

Background

- Infection with sexually transmitted diseases (STDs) facilitate sexual transmission of HIV
 - STDs increase HIV shedding in the genital tract
 - Presence of STDs may enhance recruitment of HIV-susceptible inflammatory cells to genital tract
 - STDs can disrupt mucosal barriers to HIV infection
- Few studies have integrated large public health surveillance, laboratory, and behavioral databases for examination of risk factors associated with infections of STDs and newly diagnosed HIV
- Illinois chlamydia (CT), gonorrhea (GC), early syphilis (primary, secondary, and early latent infection), and HIV rates rank among the highest in the United States
- Behavioral, laboratory, and surveillance data were analyzed to identify factors associated with concomitant laboratory-confirmed STDs and newly diagnosed HIV in Illinois during 2002

Methods

- Client encounters during 2002 at Illinois public STD clinics during which concomitant STD (CT, GC, or early syphilis) and HIV tests were administered, and risk behavior surveys were completed were included in the analysis
- All biologic specimens were analyzed by the Illinois Department of Public Health (IDPH) laboratory
 - Urine or urethral specimens with nucleic acid amplified tests positive for CT or GC were designated laboratory-confirmed cases
 - Early syphilis cases were defined as serum specimens reactive for fluorescent treponemal antibody absorbed (FTA-ABS) and a nontreponemal RPR or VDRL titer $\geq 1:8$, with a diagnostic code of primary, secondary, or early latent syphilis determined by IDPH or CDPH STD Sections based upon field investigation information corroborated by medical record reports on signs and symptoms of infection
 - Serum specimens with a screening enzyme immunoassay positive for HIV were laboratory-confirmed by Western Blot
- Laboratory results for CT, GC, and syphilis tests were merged with HIV laboratory results
- Risk behavior data were collected on different forms (with similar questions) based on jurisdiction
 - Chicago STD clinics: Physicians or Nurse Practitioners administered the behavioral survey to clients and recorded responses on the medical record
 - Illinois, excluding Chicago, clinics: Risk Assessment Surveys (RAS) were administered to clients at 36 public STD clinics, 7 family planning clinics, 7 HIV anonymous counseling & testing sites, 2 county jails; clients self-administered the RAS
- IDPH and Chicago Department of Public Health (CDPH) 2002 STD surveillance, behavioral risk, and laboratory databases were standardized and merged
- "Any STD" was defined as a positive (+) chlamydia, gonorrhea, and/or early syphilis result
- All newly diagnosed HIV-positive results are newly-recognized cases without a known prior history of HIV in the IDPH reporting system
- Multivariable logistic regression analysis was performed using SAS v.8.2 to identify factors independently associated with laboratory-confirmed CT, GC, and/or syphilis concomitant with newly diagnosed HIV
 - Variables with an alpha value ≤ 0.10 in bivariate analysis were selected for the multivariate model

Results

- Client visits to public health clinics with concomitant STD and HIV tests: n= 43,517
 - Any STD: Client visits with a positive CT, GC, and/or syphilis test, n=5,814 (13.4%)
 - CT 3,487 (60.0%)
 - GC 2,381 (41.0%)
 - Syphilis 438 (7.5%)
- Total HIV-positive cases: n=433
 - Newly diagnosed HIV-positive cases: n= 308
 - Any STD concomitant with newly diagnosed HIV infection: n=71 (22.7%)
- Client visits with risk behavior data: 27,609 visits (63.4%), representing 25,575 clients

Distinct STDs Associated with Concomitant Newly Diagnosed HIV Cases

STD Infection	New HIV-positive lab report (%)	Negative HIV lab report (%)	Unadjusted OR (95% CI)*
Chlamydia	13 (18.3)	3,462 (60.3)	0.72 (0.41-1.3)
Gonorrhea	24 (33.8)	2,352 (41.0)	2.2 (1.4-3.3)
Chlamydia + Gonorrhea	2 (2.8)	616 (10.7)	0.45 (0.11-1.8)
Syphilis	31 (43.7)	405 (7.1)	11.0 (7.7-15.8)
Any STD	71	5,724	1.9 (1.5-2.5)

*OR=Odds Ratio; CI=Confidence Interval

Demographic Characteristics Associated with Newly Diagnosed HIV Cases with Concomitant STDs

Client Characteristics	All Client Visits (n=43,517) (%)	Any STD and HIV-positive (n=71) (%)	Any STD and HIV-negative (n=5,743) (%)	Unadjusted OR (95% CI)*
Age at Visit (years)				
Median (Range)	25 (11-89)	29 (17-59)	22 (12-89)	P <0.0001
<15 years**	269 (0.62)	0 (0)	44 (0.77)	undefined
15 - 19 years	7,357 (16.9)	5 (7.0)	1,507 (26.3)	0.31 (0.12-0.81)
20 - 24 years	12,405 (28.5)	22 (31.0)	2,020 (35.3)	referent
25 - 29 years	8,185 (18.8)	13 (18.3)	922 (16.1)	1.3 (0.65-2.6)
≥ 30 years	15,301 (35.2)	31 (43.7)	1,231 (21.5)	2.3 (1.3-3.9)
Male	18,214 (41.9)	57 (80.3)	3,205 (56.0)	3.5 (1.9-6.3)
Female	25,209 (57.9)	13 (18.3)	2,511 (43.9)	referent
Unknown	94 (0.22)	1 (1.4)	8 (0.1)	21.6 (3.1-48.0)
White Non-Hispanic	10,452 (24.0)	15 (21.1)	861 (15.0)	referent
Black Non-Hispanic	21,530 (49.5)	47 (66.2)	4,052 (70.1)	0.67 (0.38-1.2)
Hispanic	9,572 (22.0)	4 (5.6)	622 (10.9)	0.37 (0.12-1.1)
Asian/Pacific Islander	474 (1.1)	0 (0)	24 (0.4)	—
Unknown	1,431 (3.3)	5 (7.0)	161 (2.8)	1.8 (0.65-4.8)
City of Chicago STD clinic	17,865 (41.1)	52 (73.2)	3,163 (55.3)	2.2 (1.3-3.7)
Illinois (excluding Chicago) STD clinic	25,652 (59.0)	19 (26.8)	2,561 (44.7)	referent

*OR=Odds Ratio; CI=Confidence Interval; **Statistically significant for trend, p<0.05; Unknown responses not shown (some percentages do not add up to 100%)

Risk Factors Associated with Newly Diagnosed HIV Cases with Concomitant STDs

Risk Assessment Responses	Client Visits (n=27,609) (%)	Any STD and HIV-positive (n=71) (%)	Any STD and HIV-negative (n=5,743) (%)	Unadjusted OR (95% CI)*
Heterosexual (N=27,500)	24,325 (88.1)	30 (42.3)	4,391 (76.7)	0.08 (0.05-0.13)
Men who have sex with men (N=15,312)	1,065 (7.0)	25 (35.2)	178 (3.1)	17.9 (11.0-29.1)
Bisexual male (N=15,313)	383 (2.5)	5 (7.0)	38 (0.66)	10.1 (4.3-23.9)
Women who have sex with women (N=12,205)	288 (2.4)	0 (0)	39 (0.68)	— (p=1.0)
Bisexual women (N=12,208)	442 (3.6)	0 (0)	54 (0.94)	— (p=0.41)
Always use condoms	3,206 (7.4)	6 (10.3)	470 (10.2)	Referent
Sometimes use condoms	17,351 (39.9)	42 (59.2)	3,240 (56.6)	1.0 (0.43-2.4)
Never use condoms	5,749 (13.2)	10(14.1)	910 (15.9)	0.86 (0.32-2.4)
No sex partner during past 2-12 mos	1,157 (4.2)	2 (3.4)	94 (2.0)	Referent
One sex partner during past 2-12 mos	12,775 (46.3)	20 (33.9)	1,905 (41.0)	0.50 (0.12-2.1)
Multiple (>1) sex partners during past 2-12 months	12,619 (45.7)	37 (62.7)	2,652 (57.0)	0.66 (0.16-2.7)
Injection drug use	365 (1.3)	1 (1.4)	37 (0.65)	2.1 (0.30-14.6)
Sex with injection drug user	682 (2.5)	1 (1.4)	67 (1.2)	1.2 (0.16-8.2)
Ever snorted drugs	2,549 (9.2)	6 (8.5)	341 (6.0)	1.4 (0.60-3.19)
Ever had sex or shared needles with an HIV+ person	301 (1.1)	2 (2.8)	36 (0.63)	4.2 (1.1-16.7)
Ever exchanged money/drugs for sex	976 (3.5)	0 (0)	141 (2.5)	— (p=0.26)
Sex while drinking or using drugs	3,039 (11.0)	3 (4.2)	571 (10.0)	0.86 (0.22-3.4)
Ever been diagnosed with any STD	13,463 (48.7)	33 (46.5)	2,517 (44.0)	1.1 (0.63-1.7)
Ever been previously tested for HIV	17,290 (62.6)	39 (54.9)	2,879 (50.3)	1.1 (0.67-1.9)

*OR=Odds Ratio; CI=Confidence Interval; Alpha value for statistical significance, p<0.05; Unknown responses not shown (some percentages do not add up to 100%)

Independent Risk Factors for Any STD with Newly Diagnosed HIV

Risk Factor	Adjusted* OR (95% CI)
Age ≥ 30 years	1.9 (1.0-3.4)
Bisexual male	22.4 (7.8-64.8)
Men who have sex with men	22.5 (11.3-43.7)

*Adjusted for all other variables in the model, including age 15-19 years, heterosexual, Black non-Hispanic, Hispanic, sex or shared needles with an HIV-positive person, unknown number of sexual partners within 2-12 months, one sexual partner within 2-12 months, unknown if ever snorted drugs

Limitations

- Analysis based on client visits, not individual persons
 - However, client identifiers cross-checked by multiple demographic indicators (name, birthdate, unique identifier code)
 - Recidivism low (<10%)
 - Assured each newly diagnosed HIV-positive case represented an individual person
- Selection bias
 - Public healthcare system users vs. private care
 - Clients who complete risk assessment surveys vs. clients who decline
 - Missing risk behavior data (36.6% of total cohort) may have impacted results
- Reporting bias
 - Physician-administered surveys (Chicago clinics) vs. client self-administered surveys (non-Chicago Illinois clinics)
 - Self reported risk behavior data may not be reliable
- Chicago and Illinois (excluding Chicago) clinics collect risk behavior surveys on different forms
 - Similar, but not identical, questions

Conclusions

- Active STD infections were common among persons newly diagnosed with HIV at public health clinics in Illinois in 2002
- The majority (59.0%) of client encounters were in clinics outside Chicago, though the majority (55.5%) of positive STD test results were from Chicago-based clinics
- Compared to STD-positive, HIV-negative cases, clients with active STD infections concomitant with newly diagnosed HIV were more likely to be
 - >30 years old
 - Men who have sex with men (MSM)
 - Bisexual male
- Among distinct STDs reported, syphilis was the most infrequent (7.5%), but showed the highest frequency (43.7%) and greatest risk (OR 11.0, 95% CI 7.7-15.8) for newly recognized HIV in concomitant infections
- In Chicago, syphilis cases among MSM peaked in 2002¹
 - By 2004, syphilis cases declined by 23%
 - In 2005, syphilis cases reemerged with a 25% increase among MSM despite a targeted social marketing campaign

Recommendations

- Evaluate effectiveness of current programs to identify gaps in prevention messages and services
- Prioritize innovative interventions and services for syphilis and HIV transmission within high-risk networks
- Intensify public health strategies to strengthen primary prevention of STDs for clients at high risk for HIV seroconversion, particularly MSM and persons older than U.S. populations that generally constitute the greatest proportion of STD cases
 - Prompt and appropriate treatment of STDs
 - Partner notification and treatment
 - Safer-sex counseling and condom promotion
 - Routine "opt-out" testing for HIV
 - Consideration of rapid HIV testing in both clinical and non-clinical settings
 - Counseling about possible acute HIV infection
- Serologic testing algorithm for recent HIV seroconversion (STARHS) using BED HIV-1 Capture EIA and incidence testing history data inventory introduced by CDPH and IDPH in January 2006 for HIV surveillance
 - Determine behavior profiles indicating recent HIV infection to closely evaluate populations at high risk for potential secondary HIV transmission
- Implement risk behavior surveys in all clinics that report results to the state health department to assess more accurately the risk factors for STD and HIV infection
 - Standardize risk behavioral survey tools and administration of those tools for more accurate cross-jurisdictional comparisons of STD clinic clients

¹Tabidze I, Ciesielski C, Wong W, Broad J. Rapid Re-emergence of Primary and Secondary Syphilis among Men who have Sex with Men in Chicago, 2005. 2006 National STD Prevention Conference, Abstract 309, Jacksonville, FL, May 10, 2006.