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Expanding HIV Testing in Ontario?

Dr. Rita Shahin
October 1, 2013
Objectives

- Overview of HIV in Toronto
- Introduction to routine testing, the treatment cascade and treatment as prevention
- HIV testing in Ontario
- Estimates of those infected but undiagnosed in Toronto
- HIV continuum/cascade in Ontario
Figure 1.23: Incidence of HIV infection by year.
Toronto, the rest of Ontario and Canada, 2001 - 2011

NA: Canadian data for 2010 and 2011 are not available.
Figure 1.27: Incidence rates of HIV infection by age group and sex.  
Toronto, 2011
### Table 1.11: Number and proportion of HIV infections by exposure category* and sex.

**Toronto, 2011.**

<table>
<thead>
<tr>
<th>Exposure category*</th>
<th>Male</th>
<th>Female</th>
<th>Overall</th>
</tr>
</thead>
<tbody>
<tr>
<td>MSM</td>
<td>317 (76)</td>
<td>N/A</td>
<td>317 (63)</td>
</tr>
<tr>
<td>MSM/Illicit drug use</td>
<td>15 (4)</td>
<td>N/A</td>
<td>15 (3)</td>
</tr>
<tr>
<td>Illicit drug use</td>
<td>9 (2)</td>
<td>4 (5)</td>
<td>13 (3)</td>
</tr>
<tr>
<td>Perinatal</td>
<td>1 (&lt;1)</td>
<td>0 (0)</td>
<td>1 (&lt;1)</td>
</tr>
<tr>
<td>Received blood or blood products</td>
<td>2 (&lt;1)</td>
<td>3 (3)</td>
<td>5 (&lt;1)</td>
</tr>
<tr>
<td>HIV-Endemic</td>
<td>43 (10)</td>
<td>67 (76)</td>
<td>110 (22)</td>
</tr>
<tr>
<td>HET-Partner</td>
<td>2 (&lt;1)</td>
<td>2 (2)</td>
<td>4 (&lt;1)</td>
</tr>
<tr>
<td>NIR-HET</td>
<td>25 (6)</td>
<td>10 (11)</td>
<td>35 (7)</td>
</tr>
<tr>
<td>Other</td>
<td>5 (1)</td>
<td>2 (2)</td>
<td>7 (1)</td>
</tr>
<tr>
<td><strong>Total with a known exposure</strong></td>
<td>419 (100)</td>
<td>88 (100)</td>
<td>507 (100)</td>
</tr>
<tr>
<td><strong>No identifiable risk‡/ Unknown</strong></td>
<td>30</td>
<td>8</td>
<td>38</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>449</td>
<td>96</td>
<td>545</td>
</tr>
</tbody>
</table>

N/A: Not Applicable

*Definitions for each exposure category are included in the glossary.

†Cases may report one or more exposures but are counted in the category considered the highest risk according to an exposure category hierarchy. The categories are listed in descending order from those that are considered to carry the highest risk of HIV infection to those considered to carry the lowest risk.

‡As of the 2011 report, the exposure category "No identifiable risk/Unknown" has been updated to include all clients who have missing or unknown risk factors.
Figure 1.24: Reported cases of HIV/AIDS in adults 20-54 years old*. Toronto by neighbourhood, 2011.
Early/Acute HIV Infection

- Usually the first 6 months of infection
- Very high viral loads that make individuals highly infectious to their partners
- The proportion of new infections attributed to EHI has been estimated to be in the range of 25-50% within certain populations
- Treatment as prevention attempts to reduce the risk of onward transmission
- USA and UK have issued clinical guidelines for the treatment of individuals with early infection (with caveats about the strength of evidence).
• The HIV Prevention Trials Network 052 study was a randomized control trial comparing early vs. delayed ART in 1763 serodiscordant heterosexual couples in 9 countries.
• 39 HIV transmission occurred, with 28 attributable to the infected partner
• 27 transmissions were in the delayed group and 1 in the early treatment group with evidence of 96% effectiveness
Number and percentage of HIV-infected persons engaged in selected stages of the continuum of HIV care — United States
MMWR 2011 60(47);1618-1623
Expanded Cascade

- Sexually Active
- Exposed
- Infected
- Diagnosed
- Linked to Care
- Retained in Care
- On ART
- Suppressed Viral Load
• Approximately 425,000 tests annually
• The HIV-positivity rate has decreased continuously since 1996. The HIV-positivity rate in Ontario was 0.19% in 2012 and 0.16% in 2013 compared to 0.30% to 0.35% from 1996 to 2004.
• HIV testing is thought to be cost effective if positivity rate is 0.1% or greater.
• Based on OHEMU modelling data, as of 2009 there were approximately 5,798 undiagnosed HIV+ individuals in Toronto

• Given a population of 2,126,275 people over 18 years of age, the undiagnosed prevalence in adults is approximately **0.27%** in Toronto

<table>
<thead>
<tr>
<th>A. Modelled prevalence (Table 6.3a)</th>
<th>B. Proportion diagnosed (for Ontario – Table 6.2)</th>
<th>C. Modelled diagnosed (A*B)</th>
<th>D. Modelled undiagnosed (A-C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>MSM</td>
<td>10,575</td>
<td>71.0%</td>
<td>7,508</td>
</tr>
<tr>
<td>MSM-IDU</td>
<td>410</td>
<td>73.4%</td>
<td>301</td>
</tr>
<tr>
<td>IDU</td>
<td>595</td>
<td>71.3%</td>
<td>424</td>
</tr>
<tr>
<td>HIV-End</td>
<td>3,020</td>
<td>53.8%</td>
<td>1,625</td>
</tr>
<tr>
<td>HET</td>
<td>2,270</td>
<td>53.5%</td>
<td>1,214</td>
</tr>
<tr>
<td>Clotting</td>
<td>45</td>
<td>99.6%</td>
<td>45</td>
</tr>
<tr>
<td>Transfusion</td>
<td>5</td>
<td>98.1%</td>
<td>5</td>
</tr>
</tbody>
</table>
| **Total:**                        | **16,920**                                    |                            | **11,122**                    | **5,798**
• 30,800 HIV infections have been diagnosed in Ontario by end of 2009
• 15,107 individuals with HIV estimated to be in care in 2009 based on billing records (T. Antoniou)
• OHTN Cohort Study follows people in specialty HIV care in 10 sites in Ontario
• The mean number of days to the first viral load test among HIV-positive individuals who had nominally tested positive was 65 days (median = 36 days). (POWER study)
• Eighty-two percent of women and 81 percent of men who were newly diagnosed with HIV had a viral test within three months of testing HIV-positive; however seven percent of women and ten percent of men who were newly diagnosed with HIV had not had a viral load test conducted within 12 months of testing positive for HIV. (POWER study)
• Mean CD4 count of Ontario Cohort Study participants when entering care was 379 (entered care between 1985 and 2009). (POWER study)
Mean CD4 entering care for OCS participants, 1985-2009

- Mean CD4 count when entering care declined significantly by age.
- Mean CD4 count was lower for Aboriginal women and men and Black/African women and men.
- IDUs in the OCS had higher CD4 counts than people from other HIV exposure categories.
- Men whose exposure category was heterosexual (including HIV endemic and heterosexual transmission) had the lowest CD4 counts when entering care.
HIV Continuum in Ontario, 2011

• Among 3273 OCS participants in care in 2011, 86.2% were in continuous care, 91.5% were on ART, 87.7% had a suppressed viral load and 84% had an undetectable viral load. (L. Light, ohtn.on.ca)

• Little variation between regions of Ontario

• Older adults living with HIV were most likely to be in continuous care and successfully undetectable on ART (M. Manno, ohtn.on.ca)
• People infected with HIV will decrease high-risk behaviours once aware of their status.
• Early initiation of ART reduces clinical progression and transmission to partners
• 2006 CDC recommended routine opt-out screening in health care settings
• 2013 PHAC recommendations promote routine testing – “The offer of a routine test should be made as part of periodic routine medical care.” (guide does not supercede provincial guidelines)
Expanding HIV Testing?

• Challenges include addressing HIV stigma, confidentiality, counseling and consent, costs/resources (lab, linkage to care and ARV treatment)

• Routine testing vs. expanding targeted testing efforts in groups or neighbourhoods with higher rates?
Thank You!
Routinizing HIV Testing in New York City: Successes and Lessons Learned

Benjamin Tsoi, MD, MPH
Director of HIV Testing
Bureau of HIV/AIDS Prevention and Control
NYC Department of Health and Mental Hygiene
CDC Recommendations

• Routine, voluntary HIV screening for all persons age 13–64 in health-care settings, not based on risk
  • Patient notified that HIV testing will be performed unless they decline (opt-out screening)
Previous Recommendations

Recommendations for HIV Testing Services for Inpatients and Outpatients in Acute-Care Hospital Settings

and

Technical Guidance on HIV Counseling

Revised Guidelines for HIV Counseling, Testing, and Referral

and

Revised Recommendations for HIV Screening of Pregnant Women
Previous CDC Recommendations
Adults and Adolescents

- Routinely recommend HIV screening in settings with high HIV prevalence (≥1%)
- Targeted testing based on risk assessment
- Routinely recommend HIV testing for those seeking treatment for STDs
- Annual testing for sexually active MSM
Are Recommendations Having Their Intended Effect?

National Hospital Ambulatory Medical Care Survey: 2002 Emergency Department Summary
by Linda F. McCaig, M.P.H., and Catharine W. Burt, Ed.D., Division of Health Care Statistics
Recommendations Are Not Having Their Intended Effect in Acute Care Settings

EDs account for 10% of all ambulatory care visits

<table>
<thead>
<tr>
<th></th>
<th>2000</th>
<th>2001</th>
<th>2002</th>
</tr>
</thead>
<tbody>
<tr>
<td>ED visits</td>
<td>108 million</td>
<td>107 million</td>
<td>110 million</td>
</tr>
<tr>
<td>Age 15-64</td>
<td>68.3 million</td>
<td>69.4 million</td>
<td>69.6 million</td>
</tr>
<tr>
<td>HIV serology</td>
<td>215,000</td>
<td>201,000</td>
<td>163,000</td>
</tr>
</tbody>
</table>
Many with Reactive Rapid Tests in ED Have No Identified Risk

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>N= 83 Number (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>No previous test</td>
<td>47 (57%)</td>
</tr>
<tr>
<td>Risk factors</td>
<td></td>
</tr>
<tr>
<td>MSM</td>
<td>30 (34%)</td>
</tr>
<tr>
<td>IDU</td>
<td>8 (10%)</td>
</tr>
<tr>
<td>High risk hetero partner</td>
<td>3 (4%)</td>
</tr>
<tr>
<td>No identified risk</td>
<td>42 (51%)</td>
</tr>
</tbody>
</table>

Cook County Bureau of Health Services, 2003
Missed Opportunities to Screen for HIV

Many HIV-Infected Persons Access Health Care, But Are Not Tested

Risk-based approach doesn’t work
HIV Cases in South Carolina, 2001–2005

- 4,315 newly reported HIV cases matched to registry of health care visits (1997–2005)
  - 3,157 (73%) made >20,000 health care visits prior to their first HIV diagnosis
  - 77% did not have diagnosis code to prompt for HIV test
- Risk-based screening would have missed majority of HIV cases
Late Testers with HIV in South Carolina
2001–2005

- 1,784 (41%) developed AIDS within 1 year

- 1,302 (73%) made 7,988 previous health-care visits, but were not tested for HIV
  - Median: 4 per patient; range: 1–133
HIV Cases in Kaiser Permanente

- 440 patients with new HIV diagnosis
  - Mean: 8.6 health-care contacts before positive HIV test
  - CD4 count at diagnosis:
    - 62% < 350
    - 43% < 200
    - 18% < 50
  - Only 26% had risk factors documented in chart

Majority eligible for treatment at time of diagnosis

- Klein D, et al JAIDS 2003
Patients May Not Disclose Risks
Patients May Not Disclose Risks

  - Thirty-nine percent (39%) of all men who reported at least one male sex partner in past year & self-reported HIV seronegative, did not disclose to their healthcare provider
  - Black and Hispanic men who have sex with men (MSM) were less likely to disclose than white MSM

Sexual Identity Don’t Always Match Sexual Behavior

- 12% reported sex with other men
  - Of those, 61% straight identified
    - Racial minority, be foreign-born, have lower education and income levels, and be married
  - 36% gay identified
  - 3% bisexual identified

Estimated Number of AIDS Cases, Deaths, and Persons Living with AIDS, 1985-2004, United States

Note. Data adjusted for reporting delays.
Routine Screening Works
Previous CDC Recommendations

Pregnant Women

• Routine, voluntary HIV testing as part of prenatal care, as early as possible, for all pregnant women
• Simplified pretest counseling
• Flexible consent process
Estimated Number of Perinatally Acquired AIDS Cases, by Year of Diagnosis, 1985-2004 – United States

- PACTG 076 & USPHS ZDV Recs
  - CDC HIV screening Recs
- ~95% reduction

Year of Diagnosis

Number of cases
New York City Experience with Routine Screening
New York City

- Most populous city in U.S.
- Population: 8,175,133 (2010 Census)
- 5 boroughs
- Area: 468.5 sq mi (1,213 km²)
- Median income:
  - Congressional district with lowest median income: 16 (Bronx)
  - 21st highest: Upper East Side in Manhattan
NYC Demographics

- Non-Hispanic (NH) White: 33.3%
- Hispanic: 28.6%
- NH Black: 22.8%
- Asian/Pacific Islander: 12.6%
- Other: 2.7%
NYC has a heavy disease burden in terms of number of new diagnoses, but a lower HIV case rate relative to other urban areas.
HIV/AIDS in New York City, Basic Statistics, 2011

- **3,404 new HIV diagnoses**
  - 41.6 diagnoses per 100,000 persons
  - 2,734 HIV without AIDS
  - 670 HIV concurrent with AIDS (19.7%)

- **2,208 new AIDS diagnoses**
  - 670 concurrent HIV/AIDS diagnoses

- **113,319 persons living with HIV/AIDS**
  - 1.4% of the population of NYC

- **1,690 deaths among persons with HIV/AIDS**
  - 14.7 deaths per 1,000 PWHA

As reported to the New York City Department of Health and Mental Hygiene by September 30, 2012.
Concurrent HIV/AIDS Diagnoses\(^1\) as Percent of Total HIV Diagnoses in NYC, 2007-2011

<table>
<thead>
<tr>
<th>Year of Diagnosis</th>
<th>Concurrent HIV/AIDS</th>
<th>HIV (non-AIDS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007 (N = 4,208)</td>
<td>21%</td>
<td>79%</td>
</tr>
<tr>
<td>2008 (N = 4,186)</td>
<td>21%</td>
<td>79%</td>
</tr>
<tr>
<td>2009 (N = 3,868)</td>
<td>20%</td>
<td>80%</td>
</tr>
<tr>
<td>2010 (N = 3,532)</td>
<td>21%</td>
<td>79%</td>
</tr>
<tr>
<td>2011 (N = 3,404)</td>
<td>20%</td>
<td>80%</td>
</tr>
</tbody>
</table>

Since 2007, about one-fifth of those diagnosed with HIV are concurrently diagnosed with AIDS.

\(^1\) AIDS diagnosis within 31 days of HIV diagnosis. As reported to the New York City Department of Health and Mental Hygiene by September 30, 2012.
Each year from 2007 to 2011, males had more new HIV diagnoses than females.
In 2011, 66% of new HIV diagnoses among males were among men who have sex with men (MSM).
Percentage of New HIV Diagnoses among Females by Transmission Risk in NYC, 2007-2011

In 2011, 78% of new HIV diagnoses among females were attributed to heterosexual transmission.

Perinatal and Other transmission risk not shown but included in calculation. Heterosexual risk category expanded in 2005 to include HEFSP-defined probable heterosexual risk. As reported to the New York City Department of Health and Mental Hygiene by September 30, 2012.
HIV Diagnosis Rates by Race/Ethnicity in NYC, 2007-2011

In the past 5 years, the HIV diagnosis rate among blacks was over four times higher than the rate among whites.

In 2011, UHF neighborhoods with the highest rates of HIV diagnoses were in the South Bronx, Central Brooklyn, Chelsea-Clinton and Harlem.

Rates based on 2010 Census population. UHF boundaries used in this map have been updated from previous maps. As reported to the New York City Department of Health and Mental Hygiene by September 30, 2012.
Number and proportion of persons diagnosed with HIV in New York City engaged in selected stages of the continuum of care at the end of 2011

- Estimated HIV-infected: 131,766 (100%)
- Ever HIV-diagnosed: 113,319 (86% of infected) 
- Ever linked to HIV care: 95,683 (73% of infected)
  - 84% of diagnosed
- Retained in HIV care in 2011: 71,489 (54% of infected)
  - 75% of linked to care
- Presumed ever started on ART: 64,548 (49% of infected)
  - 90% of retained in care
- Suppressed viral load (≤200 copies/mL) in 2011: 50,191 (38% of infected)
  - 78% of started on ART

As reported to the NYC DOHMH by September 30, 2012. For definitions of the stages of the continuum of care, see Appendix (2).
New York State
HIV Testing Law, 2010
NYS Chapter 308 of the Laws of 2010

• “Amended HIV Testing Law”
  • Signed on July 30, 2010
  • Effective September 1, 2010

• NYS DOH Regulations
  • Developed with input of many partners
  • Published in November 2011
  • Adopted in February 2012

• www.health.ny.gov/diseases/aids/regulations
NYS Chapter 308 of the Laws of 2010

Key Provisions

- HIV testing must be offered to all patients
  - Aged 13-64 receiving hospital or primary care services, with limited exceptions

- Consent for HIV testing
  - May be part of a general consent to medical care, with specific opt-out language included
  - Can be oral for rapid HIV testing (except in correctional facilities) and must be noted in the medical record
  - Can remain in effect for a period of time stipulated by the patient or until revoked by the patient
NYS Chapter 308 of the Laws of 2010

Key Provisions (cont.)

• Prior to being asked to consent to HIV testing, patients must be provided information about HIV required by the Public Health Law

• Clinicians authorizing HIV testing must arrange, with the consent of the patient, an appointment for medical care for those confirmed as HIV positive
Laboratory Testing

- Testing volume was stable in the baseline period and increased at a significant rate after Sept 2010
NYS Testing Law: Early Impact
CHCs and Small Practice Sites

Percent of Patients with HIV Test Results at CHCs and Small Practice Sites By Age
(2009-2011, n=97)

NYC DOHMH, Primary Care Information Project, 2009-2011
Lessons Learned
Keys to Implementing Change

• Obtain buy-in
• Have a champion
• Develop a plan
• Provide training & technical assistance
• Provide ongoing feedback
• Be flexible
Obtain Buy In

- Gain support from leadership
  - Must be backed with accountability

- Gain support from front line staff

- Have a multi-discipline approach
Have a Champion

- Someone who is passionate
- Someone who has the administrative authority to invoke change
- Have someone with similar training talk to each other, i.e., have emergency medicine (EM) provider talk to other EM providers
Plan-Do-Study-Act (PDSA)

**ACT**
- What changes are to be made?
- Next cycle?

**PLAN**
- Objective
- Questions and Predictions (why)
- Plan to carry out the cycle (who, what, where, when)

**STUDY**
- Complete the analysis of the data
- Compare data to predictions
- Summarize what was learned

**DO**
- Carry out the plan
- Document problems and unexpected observations
- Begin analysis of the data
Develop a Plan

• Set aims, measures
  • Institutional policy change
• Map process/work flow
  • How would testing integrate into patient flow?
• Include quality improvement, including Plan-Do-Study-Act (PDSA) process
• Set up process to collect & analyze data
Provide Training & Technical Assistance

- Team trainings
- Collaborative calls
- Site visits
- Individualized technical assistance
- Data calls
- Offer counseling training to providers
- Offer CME credits
Provide Ongoing Feedback

• Review baseline data
  • Are agencies able to measure key outcomes?
  • Awareness is a powerful motivator
• Assess impact of implementation
  • Consider targeted daily chart reviews
Daily Chart Review

QI Process

- Days 1-2: monitor charts without telling providers
- Day 3: tell provider that you are monitoring
- Days 4-5: provide daily feedback
Be Flexible

- One size does not fit all
- Choose HIV test appropriate for setting
- No magic bullet
Musings

- Testing teenagers have its own unique issues and challenges
- Legislation assist, but not sufficient
- Electronic health record prompts and alerts are useful, but need monitoring
- Be aware of provider fatigue
- Be aware of staff turn over (training)
- Competition and incentives are good
- Just Do It!
Challenges & Barriers

- Competing priorities
- Resource allocation
- Team stability
- Electronic health record modifications
- Data reporting and analysis
- Testing team buy in
- Timely data feedback for continuous quality improvement (CQI)
Six A’s to Successful QI

- Allocate resources to the project
  - Senior Leaders
- Assign a champion
- Activate the team
- Assess and share results (continuously)
- Act based on data
- Agree on final process and sustain
Thank you

Questions?
Overall, HIV rates have been decreasing in all age groups.

Median CD4 Count at Diagnosis\(^1\) among Persons Newly Diagnosed with HIV in NYC, 2007–2011

Median CD4 count at HIV diagnosis in NYC increased from 2007 to 2011.

\(^1\)Only persons with a CD4 count reported within 12 months of their HIV diagnosis date were included. The earliest CD4 count relative to HIV diagnosis date was used in the calculation of median CD4 at HIV diagnosis. As reported to the NYC DOHMH by September 30, 2012.
Timely Initiation of Care among Persons Newly Diagnosed with HIV in NYC, 2007–2011

The proportion of persons newly diagnosed with HIV with timely initiation of care increased between 2007 and 2011.
Proportion of Persons Newly Diagnosed with HIV with Viral Suppression\(^1\) at 6 and 12 Months After Diagnosis, NYC 2011

- **6 months**: 34%
- **12 months**: 51%

Over half of persons newly diagnosed with HIV in NYC in 2011 were virally suppressed by 12 months after diagnosis.

\(^{1}\)Viral suppression is defined as viral load \(\leq\) 200 copies/mL. As reported to the NYC DOHMH by September 30, 2012.
Proportion of PLWHA in 2011 with a CD4 or VL Test Ordered by an NYC Provider in 2011 whose Last HIV VL Result Indicated Viral Suppression

Nearly three-quarters of persons living with HIV/AIDS and under clinical monitoring in NYC in 2011 had an undetectable last viral load.

\(^{1}\)Viral suppression is defined as viral load ≤200 copies/mL. As reported to the NYC DOHMH by September 30, 2012.
Revised Recommendations
Adults and Adolescents - I

- Routine, voluntary HIV screening for all persons 13-64 in health care settings, not based on risk
- Repeat HIV screening of persons with known risk at least annually
- Opt-out HIV screening with the opportunity to ask questions and the option to decline
- Include HIV consent with general consent for care; separate signed informed consent not recommended
- Prevention counseling in conjunction with HIV screening in health care settings is not required
Revised Recommendations
Adults and Adolescents - II

- Intended for all health care settings, including inpatient services, EDs, urgent care clinics, STD clinics, TB clinics, public health clinics, community clinics, substance abuse treatment centers, correctional health facilities, primary care settings

- Communicate test results in same manner as other diagnostic/screening tests

- Provide clinical HIV care or establish reliable referral to qualified providers
Revised Recommendations
Adults and Adolescents - III

- Low prevalence settings:
  - Initiate screening
  - If yield from screening is less than 1 per 1000, continued screening is not warranted

- Steps should be considered to resolve conflicts between the recommendations and state or local regulations
Revised Recommendations
Pregnant Women - I

- Universal opt-out HIV screening
  - Include HIV in routine panel of prenatal screening tests
  - Consent for prenatal care includes HIV testing
  - Notification and option to decline

- Second test in 3rd trimester for pregnant women:
  - Known to be at risk for HIV
  - In jurisdictions with elevated HIV incidence
  - In high HIV prevalence health care facilities
Revised Recommendations
Pregnant Women - II

- Opt-out rapid testing with option to decline for women with undocumented HIV status in L&D
  - Initiate ARV prophylaxis on basis of rapid test result

- Rapid testing of newborn recommended if mother’s status unknown at delivery
  - Initiate ARV prophylaxis within 12 hours of birth on basis of rapid test result
HIV testing: a new paradigm for British Columbia

Dr. Réka Gustafson
Medical Health Officer and Medical Director of Communicable Disease Control
Vancouver Coastal Health
Acknowledgements

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- Dr. Julio Montaner
- Dr. Perry Kendall
- Dr. Mark Gilbert
- Dr. Sarah Stone
- Dr. Rolando Barrios
- Dr. Jat Sandhu
- Dr. Patricia Daly
- Dr. Dean Chittock
- Julie Kille
- Miranda Compton
- Meaghan Thumath
STOP HIV/AIDS (2010-2013)

- A provincially funded pilot to enhance early diagnosis and treatment of HIV, with the goal of altering the course of the epidemic

- Two pilot sites: Vancouver and Prince George

- Not accompanied by any changes in testing or treatment recommendations
Initial approach

• Analyse the cascade of care in our community
  – Who is getting infected?
  – Where are they being diagnosed?
  – What stage of their disease are they being diagnosed?
  – How long do they take to engage in care?
  – How well are they retained in care?
  – Do they achieve viral suppression?
  – Do they maintain viral suppression?
Treatment

How long do people take to engage in care?
How well are people retained in care?
Do people achieve viral suppression?
Do people maintain viral suppression?

→ Peer Navigator Program
Outreach Team
Enhanced Public Health Follow-up
Provincial collaborative
Supports for family physicians to retain HIV positive patients in their care
Re-designed, seamless system of care
Initial approach to testing

- Expanded hours and locations for HIV testing in the community
- Point of care testing fairs
- Point of care testing at St. Paul’s Hospital
- Expanded outreach testing in areas such as bathhouses and parks

Outcome of doing more of the same:
Additional services were welcomed and well utilised

but

Little population level change in testing rates and stage of disease at diagnosis
In addition to antenatal and risk-based HIV testing

For patients in all health-care settings

- HIV screening is recommended for patients in all health-care settings after the patient is notified that testing will be performed unless the patient declines (opt-out screening).
- Persons at high risk for HIV infection should be screened for HIV at least annually.
- Separate written consent for HIV testing should not be required; **general consent for medical care should be considered sufficient to encompass consent for HIV testing.**
- Prevention counseling should not be required with HIV diagnostic testing or as part of HIV screening programs in health-care settings.
Health Protection Agency

- Routine HIV testing in hospitals, primary care and community
  - Feasible
  - Acceptable
  - Ranges of cost per diagnosis overlapped for the three settings
Routine Testing in General Health Care Settings

Routine Testing in High Prevalence Settings

Risk-Based Testing

Reach

Diagnostic Yield

SETTING

POPULATION

HIV/STI Clinics
Partner Notification
Community Outreach

Health Services for High Prevalence Populations

Family Practice Health Clinics

Key Populations
Partners of Cases
Individuals Seeking an HIV Test

Key Populations
Other Clients of These Health Services

Entire Population
In the absence of an existing recommendation, we needed

- A practice recommendation
- Rationale
- An incentive to participate (to overcome the “not my problem”)
- Implementation plan
  - Endorsement
  - Enabling policies
  - Care and treatment plan for all settings
  - Monitoring and evaluation plan
New HIV Testing Recommendations

BCMJ, 2011, 53:49

Offer an HIV test to all adults in your practice who have not had one in the past year

- in acute and community care
- as part of blood work for any other reason
- every time you test for STIs, HCV, tuberculosis

Vancouver Coastal Health Public Health
New HIV Testing Recommendations
BCMJ, 2011, 53:49

If aware of a specific risk, recommend an HIV test now, and more often

- clinical symptoms
- every time you **diagnose another STI**
- every 3-6 months if you are aware of ongoing high risk

Vancouver Coastal Health Public Health
Rationale

• Early diagnosis benefits the HIV infected individual
• Early diagnosis benefits partners of the HIV infected individual
• Early diagnosis is the exception, rather than the norm
• People diagnosed late have had multiple missed opportunities for earlier diagnosis in the health care system
• Risk-based testing has inherent limitations that cannot be overcome by doing more risk-based testing
• Routine HIV testing is cost effective at relatively low diagnostic yield
• HIV infection is consistent with all generally accepted criteria that justify screening
Early diagnosis benefits the individual

Life expectancy as a function of disease stage at start of treatment

<table>
<thead>
<tr>
<th>Disease stage at start of Treatment</th>
<th>Can expect to live to (years)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CD4&lt;100</td>
<td>57.9</td>
</tr>
<tr>
<td>CD4 100-199</td>
<td>61.0</td>
</tr>
<tr>
<td>CD4 200-350</td>
<td>73.4</td>
</tr>
</tbody>
</table>

BMJ 2011; 343:d6016
### Early Treatment Benefits

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>CD4+ cell count &lt; 350 cells/mm³</td>
<td>Start ART</td>
<td>Start ART</td>
</tr>
<tr>
<td>CD4+ cell count 350-500 cells/mm³</td>
<td>Start ART*</td>
<td>Start ART‡</td>
</tr>
<tr>
<td>CD4+ cell count &gt; 500 cells/mm³</td>
<td>Panel divided†</td>
<td>Should be considered‡</td>
</tr>
</tbody>
</table>

### Clinical Conditions Favoring Initiation of Therapy Regardless of CD4+ Cell Count

<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>• Symptomatic HIV disease</td>
<td>• Symptomatic HIV disease</td>
</tr>
<tr>
<td>• Pregnancy</td>
<td>• Pregnancy in women</td>
</tr>
<tr>
<td>• HIV-associated nephropathy</td>
<td>• HIV-1 RNA &gt; 100,000 copies/mL</td>
</tr>
<tr>
<td>• HIV-1 RNA &gt; 100,000 copies/mL</td>
<td>• Rapid decline in CD4+ cell count (&gt; 100 cells/ mm³/yr)</td>
</tr>
<tr>
<td>• CD4+ count decline &gt; 100 cells/mm³ per year</td>
<td>• Active HBV or HCV infection</td>
</tr>
<tr>
<td>• Hepatitis B co-infection (when active or needing treatment)</td>
<td>• Active or high risk for CVD</td>
</tr>
<tr>
<td>• History of AIDS-defining illness</td>
<td>• Symptomatic primary HIV infection</td>
</tr>
<tr>
<td>• Certain acute opportunistic infections†</td>
<td>• HIVAN</td>
</tr>
<tr>
<td></td>
<td>• Serodiscordant couples</td>
</tr>
</tbody>
</table>
Early diagnosis benefits partners

Majority of HIV Transmissions From People Unaware of Their Infection

- ~21% unaware of their infection
- ~79% aware of their infection

Percentage

People Living With HIV/AIDS (1,039,000-1,185,000)

New Sexual Infections Each Year (~48,000)

Account for ~54% of new infections

Account for ~46% of new infections

Early treatment benefits partners

1,763 couples
HIV positive partner with
CD4 350-550
97% heterosexual

N=886
Immediate ART
1 transmission
3 cases of extrapulmonary TB
10 deaths

N=877
ART at CD4 of 250
27 transmissions
17 cases of extrapulmonary TB
13 deaths
Early diagnosis is not the norm

Figure 4a
Proportion of Patients by CD4 Cell Count at Diagnosis and Year of Diagnosis [VCH45]

- CD4 < 200
- CD4 200-349
- CD4 350-500
- > 60% diagnosed with CD4 < 500
Missed Opportunities Analysis

- Retrospective electronic chart review of new HIV cases in Vancouver from 2009-2011
- Acute care visits and laboratory tests for three years prior to diagnosis were included in the analysis
- Data from hospital, emergency departments, outpatient clinics, and hospital laboratories extracted for all cases
- Acute care visits and laboratory tests prior to and within 3 months of last negative HIV test were excluded from study
- Acute care visits and laboratory tests within 2 weeks of diagnosis were excluded from study
- Data do not include health care contacts outside of hospital or laboratory tests. Therefore analysis underestimates total number of missed opportunities.
Missed Opportunities among ER, Inpatient, and Hospital Outpatient Visits

<table>
<thead>
<tr>
<th>CD4 at Diagnosis €</th>
<th>N</th>
<th>≥1 Prior Encounter</th>
<th>Mean # Encounters*</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;200</td>
<td>84</td>
<td>46%</td>
<td>4.1</td>
</tr>
<tr>
<td>200-350</td>
<td>92</td>
<td>48%</td>
<td>3.6</td>
</tr>
<tr>
<td>350-500</td>
<td>102</td>
<td>35%</td>
<td>4.6</td>
</tr>
<tr>
<td>500+</td>
<td>177</td>
<td>34%</td>
<td>4.4</td>
</tr>
<tr>
<td>Unknown</td>
<td>52</td>
<td>12%</td>
<td>4.8</td>
</tr>
<tr>
<td>Overall</td>
<td>507</td>
<td>37%</td>
<td>4.2</td>
</tr>
</tbody>
</table>

Total Missed Opportunities = 782

47% of Patients Diagnosed with a CD4 count below 350 had at least one ER, inpatient, or outpatient encounter

*Among those with ≥1 Prior Encounter
€CD4 at data available for 90% of clients
Laboratory Tests

<table>
<thead>
<tr>
<th>CD4 at Diagnosis€</th>
<th>N</th>
<th>≥1 Prior Lab Test (%)</th>
<th>Mean # Lab Tests*</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;200</td>
<td>84</td>
<td>35%</td>
<td>3.4</td>
</tr>
<tr>
<td>200-350</td>
<td>92</td>
<td>20%</td>
<td>2</td>
</tr>
<tr>
<td>350-500</td>
<td>102</td>
<td>21%</td>
<td>3.4</td>
</tr>
<tr>
<td>500+</td>
<td>177</td>
<td>23%</td>
<td>2.8</td>
</tr>
<tr>
<td>Unknown</td>
<td>52</td>
<td>4%</td>
<td>2.5</td>
</tr>
<tr>
<td>Overall</td>
<td>507</td>
<td>22%</td>
<td>2.9</td>
</tr>
</tbody>
</table>

Total Missed Opportunities = 322

27% of Patients Diagnosed with a CD4 count below 350 had at least one public laboratory test

*Among those with ≥1 Prior Lab Test
€CD4 at data available for 90% of clients
LIMITATIONS OF RISK-BASED TESTING
Limitations of risk-based testing

Stigmatizes testing

- Discourages clinicians from offering an HIV test
- Discourages patients from seeking and/or accepting the test
Limitations of risk-based testing

Fails to recognize changes in epidemiology

- Identified mode of HIV transmission:
  - 58% MSM
  - 25% heterosexual
  - 12% IDU

BCCDC HIV Annual Report, 2011 (www.bccdc.ca)
Limitations of risk based testing

Assumes—incorrectly-- that people with risk behaviours recognize their risk AND tell their health care provider about them.

Venue-based survey of gay men:

• 20% have never told a health care provider that they have sex with men
• Mean duration to disclosure was 4 years

Mtrack, www.mancount.ca
Limitations of risk-based testing

It’s not happening

- 50% of those with HCV are tested for HIV within 3 months of diagnosis
- Less than 25% of those with a diagnosis of Sexually Transmitted Infection (STI) have an HIV test following their diagnosis
- 38.6% of individuals with a new HIV diagnosis had their first HIV test at the time of diagnosis (2004-2008)
WHO Criteria for Screening Programmes

• The condition sought should be an important health problem for the individual and community.
• There should be an accepted treatment or useful intervention for patients with the disease.
• The natural history of the disease should be adequately understood.
• There should be a latent or early symptomatic stage.
• There should be a suitable and acceptable screening test or examination.
• Facilities for diagnosis and treatment should be available.
• There should be an agreed policy on whom to treat as patients.
• Treatment started at an early stage should be of more benefit than treatment started later.
• The cost should be economically balanced in relation to possible expenditure on medical care as a whole.
• Case finding should be a continuing process and not a once and for all project.
Conservative threshold for cost effectiveness is estimated to be

1/1000 new diagnoses*

or 2/1000 diagnosed prevalence

Turning Missed Opportunities into Opportunities

- Routine HIV testing in acute care
  - Vancouver Hospitals (October 2011-Present)

- Routine HIV testing in primary care
  - (June 2012)
Implementation

- Endorsement of medical leadership/identifying champions
- Enabling policies: tailor pre-test information to patient and clinical setting: counseling, posters, printed materials etc
- Engagement of the community
- Social Marketing Campaign
- Pathway for follow-up
  - Delegate follow-up process
  - Website for family physicians to link them to information, public health, primary care guidelines, expert consultation, peer support
  - Peer navigator program in the hospital
- Education: comprehensive, recurring, sustained
- Whatever the ward/hospital/clinic needed to get the job done
- Data, data, and more data
Whatever the hospital ward/clinic needed

• Education embedded where they are already receiving it or where they are working
  – At a conference, or in their lunch room
• Wording and pictures on posters
• Translation/lamination of information materials
• Clerk to process orders
• Nurse embedded in clinics providing care to high prevalence populations
• Access to outreach and peers
• Endorsement of the college
Now to the data

FEASIBLE
Number of HIV Tests at Vancouver Hospitals by Month 2010-2012

- SPH
- MSJ
- VGH
- UBCH

Start of Routine Testing
Public Health Surveillance Unit
Family Practice HIV Testing Volumes
January 2010 - June 2013

Note: Webinars began April 2012, IPS began July 2012, and Workshops started August 2012
**Chart Audit Data of Routine Testing**

Departments of Medicine ONLY: October 2011 – March 3, 2013

<table>
<thead>
<tr>
<th>Site</th>
<th># Admissions</th>
<th>% Offered</th>
<th>% Tested</th>
<th>% Acceptance among Offered</th>
<th># Positives</th>
<th>Percent Positivity (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPH</td>
<td>4250</td>
<td>47%</td>
<td>39%</td>
<td>97%</td>
<td>12</td>
<td>0.7</td>
</tr>
<tr>
<td>MSJ</td>
<td>1895</td>
<td>62%</td>
<td>47%</td>
<td>85%</td>
<td>4</td>
<td>0.4</td>
</tr>
<tr>
<td>VGH</td>
<td>5104</td>
<td>35%</td>
<td>28%</td>
<td>96%</td>
<td>4</td>
<td>0.3</td>
</tr>
<tr>
<td>Total</td>
<td>11249</td>
<td>44%</td>
<td>36%</td>
<td>94%</td>
<td>20</td>
<td>0.5</td>
</tr>
</tbody>
</table>

Only 6% refuse when offered
COST EFFECTIVE
## Routine Testing among Acute Care Admissions

<table>
<thead>
<tr>
<th>Indicator</th>
<th>SPH</th>
<th>MSJ</th>
<th>VGH</th>
<th>UBCH</th>
<th>Overall</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Acute Admissions</td>
<td>20,749</td>
<td>4,452</td>
<td>34,252</td>
<td>2,919</td>
<td>62,372</td>
</tr>
<tr>
<td>Number of Patients Tested</td>
<td>3,109</td>
<td>1,181</td>
<td>3,739</td>
<td>56</td>
<td>8,085</td>
</tr>
<tr>
<td>Proportion of Admissions Tested (%)</td>
<td>15</td>
<td>27</td>
<td>11</td>
<td>2</td>
<td>13</td>
</tr>
<tr>
<td>Number Tested Positive §</td>
<td>14</td>
<td>3</td>
<td>12</td>
<td>0</td>
<td>29</td>
</tr>
<tr>
<td>Percent Positivity (%)</td>
<td>0.5</td>
<td>0.3</td>
<td>0.3</td>
<td>0</td>
<td>0.4</td>
</tr>
</tbody>
</table>

- **Monthly testing** since launch among those admitted has **increased greater than 4 fold** compared to the historical monthly average (2008-2010)

- **Diagnoses** among those admitted has **increased 3.0/1000** in 2012 compared with 2011

*Acute Care Initiative Launched at SPH and MSJ October 1, 2011; VGH October 31, 2011; UBCH April 1, 2012*
Routine Testing among Emergency Department Visits

<table>
<thead>
<tr>
<th>Indicator</th>
<th>SPH</th>
<th>MSJ</th>
<th>VGH</th>
<th>Overall</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of ER Visits</td>
<td>51,334</td>
<td>15,497</td>
<td>43,053</td>
<td>109,884</td>
</tr>
<tr>
<td>Number of Patients Tested</td>
<td>1,964</td>
<td>437</td>
<td>1,649</td>
<td>4,050</td>
</tr>
<tr>
<td>Proportion of Visits Tested (%)</td>
<td>3.8</td>
<td>2.8</td>
<td>3.8</td>
<td>3.7</td>
</tr>
<tr>
<td>Number Tested Positive§</td>
<td>4</td>
<td>1</td>
<td>2</td>
<td>7</td>
</tr>
<tr>
<td>Percent Positivity (%)</td>
<td>0.2</td>
<td>0.2</td>
<td>0.1</td>
<td>0.2</td>
</tr>
</tbody>
</table>

- **Monthly testing** since launch in ER has **increased almost 12 fold** compared to the historical monthly average (2008-2010)
- **Diagnoses** in ER has **increased 2.1/1000** in 2012 compared with 2011
- 4 of new Positives Diagnosed as ER Outpatients

*Acute Care Initiative Launched in ER at SPH May, 2012 and VGH July 2012*
Acute Care HIV Positive Patients Compared to all other Vancouver HIV Patients

- Heterosexual
- MSM
- Advanced stage of disease

Mean CD4 ($\Delta 193$ cells per mm$^3$; 95% CI 88 – 299)

All differences are significant at $p<0.001$
POPULATION EFFECT
## Family Practice

<table>
<thead>
<tr>
<th>Region</th>
<th>Indicator Number</th>
<th>Indicator Name</th>
<th>Total Counts Since Launch at Site*</th>
<th>Since Family Practice Strategy €</th>
<th>2-year Historical Baseline (July 1, 2008 - June 30, 2010)</th>
<th>Year to Date Counts</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Avg (Monthly) Min Max</td>
<td>Avg (Monthly) Min Max</td>
<td>Year 2013 Year 2012</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vancouver</td>
<td>VAN-1</td>
<td>Number of Patients Tested</td>
<td>16488</td>
<td>1499 954 2005</td>
<td>540 424 671</td>
<td>10933 5203</td>
<td>A+H+Y+</td>
</tr>
<tr>
<td></td>
<td>VAN-2</td>
<td>Number Tested Positive</td>
<td>25</td>
<td>2.3 1 5</td>
<td>1.6 0 5</td>
<td>12 11</td>
<td>A+H+</td>
</tr>
<tr>
<td></td>
<td>VAN-3</td>
<td>Percent Positivity</td>
<td>0.2</td>
<td>0.2 0.1 0.3</td>
<td>0.3 0 0.9</td>
<td>0.1 0.2</td>
<td></td>
</tr>
</tbody>
</table>

Note: Data subject to change as billing code and test assignment may change.

*Launch date standardized for physicians to be August 2012 because all session types began by August 2012.

€ Monthly averages, minimum and maximum values since the Family Practice Strategy launched each session type are determined using the first full month of data for all sites (Aug 2012).

Data Source: BCCDC Microbiology Lab
Prepared by: Public Health Surveillance Unit: September 19, 2013
Mean monthly rate of HIV lab tests for Vancouver residents per 10,000 population

Map 1. Historical value (2008 - 2009)

Map 2. Since July 2010 to current.

Map 2-1. Since July 2012 to current

HIV lab tests per 10,000 population
- Red: < 36 tests/10,000 population
- Orange: 36 - 40 tests/10,000 population
- Yellow: 40 - 45 tests/10,000 population
- Green: > 45 tests/10,000 population

Data source: Provincial Public Health Microbiology and Reference Laboratory (Misys Laboratory Database) & Providence Health Care Virology Laboratory.
Number of HIV tests in the city of Vancouver

Before pilot: 18,280 (17515-19337) per quarter

2012: 28,984 (26608- 29564)
Mean CD4 cell count (cells/mm³) at diagnosis for all HIV positive individuals [VCH45].


Map 4. Vancouver local health areas, since STOP HIV/AIDS July 1, 2010 to current.

Mean CD4 cell count (cells/mm³)
- Red: < 200 cells/mm³
- Orange: 200 to < 350 cells/mm³
- Light green: 350 to < 500 cells/mm³
- Green: 500+ cells/mm³

Spatial source: RC STATS, RC Ministry of Labour and Citizens' Services
Data source: Provincial Public Health Microbiology and Reference Laboratory (Misys Laboratory Database) & Providence Health Care Virology Laboratory.
Mean community viral load (copies/mL) for all HIV positive individuals


Map 6. Vancouver local health areas, since STOP HIV/AIDS July 1, 2010 to current.

Mean viral load (copies/mL)
- Green: 35 to < 200 copies/mL
- Orange: 200 to < 1,000 copies/mL
- Red: 1,000 to < 6,500 copies/mL
- Gray: Rest of British Columbia

Spatial source: RF STATS, RF Ministry of Labour and Citizens' Services.
Data source: Provincial Public Health Microbiology and Reference Laboratory (Misis Laboratory Database) & Providence Health Care Virology Laboratory.

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phtm@vcm.ca
<table>
<thead>
<tr>
<th>Year</th>
<th>Half years</th>
<th>Proportion of all HIV positive individuals with high viral load (&gt;1000 copies/mL</th>
<th>Numerator/Denominator of VCH54</th>
<th>Proportion on ARVs (%)</th>
<th>Proportion not on ARVs (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008</td>
<td>Jan-Jun</td>
<td>53</td>
<td>(412/774)</td>
<td>24</td>
<td>76</td>
</tr>
<tr>
<td></td>
<td>July-Dec</td>
<td>49</td>
<td>(399/820)</td>
<td>29</td>
<td>71</td>
</tr>
<tr>
<td>2009</td>
<td>Jan-Jun</td>
<td>44</td>
<td>(391/879)</td>
<td>32</td>
<td>68</td>
</tr>
<tr>
<td></td>
<td>July-Dec</td>
<td>38</td>
<td>(355/928)</td>
<td>33</td>
<td>67</td>
</tr>
<tr>
<td>2010</td>
<td>Jan-Jun</td>
<td>34</td>
<td>(338/987)</td>
<td>42</td>
<td>58</td>
</tr>
<tr>
<td></td>
<td>July-Dec</td>
<td>32</td>
<td>(342/1066)</td>
<td>41</td>
<td>59</td>
</tr>
<tr>
<td>2011</td>
<td>Jan-Jun</td>
<td>25</td>
<td>(275/1103)</td>
<td>46</td>
<td>54</td>
</tr>
<tr>
<td></td>
<td>July-Dec</td>
<td>25</td>
<td>(293/1181)</td>
<td>55</td>
<td>45</td>
</tr>
<tr>
<td>2012</td>
<td>Jan-Jun</td>
<td>21</td>
<td>(254/1233)</td>
<td>59</td>
<td>41</td>
</tr>
<tr>
<td></td>
<td>July-Dec</td>
<td>18</td>
<td>(231/1277)</td>
<td>60</td>
<td>40</td>
</tr>
</tbody>
</table>
Summary

• A significant proportion of patients with late diagnosis have multiple missed opportunities for earlier diagnosis in the health care system.

• Routine HIV testing in acute care and primary care
  – can turn missed opportunities into opportunities
  – in Vancouver is cost effective
  – highly acceptable to patients
  – can provide an additional opportunity for diagnosis even for those who do seek patient initiated testing
  – is not the only answer

• Addressing missed opportunities for diagnosis in health care settings is a key component of a comprehensive strategy for early diagnosis of HIV.
What we learned

• We could do a better job, even in complex system, but we had to engage with the other parts of the health care system in a different way
• Dollars are necessary, but not sufficient
• Data are good: many people will argue with you, it is harder to argue with data
• HIV is a complex psycho/social entity, which the medical system alone can’t address, but it is also a medical entity, which we can
Next steps: Pilot Program

- Plan for sustainability
- Roll out throughout the province
- New HIV testing Guidelines for British Columbia
  - Drafted by a working group by request of the Provincial Health Officer
  - Working group: Family physicians with support from labs, public health, STI experts, HIV treating physicians
  - Who, when, how often?