achieve and maintain viral suppression (achieved by most persons within 6 months of starting ART) can live long, healthy lives and pose effectively no risk of HIV transmission to their sexual partners.

Methods: A model was used to estimate transmission rates in 2016 along the HIV continuum of care. Data for sexual and needle-sharing behaviors were obtained from National HIV Behavioral Surveillance. Estimated HIV prevalence, incidence, receipt of care, and viral suppression were obtained from National HIV Surveillance System data.

Results: Overall, the HIV transmission rate was 3.5 per 100 person-years in 2016. Along the HIV continuum of care, the transmission rates from persons who were 1) acutely infected and unaware of their infection, 2) non-acutely infected and unaware, 3) aware of HIV infection but not in care, 4) receiving HIV care but not virally suppressed, and 5) taking ART and virally suppressed were 16.1, 8.4, 6.6, 6.1, and 0 per 100 person-years, respectively. The percentages of all transmissions generated by each group were 4.0%, 33.6%, 42.6%, 19.8%, and 0%, respectively.

Conclusion: Approximately 80% of new HIV transmissions are from persons who do not know they have HIV infection or are not receiving regular care. Going forward, increasing the percentage of persons with HIV infection who have achieved viral suppression and do not transmit HIV will be critical for ending the HIV epidemic in the United States.

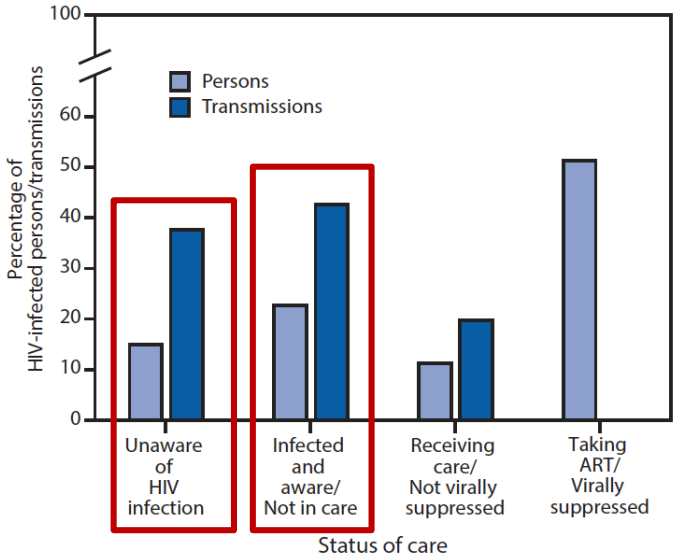
Introduction

Medical treatment has substantially improved the health, quality of life, and life expectancy of persons with HIV infection (*1*). The benefits of treatment are maximized with suppression of the virus (<200 copies of HIV/mL of blood on the most recent viral load test), which benefits health and decreases rates of transmission. Four recent studies found that viral suppression prevented sexual transmission of HIV (*2–5*). Together, these prospective studies found no HIV transmissions attributable to sex between HIV-discordant couples when the partner with HIV infection was on treatment and maintained viral suppression, despite documenting tens of thousands of acts of condomless sex in which the HIV-negative partner was not using preexposure prophylaxis. These findings indicate that HIV transmission can become a rare event if persons with infection can obtain treatment and achieve and maintain viral suppression. Today's treatment regimens are simpler than those prescribed in the past, sometimes requiring only single-tablet formulations, with fewer side effects; most persons with HIV infection can achieve viral suppression within 6 months of initiating treatment. These findings also provide an important scientific underpinning to the new federal initiative headed by the U.S. Department of Health and Human Services (HHS) to end the HIV epidemic in the United States within 10 years (*6*).

Despite the availability of effective treatment, many of the 1.1 million persons with HIV infection in the United States are not effectively treated (*7,8*). In 2015, among all persons with HIV infection, 14.5% did not have a diagnosis, 37.2% were not in care,* and 48.9% were not virally suppressed (*7*). In addition, sexual and injection-drug–associated risk behaviors varied with knowledge of HIV infection status and access to care (*9,10*). Lack of effective treatment results in worse outcomes for persons with HIV infection and higher rates of HIV transmission and was associated with 38,700 new HIV infections in 2016 (*8*). To focus national and local prevention efforts to eliminate HIV, CDC used a model to estimate the number of persons and HIV transmissions at each step along the continuum of care.

* Receipt of medical care is defined as one or more tests (CD4 or viral load) in the measurement year. The percentage of persons with HIV infection who are in care is obtained by multiplying the percentage with diagnosed infection by percentage in care among persons with diagnosed HIV infection.

FIGURE 1. Percentage of persons* with human immunodeficiency virus (HIV) infection and percentage of transmissions along the continuum of HIV care† — United States, 2016§,¶



Abbreviation: ART = antiretroviral therapy.

* Percentage of persons in each subgroup averaged over 12 months in the model.

† Receipt of medical care was defined as one or more test (CD4 or viral load) in 2016.

§ Viral suppression was defined as <200 copies of HIV/mL of blood on the most recent viral load test.

¶ Unaware of HIV infection includes acutely infected and non-acutely infected persons unaware of their HIV infection.

80% of new HIV transmissions arise from: (1) persons with HIV who have not yet received diagnosis (15% - who contributed 38%) or (2) those who have diagnosed infection that is not controlled (23% - who contributed 42%)

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We have the knowledge; We have the tools – We know:

- POC testing and self-testing / home testing can dramatically increase rates of HIV testing and significantly reduce # of those undiagnosed
- PrEP and PEP can dramatically reduce chance of HIV infection for those at high risk, or for those who have had high-risk exposure to HIV
- Treatment as Prevention (TasP) works
- U=U; Those living with HIV who are on ART for at least 6 months and who have undetectable levels of virus in their blood cannot transmit HIV
- Efforts to help people living with HIV to have access to ARVs, be linked and retained in care work and are essential for optimal health and wellbeing

- From work outside Canada: Most G7 countries have dramatically scaled up testing, prevention, and access to and support for treatment – with very progressive results

Integrating Primary and Secondary Prevention Critical

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Important Context and Opportunity for Community-based and Health System Integration and Linkages

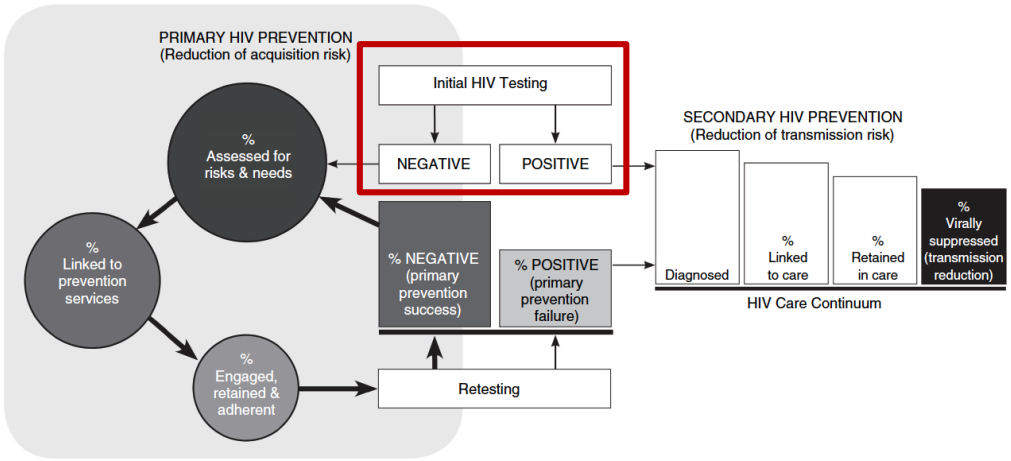
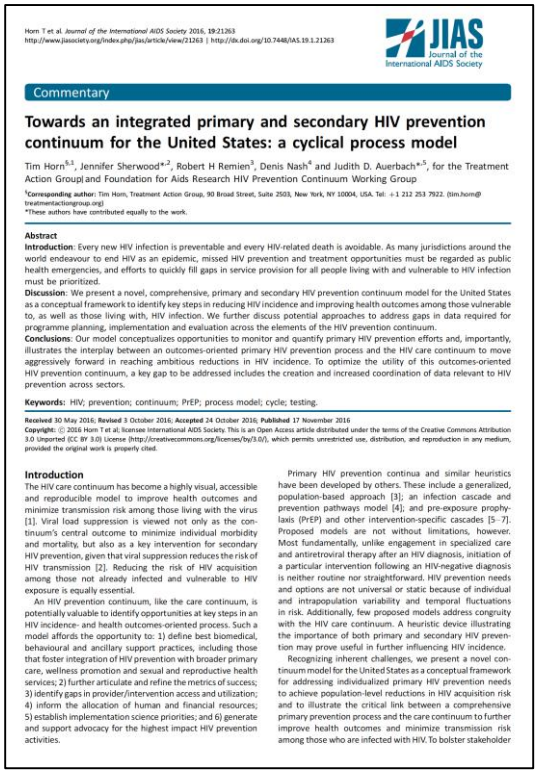


Figure 1. Comprehensive HIV prevention processes. Conceptual framework illustrating the interplay between processes to halt both the acquisition and transmission of HIV. The primary HIV prevention cycle, left, begins with HIV testing. Risk and needs assessments, linkage to services, engagement in risk-reduction prevention interventions and HIV testing are repeated for as long as an individual remains at risk for HIV acquisition.



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Commentary

Towards an integrated primary and secondary HIV prevention continuum for the United States: a cyclical process model

Tim Horn[1,3], Jennifer Sherwood*[,2], Robert H Remien[3], Denis Nash[4] and Judith D. Auerbach*[,5], for the Treatment Action Group and Foundation for Aids Research HIV Prevention Continuum Working Group

[1]**Corresponding author:** Tim Horn, Treatment Action Group, 90 Broad Street, Suite 2503, New York, NY 10004, USA. Tel: +1 212 253 7922. (tim.horn@treatmentactiongroup.org)
*These authors have contributed equally to the work.

Abstract

Introduction: Every new HIV infection is preventable and every HIV-related death is avoidable. As many jurisdictions around the world endeavour to end HIV as an epidemic, missed HIV prevention and treatment opportunities must be regarded as public health emergencies, and efforts to quickly fill gaps in service provision for all people living with and vulnerable to HIV infection must be prioritized.

Discussion: We present a novel, comprehensive, primary and secondary HIV prevention continuum model for the United States as a conceptual framework to identify key steps in reducing HIV incidence and improving health outcomes among those vulnerable to, as well as those living with, HIV infection. We further discuss potential approaches to address gaps in data required for programme planning, implementation and evaluation across the elements of the HIV prevention continuum.

Conclusions: Our model conceptualizes opportunities to monitor and quantify primary HIV prevention efforts and, importantly, illustrates the interplay between an outcomes-oriented primary HIV prevention process and the HIV care continuum to move aggressively forward in reaching ambitious reductions in HIV incidence. To optimize the utility of this outcomes-oriented HIV prevention continuum, a key gap to be addressed includes the creation and increased coordination of data relevant to HIV prevention across sectors.

Keywords: HIV; prevention; continuum; PrEP; process model; cycle; testing.

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Introduction

The HIV care continuum has become a highly visual, accessible and reproducible model to improve health outcomes and minimize transmission risk among those living with the virus [1]. Viral load suppression is viewed not only as the continuum's central outcome to minimize individual morbidity and mortality, but also as a key intervention for secondary HIV prevention, given that viral suppression reduces the risk of HIV transmission [2]. Reducing the risk of HIV acquisition among those not already infected and vulnerable to HIV exposure is equally essential.

An HIV prevention continuum, like the care continuum, is potentially valuable to identify opportunities at key steps in an HIV incidence- and health outcomes-oriented process. Such a model affords the opportunity to: 1) define best biomedical, behavioural and ancillary support practices, including those that foster integration of HIV prevention with broader primary care, wellness promotion and sexual and reproductive health services; 2) further articulate and refine the metrics of success; 3) identify gaps in provider/intervention access and utilization; 4) inform the allocation of human and financial resources; 5) establish implementation science priorities; and 6) generate and support advocacy for the highest impact HIV prevention activities.

Primary HIV prevention continua and similar heuristics have been developed by others. These include a generalized, population-based approach [3]; an infection cascade and prevention pathways model [4]; and pre-exposure prophylaxis (PrEP) and other intervention-specific cascades [5–7]. Proposed models are not without limitations, however. Most fundamentally, unlike engagement in specialized care and antiretroviral therapy after an HIV diagnosis, initiation of a particular intervention following an HIV-negative diagnosis is neither routine nor straightforward. HIV prevention needs and options are not universal or static because of individual and intrapopulation variability and temporal fluctuations in risk. Additionally, few proposed models address congruity with the HIV care continuum. A heuristic device illustrating the importance of both primary and secondary HIV prevention may prove useful in further influencing HIV incidence.

Recognizing inherent challenges, we present a novel continuum model for the United States as a conceptual framework for addressing individualized primary HIV prevention needs to achieve population-level reductions in HIV acquisition risk and to illustrate the critical link between a comprehensive primary prevention process and the care continuum to further improve health outcomes and minimize transmission risk among those who are infected with HIV. To bolster stakeholder

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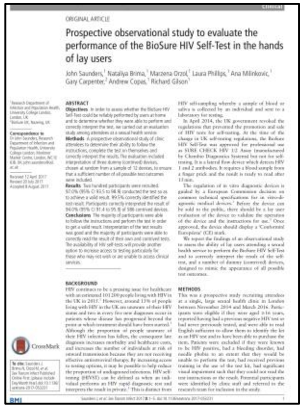
POC and Self-Testing - We have the evidence we can act on:

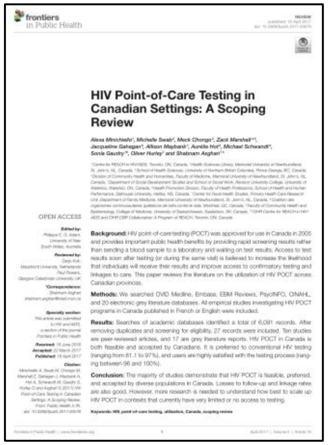
Ease of use of HIV Self-Tests


Prospective observational study to evaluate the performance of the BioSure HIV Self-Test in the hands of lay users


Journal of Clinical Virology

Evaluation of the accuracy and ease of use of a rapid HIV-1 Antibody Test performed by untrained operators at the point of care

Widespread support for POC / HIV Self-Testing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A Global Review of HIV Self-testing: Themes and Implications


What do Key Stakeholders Think About HIV Self-Testing in Canada? Results from a Cross-Sectional Survey

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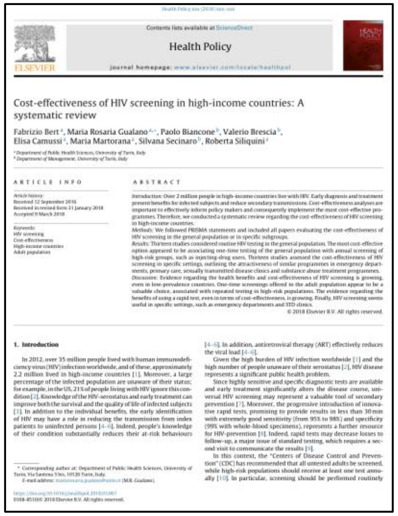
Acceptability / Cost-effectiveness of HIV Testing


Prevalence of HIV infection and acceptability of point-of-care testing in a Canadian inner-city emergency department


Clinical Infectious Diseases

The Cost-Effectiveness of Human Immunodeficiency Virus Testing and Treatment Engagement Initiatives in British Columbia, Canada: 2011–2013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Cost-effectiveness of HIV screening in high-income countries: A systematic review

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CATIE

Canada's source for HIV and hepatitis C information

La source canadienne de renseignements sur le VIH et l'hépatite C

Reaching The Undiagnosed

HIV and HCV Point-of-Care Testing in Canada: Technologies and Community Programs

National Collaborating Centre for Infectious Diseases
Centre de collaboration nationale des maladies infectieuses

REACH 2.0

- **Geneviève Boily-Larouche**, NCCID
- **Lesley Gallagher**, Hepatitis C Nurse Clinician Vancouver Coastal Health
- **Christine Hughes**, Professor, Faculty of Pharmacy & Pharmaceutical Sciences, University of Alberta
- **Jason Kielly**, Assistant Professor, School of Pharmacy, Memorial University of Newfoundland
- **Wangari Tharao**, Women's Health in Women's Hands

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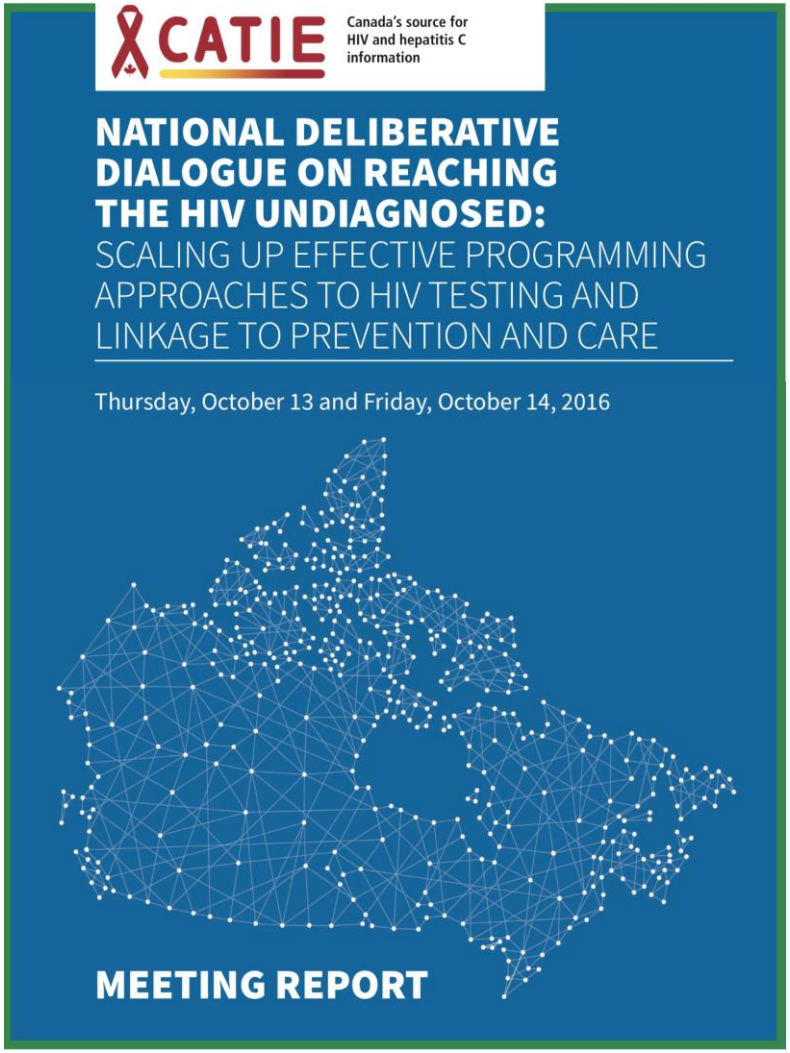
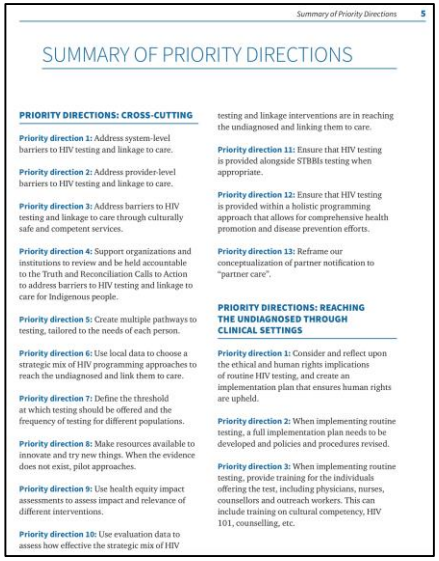
All participants will be muted until the question period.

Key Priorities and Directions





Summary of Priority Directions 5

SUMMARY OF PRIORITY DIRECTIONS

PRIORITY DIRECTIONS: CROSS-CUTTING

Priority direction 1: Address system-level barriers to HIV testing and linkage to care.

Priority direction 2: Address provider-level barriers to HIV testing and linkage to care.

Priority direction 3: Address barriers to HIV testing and linkage to care through culturally safe and competent services.

Priority direction 4: Support organizations and institutions to review and be held accountable to the Truth and Reconciliation Calls to Action to address barriers to HIV testing and linkage to care for Indigenous people.

Priority direction 5: Create multiple pathways to testing, tailored to the needs of each person.

Priority direction 6: Use local data to choose a strategic mix of HIV programming approaches to reach the undiagnosed and link them to care.

Priority direction 7: Define the threshold at which testing should be offered and the frequency of testing for different populations.

Priority direction 8: Make resources available to innovate and try new things. When the evidence does not exist, pilot approaches.

Priority direction 9: Use health equity impact assessments to assess impact and relevance of different interventions.

Priority direction 10: Use evaluation data to assess how effective the strategic mix of HIV testing and linkage interventions are in reaching the undiagnosed and linking them to care.

Priority direction 11: Ensure that HIV testing is provided alongside STBBIs testing when appropriate.

Priority direction 12: Ensure that HIV testing is provided within a holistic programming approach that allows for comprehensive health promotion and disease prevention efforts.

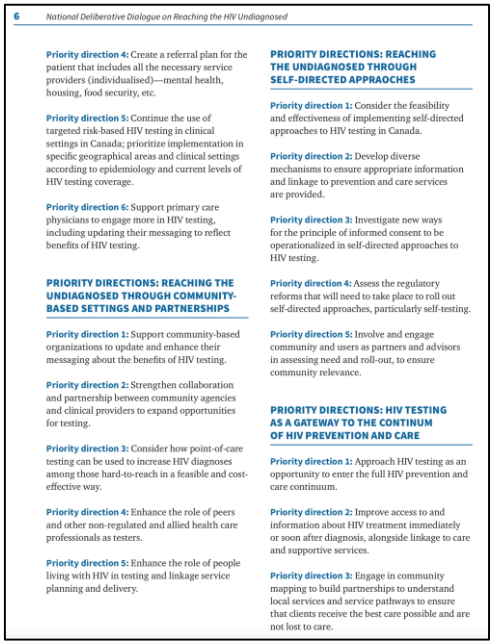
Priority direction 13: Reframe our conceptualization of partner notification to "partner care".

PRIORITY DIRECTIONS: REACHING THE UNDIAGNOSED THROUGH CLINICAL SETTINGS

Priority direction 1: Consider and reflect upon the ethical and human rights implications of routine HIV testing, and create an implementation plan that ensures human rights are upheld.

Priority direction 2: When implementing routine testing, a full implementation plan needs to be developed and policies and procedures revised.

Priority direction 3: When implementing routine testing, provide training for the individuals offering the test, including physicians, nurses, counsellors and outreach workers. This can include training on cultural competency, HIV 101, counselling, etc.



6 *National Deliberative Dialogue on Reaching the HIV Undiagnosed*

Priority direction 4: Create a referral plan for the patient that includes all the necessary service providers (individualised)—mental health, housing, food security, etc.

Priority direction 5: Continue the use of targeted risk-based HIV testing in clinical settings in Canada; prioritize implementation in specific geographical areas and clinical settings according to epidemiology and current levels of HIV testing coverage.

Priority direction 6: Support primary care physicians to engage more in HIV testing, including updating their messaging to reflect benefits of HIV testing.

PRIORITY DIRECTIONS: REACHING THE UNDIAGNOSED THROUGH COMMUNITY-BASED SETTINGS AND PARTNERSHIPS

Priority direction 1: Support community-based organizations to update and enhance their messaging about the benefits of HIV testing.

Priority direction 2: Strengthen collaboration and partnership between community agencies and clinical providers to expand opportunities for testing.

Priority direction 3: Consider how point-of-care testing can be used to increase HIV diagnoses among those hard-to-reach in a feasible and cost-effective way.

Priority direction 4: Enhance the role of peers and other non-regulated and allied health care professionals as testers.

Priority direction 5: Enhance the role of people living with HIV in testing and linkage service planning and delivery.

PRIORITY DIRECTIONS: REACHING THE UNDIAGNOSED THROUGH SELF-DIRECTED APPRAOCHES

Priority direction 1: Consider the feasibility and effectiveness of implementing self-directed approaches to HIV testing in Canada.

Priority direction 2: Develop diverse mechanisms to ensure appropriate information and linkage to prevention and care services are provided.

Priority direction 3: Investigate new ways for the principle of informed consent to be operationalized in self-directed approaches to HIV testing.

Priority direction 4: Assess the regulatory reforms that will need to take place to roll out self-directed approaches, particularly self-testing.

Priority direction 5: Involve and engage community and users as partners and advisors in assessing need and roll-out, to ensure community relevance.

PRIORITY DIRECTIONS: HIV TESTING AS A GATEWAY TO THE CONTINUM OF HIV PREVENTION AND CARE

Priority direction 1: Approach HIV testing as an opportunity to enter the full HIV prevention and care continuum.

Priority direction 2: Improve access to and information about HIV treatment immediately or soon after diagnosis, alongside linkage to care and supportive services.

Priority direction 3: Engage in community mapping to build partnerships to understand local services and service pathways to ensure that clients receive the best care possible and are not lost to care.

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Developed an Action Plan – Need to Implement !!

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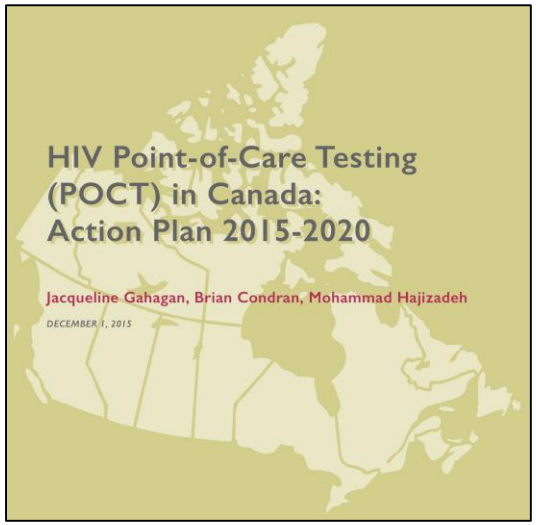

TABLE 2 displays the number of tests distributed to each province/territory annually since 2011. It should be noted that these data do not offer a break down related to test kits that are designated for quality assurance purposes and therefore cannot offer a definitive indication of how many test kits were used for actual screening. However, the data in Table 2 also compare the number of INSTI tests delivered to each province in 2013 with the number of HIV-infected individuals diagnosed during the same year through any form of HIV testing. While the highest ratio of test kits to HIV cases appears to be the Yukon, this is due to only a single case of HIV being identified in 2013 while 96 test kits were delivered in this same year. Among the Canadian provinces, Ontario had the highest ratio, while British Columbia had the second highest.

TABLE 2: INSTI Test Kits and HIV-infected individuals by province/territory in Canada: 2011-2015

Name	Number of distributed INSTI Test Kits						HIV-infected individuals in 2013**	Test Kits per each HIV-infected individual in 2013
	2011	2012	2013	2014	2015*	Total		
Quebec (QC)	2,142	8,561	8,141	10,108	5,894	34,846	457	17.83
Nova Scotia (NS)	0	0	0	0	0	0	16	0
Saskatchewan (SK)	4,536	1,920	3,984	4,080	996	15,516	126	31.59
Alberta (AB)	384	3,816	4,104	4,344	3,502	16,150	260	15.76
Newfoundland & Labrador (NL)	0	0	0	0	0	0	7	0
British Columbia (BC)	8,976	12,466	15,840	16,8740	10,474	64,630	270	58.59
New Brunswick (NB)	0	0	0	0	0	0	6	0
Prince Edward Island (PEI)	0	0	0	0	0	0	2	0
Yukon (YT)	48	48	96	48	48	288	1	97.68
Manitoba (MB)	120	1,784	2,572	2,974	9,282	9,732	116	22.09
Ontario (ON)	53,975	39,874	57,166	43,437	19,197	213,649	827	69.16
Nunavut (NU)	0	0	0	0	0	0	0	0
Northwest Territories (NT)	0	0	0	0	0	0	1	0

* The reported numbers represent the distributed INSTI Test Kits between January 1st, 2015 and June 30th, 2015.
** Data were obtained from Public Health Agency of Canada. HIV and AIDS in Canada: Surveillance Report to December 31, 2013. Minister of Public Works and Government Services Canada; 2014

Key Action and Opportunities

4.0 Key Actions and Expected Outcomes 2015-2020

TABLE 1 provides an overview of the key actions and expected outcomes in advancing HIV POCT in Canada. Achieving these key actions by 2020 will require partnerships between government, community, research and industry sectors..

TABLE 1: Key Actions and Expected Outcomes 2015-2020

Actions	Key Partners	Expected outcomes
1. AWARENESS Increase awareness of importance of HIV POCT, and related testing innovations such as testing settings, delivery methods, programs approaches, and multiplex and self-test technologies in Canada.	Federal, Provincial Territories AIDS (FPT AIDS), Public Health Agency of Canada (PHAC), Health Canada's First Nations and Inuit Health Branch, Ministerial Council on the Federal Initiative to Address AIDS (MAC-FI), Canadian Public Health Association (CPHA), Canadian Medical Association (CMA) provincial laboratory managers, national and provincial AIDS Service Organizations (ASOs), community health organizations, sexual health organizations, harm reduction organizations (CHOs, SHOs, HROs), Health Canada, Public Health Units	Increased number of Canadians aware of HIV POCT and other testing innovations available in Canada.
2. ACCESS Increase access to POCT in Canada, particularly in regions where it is not currently available and among populations who could benefit from access.	FPT AIDS, provincial laboratory managers, ASOs, CHOs, SHOs, HROs, government/public health funding bodies.	Increased partnerships between government, community, researchers, and industry to ensure availability of HIV POCT to people at highest risk of HIV without cost throughout each province and territory in Canada.
3. BILLING Offer a billing code for POCT in all Canadian jurisdictions.	FPT AIDS, Public Health Agency of Canada, Health Canada.	All provinces and territories will have a billing code in place for HIV POCT.
4.TRAIN Provide training and education to medical, pharmacy, nursing, social, work and other allied health professions, and lay providers/lay testers including those living with HIV (as peer testers)	FPT AIDS, provincial regulatory bodies for health professions, faculties of health professions at Canadian colleges and universities, Canadian Public Health Association, ASOs, SHOs, HROs.	Increased number of people who are involved in the prevention, treatment, and support of Canadians infected or affected by STBBIs who are trained and have clear standards on HIV POCT.

TABLE 1: Key Actions and Expected Outcomes 2015-2020

Actions	Key Partners	Expected outcomes
5. TEST Increase testing rates among high-risk populations through HIV POCT and other testing innovations.	Provincial laboratories, ASOs, CHOs, SHOs, HROs.	Increased numbers of high-risk populations accessing HIV POCT and other testing innovations.
6. STANDARDS Promote standardization of POCT in Canada.	FPT AIDS, MAC-FI, PHAC, Health Canada, CPHA, ASOs/CBAOs.	Canada develops, updates, and promotes standardization of POCT through increased intersectoral collaboration.
7. EDUCATE Increase education and support for people living with HIV about the prevention of the onward transmission of HIV, about the programs and services for people living with HIV, and about related supports.	FPT AIDS, PHAC, CPHA, faculties of health professions, community-based health care organizations, ASOs/ CBAOs, CHOs, HROs.	Increased number of training and educational opportunities for Canadian health care providers, allied health professionals, community-based health workers, and health trainees on the needs of those living with HIV in relation to HIV transmission.
8. COLLABORATE Strengthen collaboration between urban, suburban, and rural POCT sites for high-risk populations.	FPT AIDS, MAC-FI, Health Canada, PHAC, ASOs, CHOs, SHOs, HROs	Technology is creatively and effectively used to bridge information sharing between urban and rural POCT sites in Canada.
9. REMIND Increase awareness about HIV POCT through reminders to high-risk populations as per current epidemiological data for Canada for sustained awareness.	FPT AIDS, Health Canada, PHAC, CPHA, provincial public health associations, public health units, ASOs, CHOs, SHOs, HROs .	High-risk populations are tested earlier and more regularly. Standards are set to ensure clear practice testing guidelines, including guidelines related to consent, counseling and confidentiality.
10. INNOVATE Increase research on and approval of processes on testing innovation in Canada, including multiplex testing, self-testing options when such test kits are approved, peer based models, settings where testing is offered, and STBBI integration	FPR AIDS, Health Canada, PHAC, Industry, public health units, ASOs, CHOs, SHOs, HROs, health researchers.	Expand options for HIV POCT, multiplex and self-testing for HIV, HCV, and other blood borne infections.

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Ending HIV Epidemic in Canada – Main actions

MAP Centre for Urban Health Solutions

Goal I – Increase Prevention

Within Five Years, Dramatically Reduce New HIV Infections from > 2,100 to < 500 per annum

This would be a major step in ending the HIV epidemic in Canada, where new cases would be rare events.

The Challenges

Certain populations continue to have unacceptably high incidence rates of HIV (and many of these populations intersect with one another, or can have multiple factors of risk).

It is concerning that Indigenous people have incidence rates four times higher than non-Indigenous people; black people of African and Caribbean background living in Canada have incidence rates six times higher than non-black people; men who have sex with men have rates 131 times higher than other men; and people who inject drugs have rates 59 times higher than people who do not inject drugs.[3] We know that we need more testing and prevention efforts, and we need to eliminate the structural barriers that prevent access to the information, tools and supports people need to manage their health.

Despite great advances in testing technology, including the development of highly reliable self-testing options, the rates of HIV testing have not changed appreciably for all priority populations in recent years. We do not have point-of-care testing widely accessible throughout Canada, nor is self-testing yet available.

Our prevention messages and strategies have not kept pace with new scientific evidence (e.g. PrEP, PEP, U=U, TasP) and they do not reach all of those who are at risk, or the general public. Compared to other countries, Canada has not made it easy for people at "high risk" for HIV to access PrEP and PEP.

The Solutions

1. Engage affected communities and the general public about new prevention science and technologies – everyone should know enough about HIV to keep them from acquiring the virus;
2. Increase health promotion messages and campaigns to promote U=U and TasP, and empower people living with HIV to play a major lead role in these prevention efforts;
3. Implement and scale-up evidence-based combination prevention efforts (including PrEP and PEP) that support sexual health and well-being, and that are tailored to support different priority populations' needs and risks;
4. Ensure that there is 100% coverage and access to antiretroviral medications for prevention (PrEP and PEP) and treatment.
5. Increase access to harm reduction supplies and services including condoms and sterile drug use equipment;
6. Address structural barriers to health and wellness, such as poverty, unstable housing, mental health and addiction issues, and racism, as well as other forms of discrimination, that can put people at risk of acquiring HIV.

Definitions

PrEP
(Pre-Exposure Prophylaxis)
Involves an oral pill of antiretroviral medications that, when used correctly (consistently or on demand) by someone who is HIV-negative, works as a highly effective strategy for reducing the possibility of HIV transmission.

PEP
(Post-Exposure Prophylaxis)
Involves starting a 28-day regime of oral pills within 72 hours of potential exposure to HIV, to prevent HIV from taking root and spreading throughout the body.

U=U
Undetectable = untransmittable.

TasP
(Treatment as Prevention)
Refers to the use of antiretroviral medications, specifically their ability to achieve and maintain an undetectable viral load, as a transmission prevention method.

Goal II – Increase Testing

Within Five Years, Increase the Proportion of People Living with HIV Who Are Diagnosed to > 95%

The Challenges

Over 9,000 people in Canada do not know they are infected with HIV, representing 14% of the people in Canada living with HIV.[1]

To reach or exceed the UNAIDS target of 90% of people living with HIV diagnosed, we must dramatically expand our testing efforts to reach as early as possible those who are infected, and reduce number of undiagnosed to less than 5%. Currently, there are few local, regional or national campaigns to raise awareness about HIV risk, or the significant health benefits of testing and antiretroviral treatment for care and for prevention.

The Solutions

1. Normalize HIV testing with other sexually transmitted and blood-borne infections (STBBI) testing;
2. Increase awareness and use of culturally safe, trauma-informed, and sex-positive social media and other promotional technologies and campaigns to increase access to (and benefits of) HIV testing;
3. Increase availability and access to HIV point-of-care testing by trained health care and community providers at no out-of-pocket cost – in health care centres, community health centres, community-based organizations, and pharmacies; and make the tests available where people live and can access them to support their sexual health and well-being;
4. Provide wide-spread and easy access to accurate and affordable self-testing options sold in pharmacies;
5. Work with public health officials, front-line providers and priority populations to expand client-centred HIV testing options and approaches that are innovative, pragmatic and evidence-based, and which includes peer-led programs where appropriate;
6. Work with public health officials and leaders from priority populations to establish and implement appropriate, evidence-based targets for testing frequency that are responsive to individual need and sexual risk;
7. Implement evidence-based, culturally safe and equity-informed interventions to quickly link those who are newly diagnosed to care.

UNAIDS Target – 1st 90

86% of people living with HIV in Canada are currently aware of their status.[1]

- 86% Current
- 9% Goal
- 5% Remainder

9,090 people living with HIV in Canada remain undiagnosed.[1]

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Context / Access Really Matters – and Personal Choice

No one-size-fits-all model for testing

Reaching the right people, at the right time, at the right place, with the most effective programs

- POCT with lay testers integrated in community program
- DBS in remote communities
- POCT Duo Test in Gay men's Clinic
- Self-testing at home

Courtesy of Geneviève Boily-Larouche, NCCID

Working Together: Shared Common Values, Collaborations and Partnerships

Achieving These Goals the Right Way

We Have the Tools to Achieve Our Goals But We Must Ensure that:

1. People living with, at-risk for, and affected by HIV are at the centre of these efforts — this includes gay, bisexual, and other men who have sex with men, black people of African and Caribbean background living in Canada, Indigenous peoples, people who use drugs, at-risk youth and women. They have unique perspectives that are crucial to the leaderships of these efforts and its success.
2. This work is grounded in social justice and health equity. Social justice and self-determination are pathways to better health and wellness among Indigenous peoples, racialized communities and other marginalized groups (gay and bisexual men, and other men who have sex with men, people who use drugs, at-risk youth and women) who have endured significant systemic barriers, institutional racism and discrimination, and poor access to health care. As we work together, we must promote equity for all.
3. Practitioners and community stakeholders are supported to access the evidence base they need (including up-to-date, digestible epidemiological data) to strengthen prevention, care and treatment.
4. Respectful relationships and partnerships are built and nurtured. No one person acting alone will be able to end the epidemic. We must work together, within and across sectors, to build meaningful, respectful and responsive partnerships.
5. We have the mechanisms to monitor and evaluate our efforts to reach our goals.

Outline

1. Setting the stage – Challenges / issues
2. Bringing new STBBI tests to market in Canada
3. HIV self-testing implementation and linkages to care
4. Community-based dried blood spot (DBS) testing
5. Community-based POC testing with peers
6. Pharmacy-based STBBI testing / scale-up
7. App development for testing / linkages and scale-up
8. HIV testing awareness campaigns and PSAs
9. Health economics of innovative and responsive testing in Canada
10. Health policy work – targets, funding and sustainability

I. Bringing new HIV and STBBI tests to Market in Canada

Build private-public partnerships with:

(a) bioLytical Laboratories and OraSure to support the applications for investigational testing authorization (ITA) to Health Canada for medical device approval to get HIV self-tests to marketplace in Canada. Data is needed from 1,000 participants on accuracy, usability and acceptance of HIV self-tests. **INSTI Self-Test study launched Aug 22nd, 2019 (Rourke Lead)**.

Discussions underway with OraSure to bring both HIV and HCV self-test to Canadian market.

(a) BC Centre for Disease Control to enable and support industry to conduct assay development and validation of STBBI tests (**to start - bioLytical will be working with BC-CDC on HCV and syphilis POC tests**).

Additional partnerships with industry partners are in development / being explored.

II. HIV Self-Testing Implementation and Linkage to Care – evaluate service delivery and benefits of Technology

Major aim is to evaluate the impact of an HIV self-testing strategy on access, detection of new HIV infections, and linkages to counselling and care (using innovative App technology) in 3,000 people who are at-risk and those undiagnosed presenting to test for HIV in community and outreach clinics, spread across 5-6 provinces.

There will be two different supervised HIV self-testing strategies (service delivery models) evaluated and the preferences for oral vs blood-based self-tests.

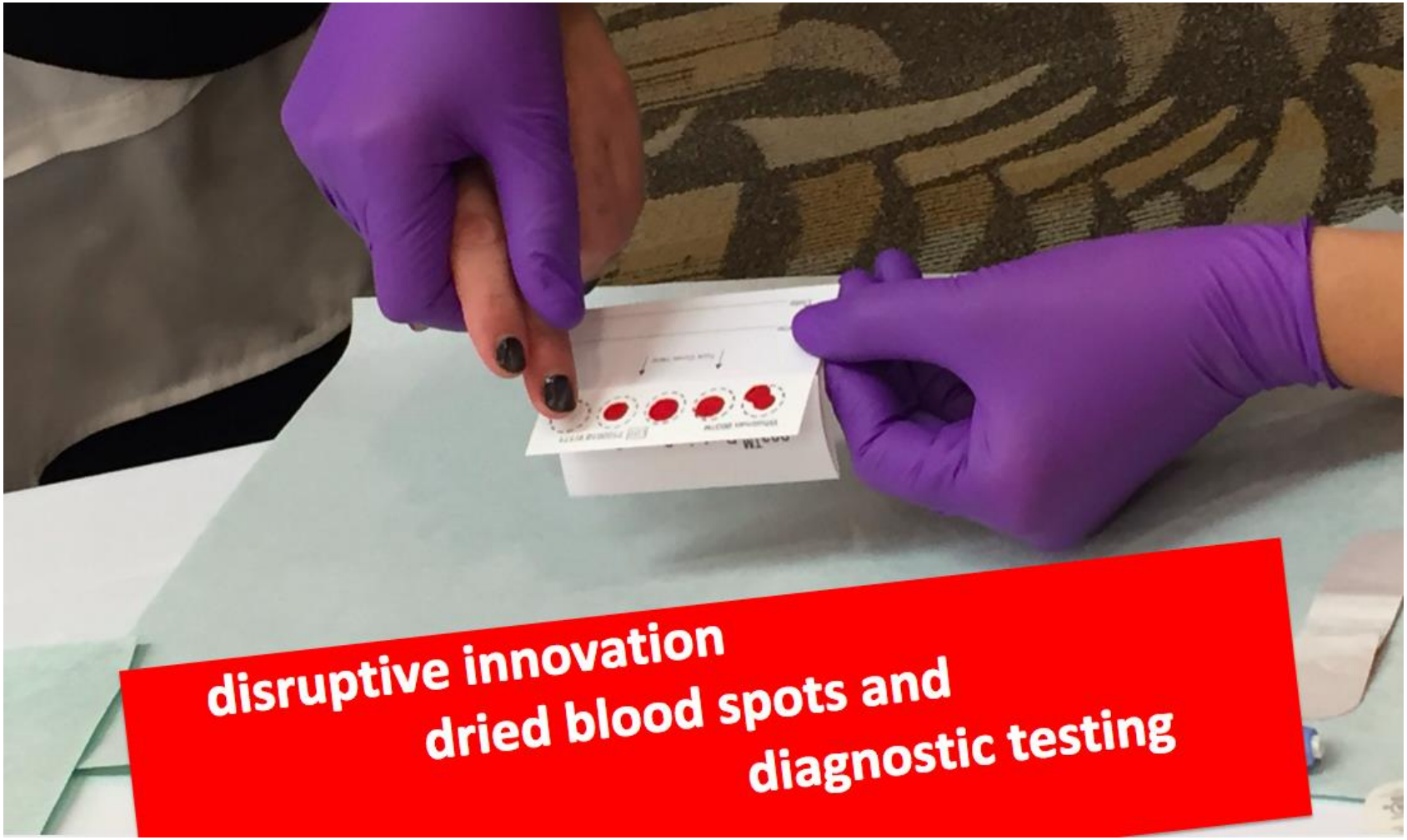
Studies will be led by Dr. Pant Pai and her team at McGill University

III. Community-Based Dried Blood Spot (DBS) Testing*

Major aim is to implement and evaluate the utility and value of DBS testing in reaching and supporting Indigenous communities and gbMSM with testing and linkage to care.

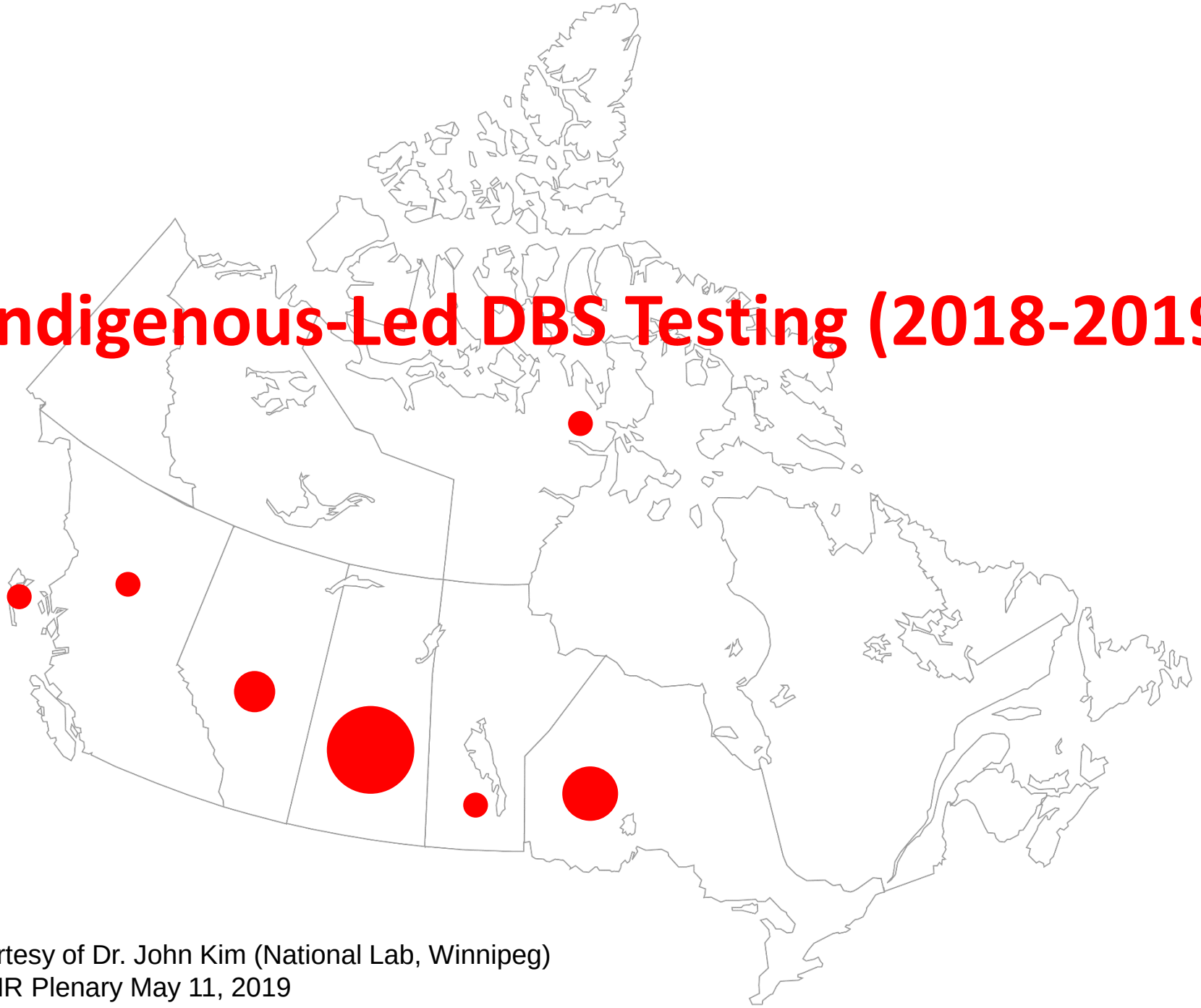
1. Led by Dr. Kim, introduce DBS testing to as many First Nations and Indigenous communities as feasible across the next five years and evaluate these within an Indigenous lens and framework.
2. Led by Dr. Lachowsky, implement and evaluate three new innovations in community-based HIV and other STBBI testing for gbMSM: (i) targeted scale-out of testing in community venues; (ii) design and evaluation of linkage to HIV PrEP prevention process; and (iii) implementation and evaluation of DBS self-testing at home.

*Planning also underway to integrate HIV POC and self-testing approaches into both programs above.



Courtesy of Dr. John Kim (National Lab, Winnipeg); CAHR Plenary May 11, 2019

Indigenous-Led DBS Testing (2018-2019)



Courtesy of Dr. John Kim (National Lab, Winnipeg)
CAHR Plenary May 11, 2019

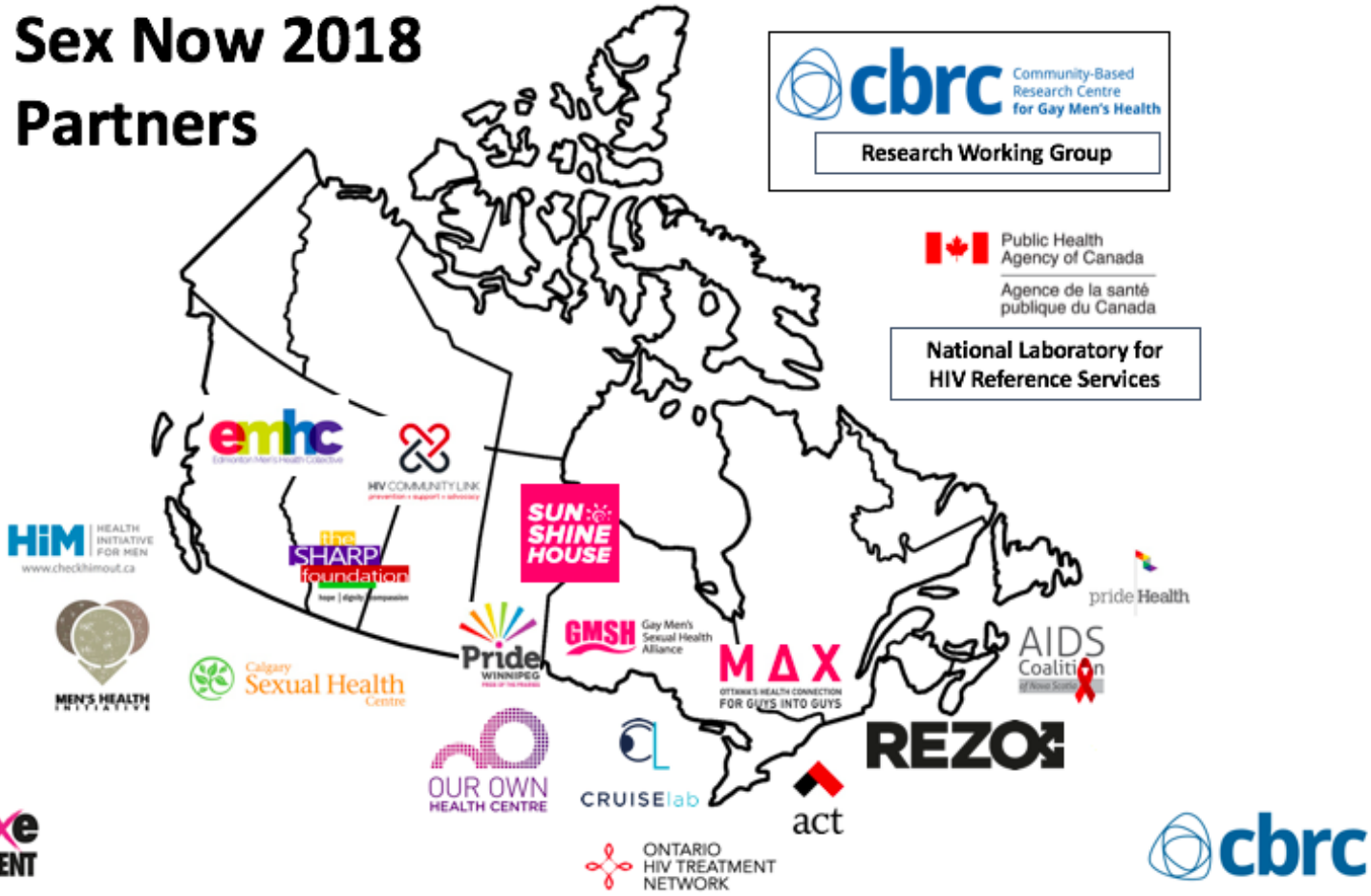
Community-based Interventions for gbMSM – Dr. Nate Lachowsky

Event-based Testing

- Community protocols and partnerships
- Meet people where they are at
- High volume testing

sexNOW sexe PRÉSENT cbrc

Community-based Interventions for gbMSM – Dr. Nate Lachowsky



Community-based Interventions for gbMSM – Dr. Nate Lachowsky

Training for Peer-based Testing

Community-based Interventions for gbMSM – Dr. Nate Lachowsky

Support training and capacity bridging

- **Community-based**
- **Cross-sectoral**
- **Inter/transdisciplinary**

investigaytors

pivot

Totally Outright!

Universities
Without Walls

More Testing options

- **In the 2018 national Sex Now survey:**
  - 86.6% provided a DBS sample at Pride
  - ~99% valid sample rate
  - 69.2% provided contact info to receive results
- **In the 2015 national Sex Now survey:**
  - 71% said they would use an at-home HIV test
  - 33% preferred at-home testing for their next test
- **Multiplex testing**

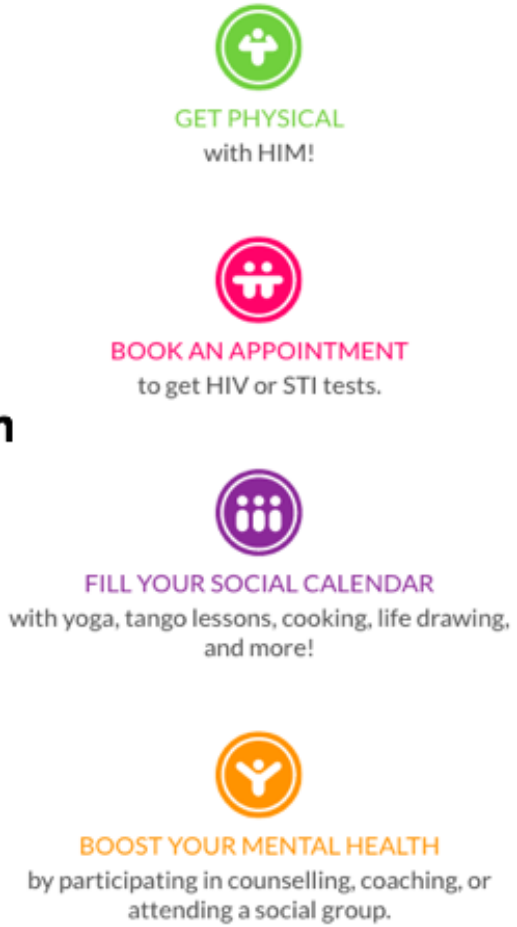
Courtesy of Dr. Nate Lachowsky (University of Victoria)
CAHR Plenary May 11, 2019

Community-based Interventions for gbMSM – Dr. Nate Lachowsky

Broader sexual health and harm reduction frameworks

- **Important for community engagement**
- **Linkage to care, prevention and health promotion**
- **Responds to individual and community priorities**

HIM | HEALTH INITIATIVE FOR MEN



Community-based Interventions for gbMSM – Dr. Nate Lachowsky

How do we get there?

- **Offer choice and respect autonomy**
- **Listen, and listen some more**
  - **Preparing for reactive results**
- **Partnerships and collaboration**
- **Scale out, scale up, and scale deep**
- **Address intersecting stigmas**

IV. Community-based POC Testing with peer community workers*

Major aim is to:

(a) implement and evaluate community-based intervention with peers to increase and diversify the HIV testing offer for gbMSM and African / Caribbean / Black people in Montreal, Ottawa, Toronto, Victoria and Vancouver, and

(b) promote referral to the health system for testing of other STBBIs, access to pre- and post-exposure prophylaxis (PrEP/PEP) and to other health care.

Led by Dr. Joanne Otis at Universite de Montreal (CIHR CBR grant secured in March 2019 to support)

*Planning underway to conduct additional studies with peers (lay persons) once Health Canada approval is available (imminent)

V. Pharmacy-based STBBI Testing and Scale-up

Major aim of APPROACH 2.0 (led by Dr. Kelly) to address:

Will a pharmacy-based STBBI testing program increase the number of people tested, find new diagnoses and generate good value for money?

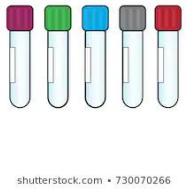
Major objective is to continue with HIV POC delivery but also adapt the pharmacy model to incorporate new testing innovations for HCV and syphilis, toward a goal of improving health outcomes and health system efficiency through integration of these programs within existing health and community resources infrastructure.

Courtesy of Dr. Deborah Kelly (Memorial University)
CAHR Plenary May 11, 2019

HIV POCT
+
Direct referral for lab-based testing for other STBBIs

DBS testing:
- HCV
- HIV
- Syphilis

Results reported to client by public health nurse



Results reported to client by public health nurse

Linkage to care and treatment

the Pharmacy model offers…

- Linkage to PrEP programs
- Linkage/sample collection for additional STI testing
- Education re: safer practices for prevention
- Home test kit purchase and education
- Direct linkage for follow up for those with reactive POCT → reduce loss to follow-up
  - Requisitions for confirmatory testing
  - Follow up counselling and supports
  - Linkage to care and treatment
  - Direct access to treatment (at the pharmacy)

Courtesy of Dr. Deborah Kelly (Memorial University)
CAHR Plenary May 11, 2019

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8. HIV testing awareness campaigns and PSAs
9. Health economics of innovative and responsive testing in Canada
10. Health policy work – targets, funding and sustainability

Testing / Reaching the Undiagnosed - Website/Portal & Mobile App

Website Functionality:

- Houses all information about campaigns – with the who, what, when, where and how answered effectively
- Site will have all HIV testing info – and tailored where appropriate for priority populations – with links to trained peer navigators (with secure linkages and modes for communication)

APP Functionality: Android / IOS

- Links clients to HIV testing locations / resources and trained peer navigators
- Order HIV self-test kits on-line (have subsidized programs)
- Provides immediate access to all Q&A associated with HIV testing
- Ability to link clients (securely and confidentially) to care services / counselors
- **Access to peer navigators** to provide knowledge and support for access to test and linkages
- Track testing patterns for epi surveillance and access/responsiveness

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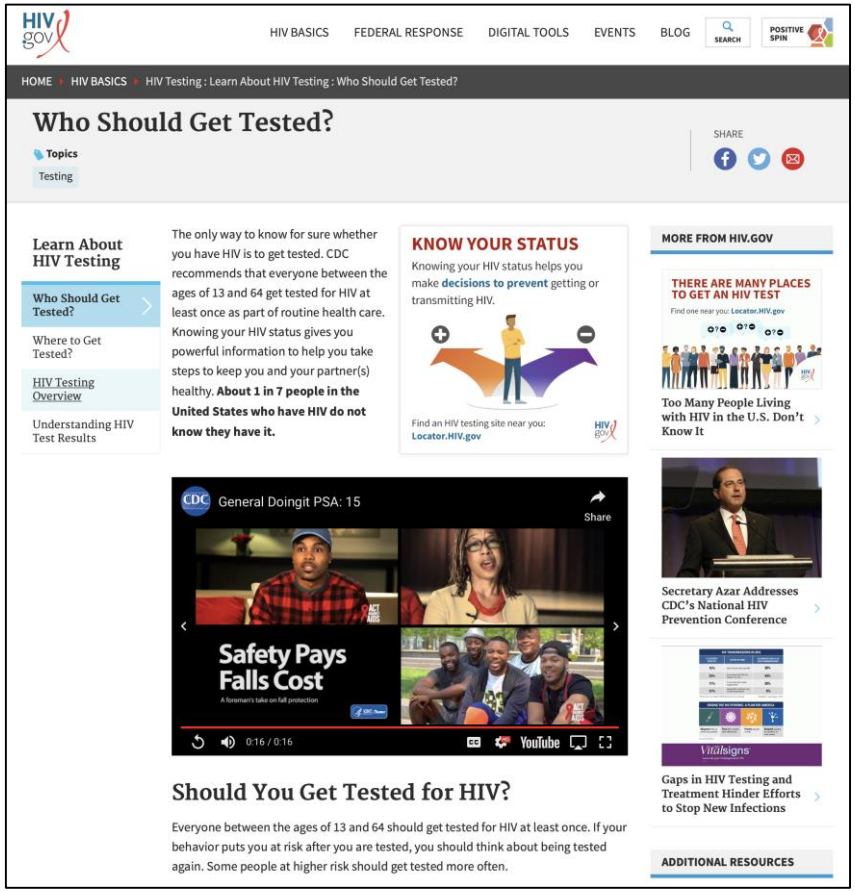
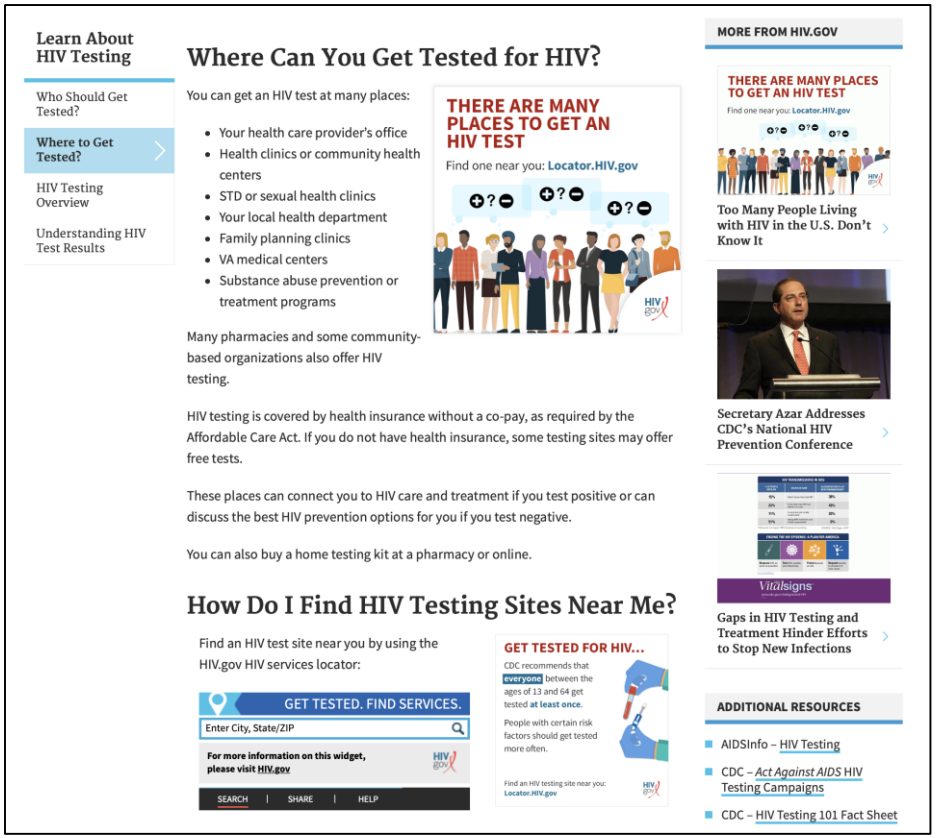
8. Building HIV Testing Awareness Campaigns and PSAs: Launch Dec 1st



US Example – Contextualize for Canada



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Health economics of innovative and responsive testing in Canada

Conduct economic evaluation (including both cost-effectiveness and cost-utility analysis) of seven HIV testing strategies from the perspectives of Canada's health care system and society. Estimate the cost, value for money and affordability of innovative testing in Canada based on best-practice guidelines.

1. **Micro-costing studies of innovative testing**: Estimate and compare unit cost (per individual) of each testing strategy (INSTI HIVST, DBS, POC and Pharmacy-based STBBI). Conduct empirical costing study from a societal perspective and estimate the start-up, scale-up and implementation costs (e.g., staff training level and time, travel costs) and estimating unit cost of each resource from diagnosis through to linkage to care / treatment initiation.
2. **Mathematical modeling and economic evaluations:** Build mathematical model for HIV and co-infection with HCV and/or STBBI - models will draw on our prior works to evaluate the potential impact of testing strategies on patterns of HIV, HCV, or STBBI, new diagnoses, and linkages to care.
3. **Budget impact analyses:** Develop budget impact models to estimate 5-year costs of implementing each testing strategy.

Outline

1. Setting the stage – Challenges / issues
2. Bringing new STBBI tests to market in Canada
3. HIV self-testing implementation and linkages to care
4. Community-based dried blood spot (DBS) testing
5. Community-based POC testing with peers
6. Pharmacy-based STBBI testing / scale-up
7. App development for testing / linkages and scale-up
8. HIV testing awareness campaigns and PSAs
9. Health economics of innovative and responsive testing in Canada
10. Health policy work – targets, funding and sustainability

Development of Targets and Monitoring/Evaluation Plan

IN DEVELOPMENT

Canadian Population: 37 million

2016 Incidence: 6.0 per 100,000 people (range 3.3-8.7/100,000)

Government of Canada 2030 Goal: 0.6 per 100,000 people

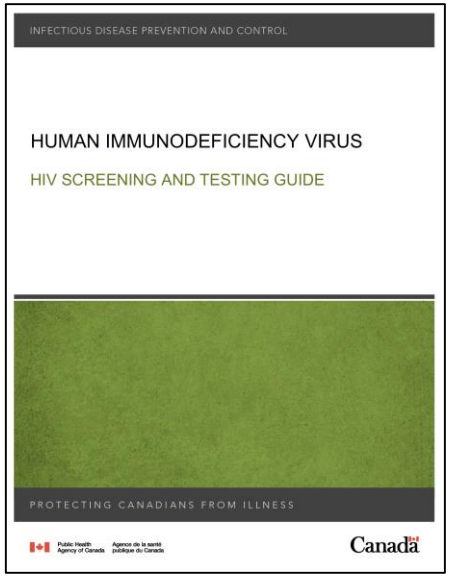
Number of Tests: Annual HIV diagnostic tests in Canada = 1.5-1.7 million*

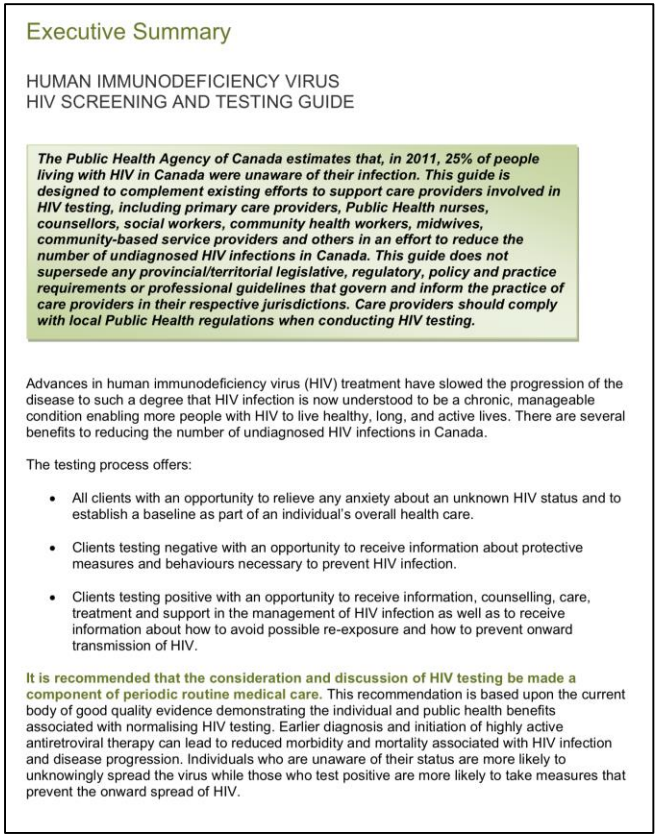
*includes 59,000 INSTI POC tests in 2018 (our only POCT approved in Canada)

To end the HIV Epidemic in Canada – in 5 years;
Estimate, we will need 8 to 10 fold increase in HIV Testing !!

HIV screening and testing in Canada - ”Individuals involved in high risk practices should be screened for HIV at least annually” – is this enough?

US Example





Executive Summary

HUMAN IMMUNODEFICIENCY VIRUS
HIV SCREENING AND TESTING GUIDE

The Public Health Agency of Canada estimates that, in 2011, 25% of people living with HIV in Canada were unaware of their infection. This guide is designed to complement existing efforts to support care providers involved in HIV testing, including primary care providers, Public Health nurses, counsellors, social workers, community health workers, midwives, community-based service providers and others in an effort to reduce the number of undiagnosed HIV infections in Canada. This guide does not supersede any provincial/territorial legislative, regulatory, policy and practice requirements or professional guidelines that govern and inform the practice of care providers in their respective jurisdictions. Care providers should comply with local Public Health regulations when conducting HIV testing.

Advances in human immunodeficiency virus (HIV) treatment have slowed the progression of the disease to such a degree that HIV infection is now understood to be a chronic, manageable condition enabling more people with HIV to live healthy, long, and active lives. There are several benefits to reducing the number of undiagnosed HIV infections in Canada.

The testing process offers:

- All clients with an opportunity to relieve any anxiety about an unknown HIV status and to establish a baseline as part of an individual's overall health care.
- Clients testing negative with an opportunity to receive information about protective measures and behaviours necessary to prevent HIV infection.
- Clients testing positive with an opportunity to receive information, counselling, care, treatment and support in the management of HIV infection as well as to receive information about how to avoid possible re-exposure and how to prevent onward transmission of HIV.

It is recommended that the consideration and discussion of HIV testing be made a component of periodic routine medical care. This recommendation is based upon the current body of good quality evidence demonstrating the individual and public health benefits associated with normalising HIV testing. Earlier diagnosis and initiation of highly active antiretroviral therapy can lead to reduced morbidity and mortality associated with HIV infection and disease progression. Individuals who are unaware of their status are more likely to unknowingly spread the virus while those who test positive are more likely to take measures that prevent the onward spread of HIV.

What is critically needed:


Real
life
IMPACT.