Incidence of chlamydia and gonorrhea co-infection among HIV-positive men who have sex with men in Ontario

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HIV and STIs
November 19, 2013 – 3:10pm

OCS
OHTN Cohort Study

OHTN 2013 RESEARCH CONFERENCE
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CHANGING THE COURSE OF THE HIV PREVENTION, ENGAGEMENT AND TREATMENT CASCADE

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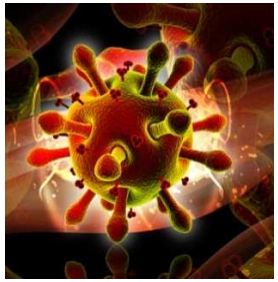
Ann N Burchell is the principal investigator of a CIHR grant to explore STI co-infections

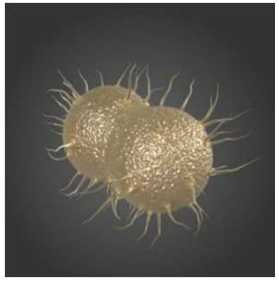
1) Ontario HIV Treatment Network; 2) Public Health Ontario; 3) St. Michael's Hospital, Toronto; 4) University of Toronto; 5) Ontario Ministry of Health and Long Term Care; 6) University Health Network, Toronto.

Chlamydia and Gonorrhea

- Caused by the bacteria

  ***Chlamydia trachomatis* (CT)** and ***Neisseria gonorrhoeae* (NG)**





- In Canada, rates of chlamydia and gonorrhea have increased dramatically since the 1990s [1]

- Chlamydia and gonorrhea co-infection among persons living with HIV can:
  - ↑ HIV Infectiousness [2]
  - Can lead to infertility, pelvic inflammatory disease in women, and Reiter's Syndrome (inflammatory arthritis, eye inflammation, and urethritis/cervicitis) if left untreated [1]

1. Public Health Agency of Canada: *Canadian Guidelines on Sexually Transmitted Infections.* 2010
2. Rebbapragada et al. *Drug Discov Today* 2007, 4(4):237–46.

Chlamydia and gonorrhea testing

- Previously reported that approximately one third of HIV-positive men in care in Ontario underwent testing annually

- Those tested were more likely to be:
  - men who have sex with men (MSM)
  - younger in age
  - from Toronto
  - conducting more viral load tests in the calendar year (proxy for frequency of clinic visits)
  - attending a primary care clinic
  - tested in the previous year

Objectives

To estimate among persons in HIV care in Ontario

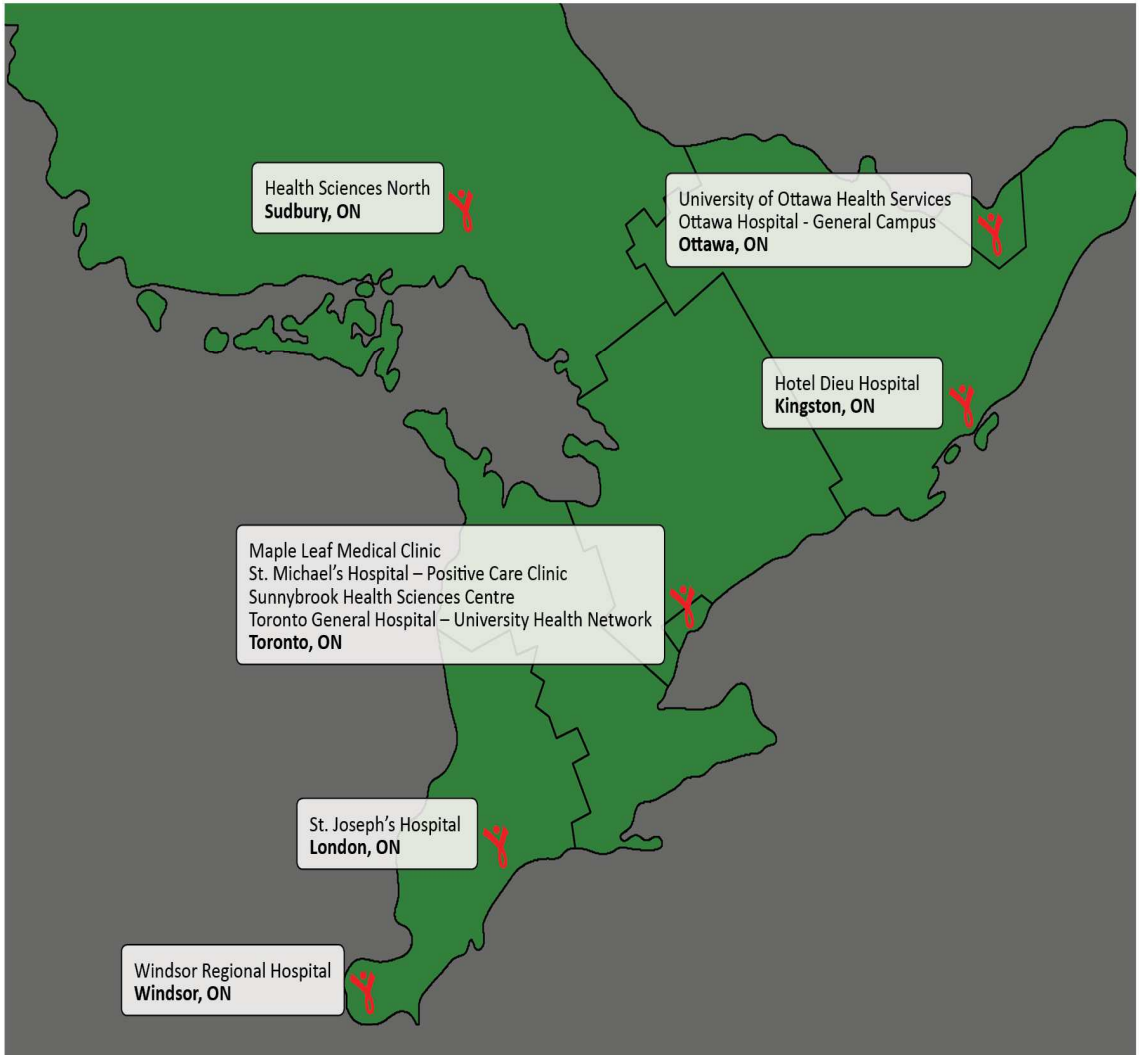
- Incidence and risk factors of first reactive chlamydia test
- Incidence and risk factors of first reactive gonorrhea test

OHTN Cohort Study (OCS) Design

- Ongoing observational, open dynamic cohort of HIV-positive persons in care in Ontario
  - HIV Ontario Observational Database (1994-1999)
  - HIV Infrastructure Information Program (2000-2006)
  - Renamed OCS in 2007
- Over 6,100 participants recruited from specialized HIV clinics & primary care practices throughout Ontario
- Data from medical charts (manual abstraction or clinical management systems) & face-to-face interviews
- Record linkage with **Public Health Ontario Laboratories (PHOL)** → virtually all testing done using urine-based nucleic acid amplification tests (NAATs)

Rourke et al. Cohort profile. *Int J Epidemiol*, 2013

OCS Clinic Sites



OCS ACTIVE SITES

Health Sciences North
Sudbury
Dr. Roger Sandre

Hotel Dieu Hospital
Kingston
Dr. Wendy Wobeser

Maple Leaf Medical Clinic
Toronto
Dr. Fred Crouzat

Ottawa Hospital
Ottawa
Dr. Curtis Cooper

St. Joseph's Hospital
London
Dr. Edward Ralph

St. Michael's Hospital
Toronto
Dr. Kevin Gough

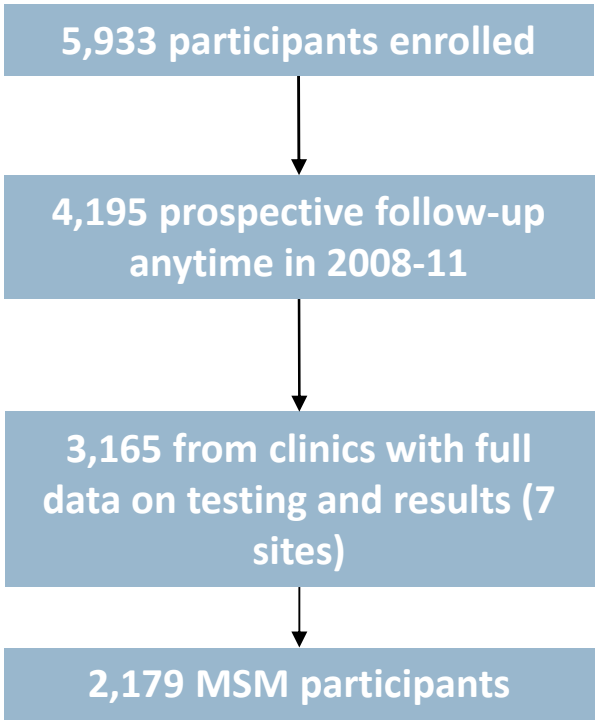
Sunnybrook Health Sciences Centre
Toronto
Drs. Anita Rachlis and Nicole Mittmann

Toronto General Hospital
Toronto
Dr. Irving Salit

University of Ottawa Health Services
Ottawa
Dr. Don Kilby

Windsor Regional Hospital
Windsor
Dr. Jeffrey Cohen

Analysis



- OCS Data Release December 2011
- Computerized records at PHOL available from 2008 onwards
- Analysis restricted to men who have sex with men (MSM)
- Person-time began at January 1, 2008 or the date follow-up began
- Person-time ended at time of first positive test result for cases and end of follow-up for non-cases
- Outcome of analysis was first reactive chlamydia or gonorrhea test
- Poisson regression to estimate rates per 100 person-years and identify risk factors

Characteristics of MSM participants (N=2,179)

Mean age at baseline* (SD)	46.7 (9.9)
Median year of HIV diagnosis (IQR)	1996 (1991-2003)
Region	
Toronto	86.5%
Other Ontario	13.5%
Ethnicity	
White	74.1%
Aboriginal	4.4%
Black/African	4.2%
Multiple	8.8%
Other	8.4%
Unknown	0.18%

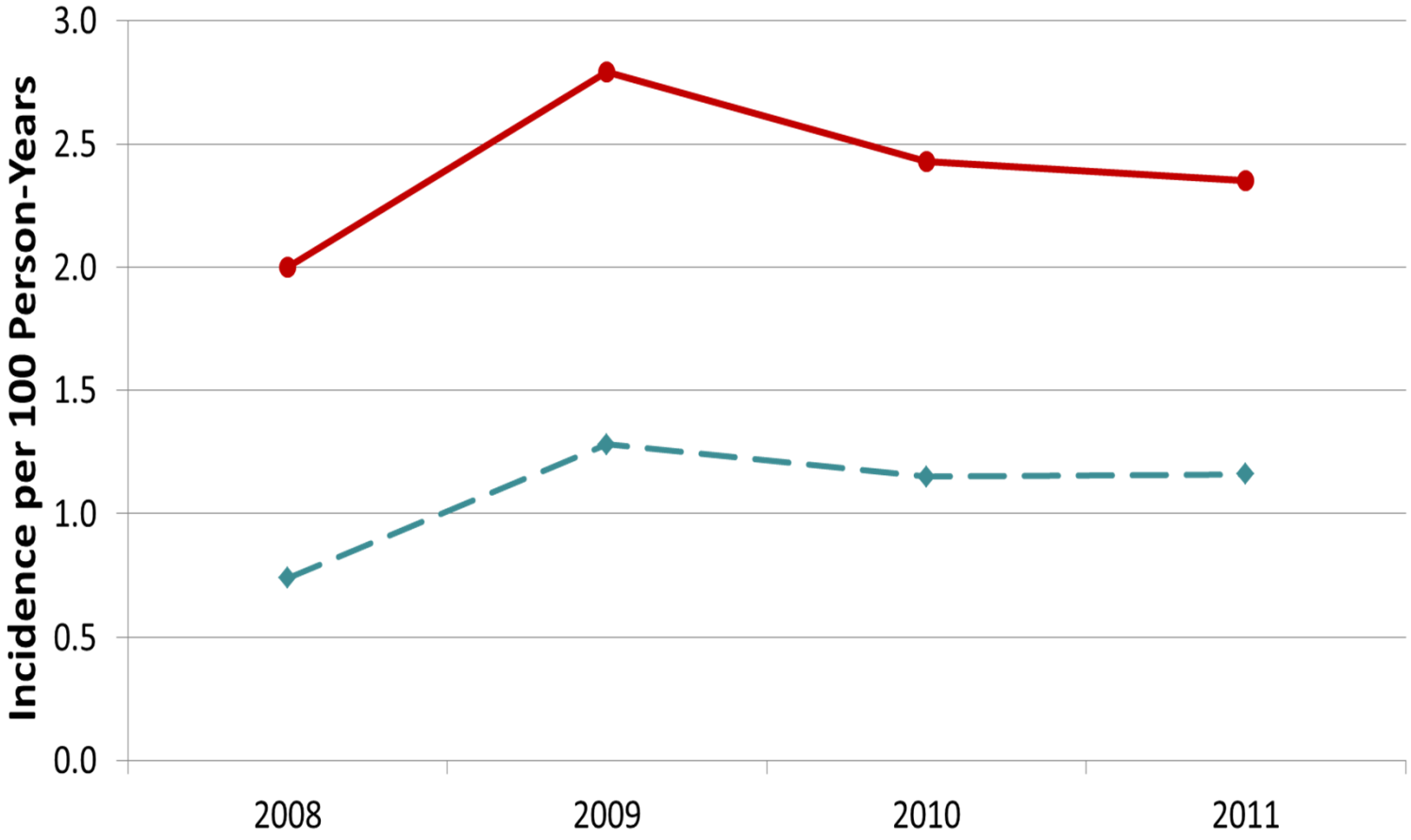
Median # months of prospective follow-up (IQR)	36 (27.6-43.2)
Sum person-years	6,013.4
CD4 cell count/mm^3 at baseline*	
≤200	8.6%
201-350	17.7%
>350	73.6%
Median log10 viral load at baseline* (IQR)	1.7 (1.7-2.1)
Any ART during follow-up	93.4%

** Baseline = later of January 1, 2008 or enrolment date*
ART, antiretroviral therapy

Incidence of first reactive chlamydia and gonorrhea test per 100 person-years, 2008-2011

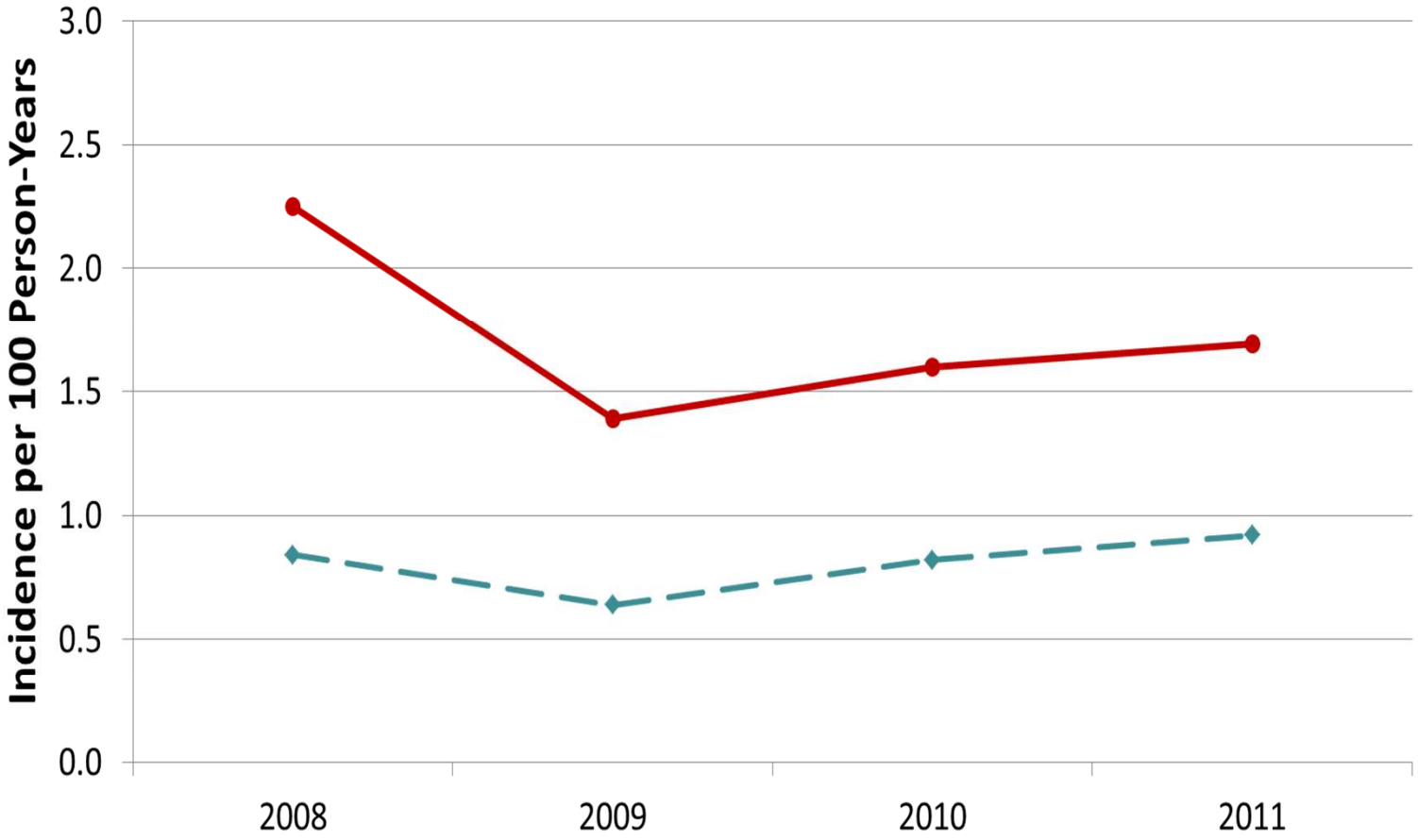
		Among all	Among those tested
	# of cases	Incidence of diagnosis (95 %CI) N = 2,179	Incidence of diagnosis (95% CI) N (gonorrhea) = 961 N (chlamydia) = 978
Chlamydia	67	1.1 (0.69-4.0)	2.5 (1.5-4.0)
Gonorrhea	49	0.79 (0.32-2.0)	1.7 (0.65-4.2)

Annual incidence of first reactive chlamydia test



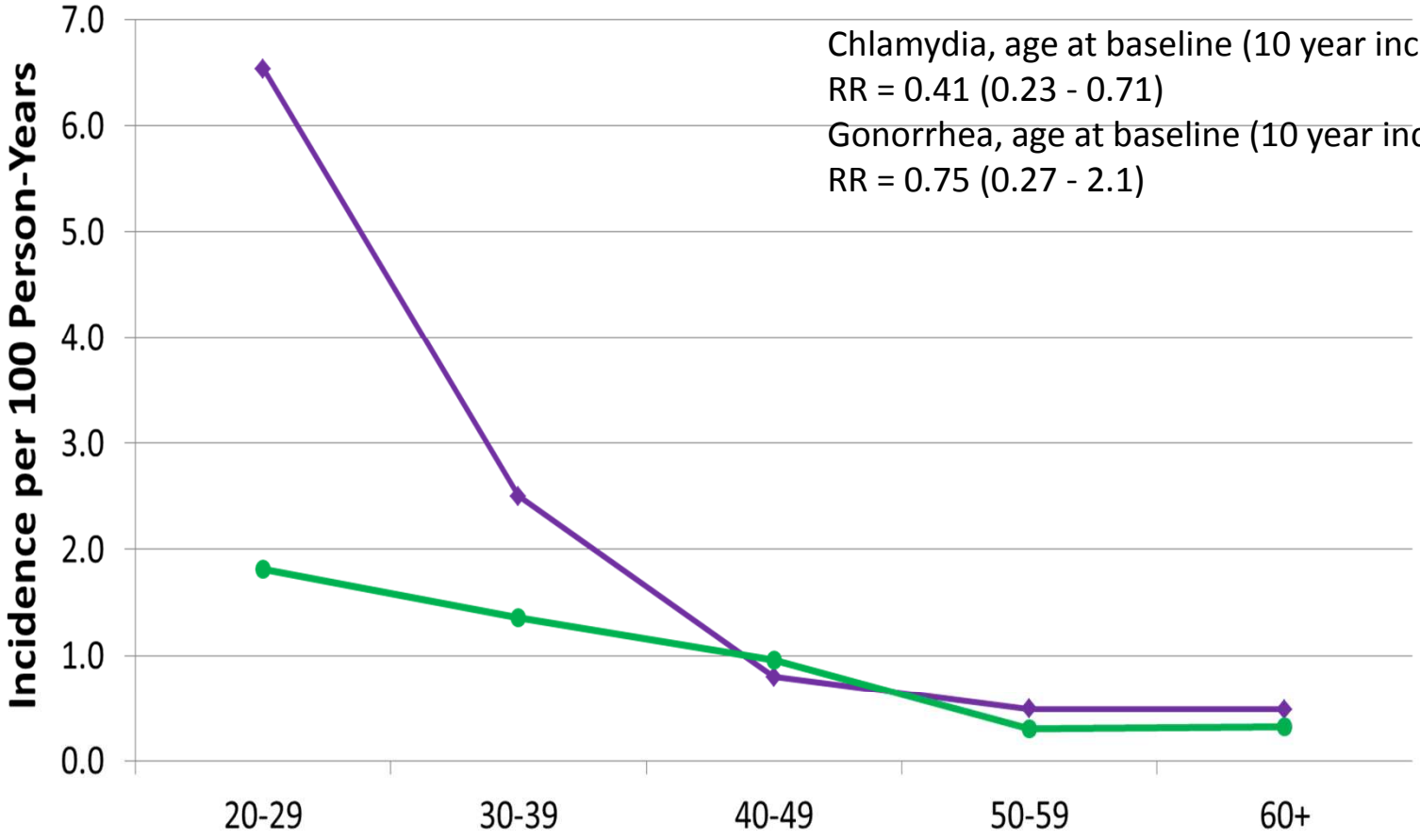
	2008	2009	2010	2011
All	N = 1513	N = 1927	N = 1926	N = 1883
Teste	N = 271	N = 458	N = 558	N = 609

Annual incidence of first reactive gonorrhea test



All	N = 1517	N = 1923	N = 1932	N = 1893
Teste(	N = 268	N = 450	N = 556	N = 596

Age-specific incidence of first reactive chlamydia or gonorrhea test



Chlamyd	N = 110	N = 323	N = 953	N = 571	N = 206
Gonorrh	N = 108	N = 322	N = 952	N = 575	N = 206

Previous chlamydia or gonorrhea infection

	Risk Factor	Adjusted Relative Rate (95 %CI)
Chlamydia	Previous Gonorrhea infection* (Yes vs No)	8.3 (2.6-26.1)
Gonorrhea	Previous chlamydia infection* (Yes vs no)	2.1 (0.08-57.0) NS

Chlamydia model adjusted for age, race, income, education, clinic type, maximum viral load, and ARV meds
Gonorrhea model adjusted for age, race, education, clinic type, maximum viral load, and ARV meds
**At anytime between 2008-2011 before first chlamydia or gonorrhea infection (not in the same year)*
NS = not significant (p > 0.05)

Black/African Race vs White Race

	Adjusted Relative Rate (95 %CI)
Chlamydia	3.5 (0.96-13.2) NS
Gonorrhea	2.6 (0.15-43.2) NS

Chlamydia model adjusted for age, income, education, clinic type, maximum viral load, previous gonorrhea infection and ARV meds
Gonorrhea model adjusted for age, education, clinic type, maximum viral load, previous chlamydia infection, and ARV meds
NS = not significant ($p > 0.05$)

Interpretation

- Rates are much higher than the general population
  - Chlamydia: 1.1 per 100 person-years > 0.27 per 100 person-years in Ontario (2011) [1]
  - Gonorrhea: 0.79 per 100 person-years > 0.03 per 100 person-years in Ontario (2011) [1]
- Observed incidence rates are likely underestimates
  - True surveillance study needed where everyone is tested at multiple anatomic sites
- Chlamydia and gonorrhea infection poses a burden for some MSM living with HIV
- Younger age and previous gonorrhea infection were risk factors for chlamydia, but no significant risk factors observed for gonorrhea
- Next steps include looking into sexual behaviour measures

1. Public Health Ontario. Monthly Infectious Diseases Surveillance Report. 2013; 2(4)

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Data Linkage

Public Health Ontario Laboratories

Risk factors for first reactive chlamydia test among HIV+ MSM, 2008-11

	CHLAMYDIA adj RR (95% CI)
Age at baseline* (10 year increase)	**0.41 (0.23-0.71)**
Race	
White	referent
Black/African	3.5 (0.96-13.2)
Multiple/Other	0.85 (0.22-3.2)
Aboriginal	1.9 (0.31-11.1)
Education*	
High school	referent
College	1.4 (0.39-5.2)
University to post-graduate	0.96 (0.24-3.8)
Gross Personal Income*	
Less than $20,000	referent
$20,000 to less than $40,000	1.5 (0.42-5.3)
$40,000 to less than $60,000	1.4 (0.34-5.5)
$60,000 to less than $80,000	2.1 (0.44-10.2)
$80,000 or more	2.6 (0.54-12.7)

	CHLAMYDIA adj RR (95% CI)
Clinic Type	
Tertiary	referent
Primary	1.4 (0.53-3.5)
Maximum viral load in calendar year at baseline*	
Suppressed/Undetectable	referent
High/Not supressed	0.81 (0.28-2.3)
ARV meds any time during follow-up	
No	referent
Yes	0.54 (0.14-2.1)
Previous NG infection	
No	referent
Yes	**8.3 (2.6-26.1)**

Adjusted for all variables shown

** Baseline = later of January 1, 2008 or enrolment date*

Risk factors for first reactive gonorrhea test among HIV+ MSM, 2008-11

	GONORRHEA adj RR (95% CI)
Age at baseline* (10 year increase)	0.75 (0.27-2.1)
Race	
White	referent
Black/African	2.6 (0.15-43.2)
Multiple/Aboriginal/Other	0.25 (0.0-9.5)
Education*	
High school	referent
College to post-graduate	2.1 (0.15-30.9)
Clinic Type	
Tertiary	referent
Primary	1.8 (0.25-13.2)

	GONORRHEA adj RR (95% CI)
Maximum viral load in calendar year at baseline*	
Suppressed/Undetectable	referent
High/Not supressed	1.5 (0.20-12.0)
ARV meds any time during follow-up	
No	referent
Yes	0.64 (0.04-11.8)
Previous CT infection	
No	referent
Yes	2.1 (0.08-57.1)

Adjusted for all variables shown

** Baseline = later of January 1, 2008 or enrolment date*