

Background Two epidemiological studies (Vancouver/Baltimore) have used ecological correlations between community measures of HIV viral load (CVL) and HIV incidence to postulate that scaled-up HIV anti-retroviral treatment (ART) has decreased HIV transmission amongst injecting drug users (IDUs). However, for both studies HCV incidence decreased concurrently with observed decreases in HIV incidence suggesting that reductions in injecting risks may also have played a role. We use modelling to estimate the likely importance of ART in producing the observed reductions in HIV incidence in Vancouver from 1997 to 2007.

Methods A joint HIV and HCV transmission model, calibrated to the Vancouver IDU HIV epidemic (60% chronic HCV prevalence and 20% HIV prevalence) explored what combinations of ART recruitment and decreases in injecting risk could produce the observed relative reductions in HIV (> 66%) and HCV (> 50%) incidence for Vancouver. For each, the relative importance of ART was assessed. Sensitivity analyses considered the implications of behavioural uncertainty.

Results Model projections suggest modest reductions in injecting risk (~30%) result in large reductions in HIV (~70%) and HCV (~45%) incidence over 10 years, whereas ART scale-up (10% per

year) only reduces HIV incidence (~40%). If we assume that HIV and HCV incidence decreased by 83% and 50% in Vancouver, respectively, then projections suggest 31–45% of the HIV impact was possibly due to ART. However, the combined intervention's impact is less than the sum of its parts, with the estimated HIV incidence decrease only reducing by < 15% with no ART. For smaller assumed reductions in HIV incidence and/or larger decreases in HCV incidence then projections suggest a smaller contribution due to ART.

Conclusions Our analysis suggests ART may not have been too important for producing observed HIV incidence declines in Vancouver, and highlights the importance of considering HCV incidence trends in similar analyses.

011.4 POPULATION-BASED HIV INCIDENCE AMONG MEN DIAGNOSED WITH INFECTIOUS SYPHILIS, 2000–2011

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Abstract 011.4 Table

	HIV-negative P&S syphilis cases	Newly diagnosed HIV	Person-years at risk	Annual HIV incidence (%)	95% CI (HIV incidence)
Total in NYC	3034	426	12850.10	3.32	3.01–3.64
Male	2805	423	11714.18	3.61	3.27–3.97
Age					
13–19	178	35	646.12	5.42	3.83–7.45
20–24	449	73	1654.75	4.41	3.48–5.51
25–29	484	83	1897.18	4.37	3.51–5.40
30–34	472	80	2107.84	3.80	3.03–4.70
35–39	489	76	2284.96	3.33	2.64–4.14
40–44	345	43	1511.29	2.85	2.08–3.80
45–49	186	23	742.20	3.10	2.01–4.58
50+	202	10	869.84	1.15	0.58–2.05
Race/ethnicity					
White	751	126	3064.03	4.11	3.44–4.88
Black	898	169	3597.64	4.70	4.03–5.45
Hispanic	94	94	2480.61	3.79	3.08–4.62
Other	34	34	960.85	3.54	2.49–4.89
Sexual behaviour/risk					
MSM	1884	389	7000.55	5.56	5.02–6.13
MSW	373	20	1661.05	1.20	0.76–1.83
Other, IDU, & unknown	548	14	3052.57	0.46	2.61–7.51
Syphilis stage					
Primary	859	103	3905.50	2.64	2.16–3.18
Secondary	1946	320	7808.68	4.10	3.67–4.57
Bacterial infections					
Syphilis only	2310	281	9718.04	2.89	2.57–3.24
Syphilis with concurrent CT/GC/LGV	103	12	348.96	3.44	1.86–5.85
Syphilis and subsequent CT/GC/LGV	392	130	1647.18	7.89	6.62–9.24
Year of syphilis					
2000	47	9	430.40	2.09	1.02–3.84
2001	133	31	1085.93	2.85	1.97–4.00
2002	186	52	1333.22	3.90	2.94–5.07
2003	231	58	1503.69	3.86	2.96–4.95
2004	274	44	1665.15	2.64	1.94–3.51
2005	255	53	1283.46	4.13	3.12–5.36
2006	272	40	1164.34	3.44	2.49–4.63
2007	360	45	1236.88	3.64	2.69–4.82
2008	443	61	1121.37	5.44	4.20–6.94
2009	406	24	691.97	3.47	2.27–5.08
January–June 2010	198	6	197.78	3.03	1.23–6.31

Background Cohort and cross-sectional studies have shown syphilis is associated with risk for HIV infection. However, population-based estimates of the actual risk for HIV following syphilis infections are lacking.

Methods In New York City, HIV and STD surveillance registries are separately maintained. Cases reported to these registries with diagnoses from 2000–June 2010 were matched using a deterministic algorithm. We measured HIV incidence among men following primary or secondary syphilis diagnoses. We calculated time at risk for HIV among men diagnosed with HIV \geq 60 days after syphilis diagnosis; men without reported HIV were presumed uninfected and censored on 3/31/2011.

Results Of 2,805 men with syphilis who contributed 11,714 person-years of follow-up, 423 (15.1%) subsequently acquired HIV; annual incidence was 3.61% (95% CI: 3.27%, 3.97%). Median time to HIV diagnosis was 582 days (range 60–3150). HIV incidence was highest among men who have sex with men (MSM) (5.56%, 95% CI: 5.02%–6.13%), relatively uniform across race/ethnicity and year of syphilis diagnosis, and decreased with increasing age at syphilis diagnosis. HIV incidence was higher among males with secondary compared with primary syphilis (4.10% vs. 2.64%, $p < 0.0001$). HIV incidence among males with syphilis who were diagnosed with another bacterial STD before HIV (14% of cases) was over double the incidence among those who were concurrently diagnosed (7.89% vs. 3.44%, $p = 0.002$) or reported only with syphilis (7.89% vs. 2.89%, $p < 0.0001$) during the analytic period.

Conclusions On a population level, one in 20 MSM with syphilis are diagnosed with HIV within a year; highly frequent HIV testing and HIV pre-exposure prophylaxis should be considered for HIV-negative syphilis cases. Secondary syphilis suggests untreated primary lesions; the higher HIV incidence among these cases underscores the importance of appropriate STD/HIV screening and early syphilis detection. Registry matching/integration permits identification of high-risk individuals, such as men repeatedly acquiring STD, for targeting prevention activities.

011.5 RISKS FOR SEXUALLY TRANSMITTED INFECTIONS (STIS), HIV, AND PREGNANCY AMONG WOMEN WORKING IN ENTERTAINMENT ESTABLISHMENTS IN CAMBODIA

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Background Since the 1990s, Cambodia successfully reduced HIV and STI prevalence among female sex workers. In 2008, brothels were outlawed, and non-brothel Entertainment Establishments (EEs) increased. Some women working in EEs exchange sex for gifts or money. We examined associations between behavioural risks and STIs, HIV and pregnancy among Cambodian Female Entertainment Workers (FEWs).

Methods In 2011, a stratified multi-stage cluster survey of 2,564 FEWs was conducted in karaoke establishments, beer halls, and former brothels. Participants consented to private interviews, blood collection, and self-administered vaginal swabs for gonorrhoea and chlamydia. Analyses were weighted and controlled for the complex design of the survey. Logistic regression models were used to examine potential risk factors of STIs, HIV and pregnancy.

Results Transactional sex in the last year was reported by 41.1% of FEWs. Chlamydia (18.9%), gonorrhoea (5.3%), and active syphilis (0.4%) were associated with younger age ($p < 0.0001$). HIV (2.6%) and pregnancies ($n = 1194$) were more likely among older women

($p < 0.0001$). Heavy drinking was associated with gonorrhoea (odds ratio [OR] = 2.5, 95% CI 1.1–5.4), while drug use was associated with any STI ($p = 0.0062$) and HIV ($p = 0.0005$). Always using condoms varied by partner type (clients [74.0%], boyfriends [31.2%], and husbands [9.8%]) and was negatively associated with pregnancy only. Working in a former brothel (OR = 2.5, 95% CI 1.4–4.6) and having > 7 vs. ≤ 7 clients per week (OR = 3.8, 95% CI 1.8–7.7) was associated with HIV. Among FEWs, 36.8% had clients plus a husband and/or boyfriend. Those with both a boyfriend and client had the highest odds of any STI (OR = 3.8, 95% CI 2.2–6.7).

Conclusion Cambodian FEWs are a heterogeneous group with varying risk behaviours. STIs and HIV appear to be concentrated in distinct subpopulations, but sexual partner relationships contribute to the complex transmission dynamics. Defining those most at risk will help focus national prevention and case-finding programmes.

011.6 MIGRATION AND HIV RISK IN RAKAI YOUTH, 2000–2010

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Background Migration is common among youth in Africa and is connected to life transitions. Migration has also long been associated with increased risk of being HIV-infected. Although this association has been observed in multiple studies, the temporal order between infection and migration is often unclear. This investigation uses unique cohort data from Rakai, Uganda to test whether recent in-migration places youth at a higher risk of HIV acquisition.

Methods We used data from the Rakai Community Cohort Study, 1999–2011. Respondents included were aged 15–24, sexually experienced and initially HIV negative ($n = 9365$). Migration and HIV status were assessed at each annual survey round. Poisson regression with robust standard errors was used to estimate age-adjusted incidence rate ratios (aIRR) of HIV acquisition among in-migrants versus non-migrants, by geographic origin and reason for migration. Additional adjustment for characteristics assessed at follow-up was explored.

Results In young men, HIV incidence in recent in-migrants (14.3 per 1000 person-years (py)) was 2 times greater than non-migrants (6.6 per 1000 py) (aIRR = 2.04; 95% confidence interval (CI): 1.07–3.92). In young women, incidence among in-migrants (12.6 per 1000 py) was similar to non-migrants (11.5 per 1000 py) (aIRR = 1.07; CI: 0.74–1.55). Associations were not affected by geographic origin. Men who had migrated for marriage were at particularly high risk (141 per 1000 py) compared to non-migrants (aIRR = 17.16; CI: 3.15–93.35). However, this was uncommon ($< 1\%$ of py) and only in men aged > 19 . Women who had migrated for work were at increased risk (30.3 per 1000 py) compared to non-migrants (aIRR = 2.59; CI: 1.41–4.76). IRRs were relatively unchanged with adjustment for marital status, number of partners in last 12 months or sexual concurrency.

Conclusion Recent in-migration is associated with increased HIV risk in young Ugandan men. Among young women, the increase in HIV risk may be specific to migration for work.

0.12 - Social determinants and structural interventions

012.1 USING SOCIAL DETERMINANTS TO PREDICT NEISSERIA GONORRHOEAE INFECTION RISK AT THE CENSUS TRACT-LEVEL: FINDINGS FROM THE STD SURVEILLANCE NETWORK (SSUN), UNITED STATES

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