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Gonorrhea Infections Diagnosed Among Persons Living With HIV/AIDS: Identifying Opportunities for Integrated Prevention Services in New York City, Washington, DC, Miami/Dade County, and Arizona

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Abstract

Persons living with HIV/AIDS who acquire new sexually transmitted diseases (STDs) pose a risk for enhanced transmission of both HIV and STDs. To describe the frequency of HIV coinfection among gonorrhea cases (GC), HIV and GC surveillance databases (2000–2008) were cross-matched in New York City (NYC), Washington, DC (DC), Miami/Dade County (MDC), and Arizona (AZ). During 2000–2008, 4.6% (9471/205,689) of reported GCs occurred among persons with previously diagnosed HIV: NYC (5.5%), DC (7.3%), MDC (4%), and AZ (2%). The overall HIV-GC coinfection rates increased over the study period in all 4 sites. Real-time data integration could allow for enhanced prevention among persons with HIV infection and acute STDs.

Keywords

STD; gonorrhea; HIV; AIDS; persons living with HIV/AIDS; STD/HIV coinfection; men who have sex with men

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INTRODUCTION

An estimated 50,000 persons acquire HIV infection in the United States each year, despite advances in treatment and prevention.[1–6] Maximizing the effectiveness of interventions with the potential to reduce the ongoing transmission requires timely identification of those persons who would benefit the most. Thus, it is important to translate the epidemiology of HIV transmission into clinical and public health practice so that (1) those who have been exposed to HIV can be tested; (2) those with sexually transmitted diseases (STDs) who are at risk of acquiring HIV infection can receive counseling, and possibly antiviral prophylaxis to prevent infection; (3) those who have recently acquired HIV infection can receive treatment; (4) those with long-standing HIV infection can receive care to reduce their viral load and counseling to reduce their risk of transmission; and (5) those with previously diagnosed HIV and incident bacterial STD can be prioritized for intensive counseling and partner management at the point of STD diagnosis. Surveillance systems maintained by the state and local health departments can be used to identify high-risk individuals and groups and guide prevention services at the client and community levels.

Historically, the use of line-listed HIV surveillance data for public health intervention was prohibited due to concerns related to patient confidentiality.[7] In 2008, the Centers for Disease Control and Prevention (CDC) released guidance on integrated partner services that highlighted the importance of identifying the individuals infected with HIV and other STDs so that partners could be notified of multiple exposures.[8] More recently, the CDC issued recommendations for data confidentiality and security to facilitate integration and analysis of surveillance and case management data at the state and local health department level and linkage of coinfected cases to partner services and care referral.[9] This national guidance for surveillance and service integration is intended to reduce barriers to collaboration at the health department level such that coinfected clients are identified and receive prevention, partner, and treatment services that are timely and without redundancy.

Efforts to locate partners exposed to HIV have traditionally focused on the partners of persons with newly diagnosed HIV infection.[8] STD programs typically focus partner elicitation and notification efforts on infectious syphilis[10]; fewer resources are generally expended for the follow-up of gonorrhea cases (GCs) and chlamydia cases. Given the high rates of HIV coinfection among persons with infectious syphilis,[11] partner services for persons with syphilis often result in the identification of partners who have also been exposed to HIV. In contrast, persons with previously diagnosed HIV who subsequently acquire gonorrhea and chlamydia often do not receive partner services. Thus, sexual contacts of these coinfected cases may not be aware of their HIV exposure. In fact, some health departments are unaware of HIV-infected persons who acquire new sexually transmitted infections because these infections are tabulated in separate surveillance systems, maintained by separate programs, and not usually cross-referenced.[12] From cross-matched HIV and STD surveillance databases in 4 US sites with sizeable STD burdens, we identified GCs that had been previously diagnosed with HIV and assessed trends in the frequency of this coinfection.

METHODS

The 4 health jurisdictions included in this evaluation were New York City (NYC), Washington, DC (DC), Miami/Dade County (MDC), and the state of Arizona (AZ). All 4 sites have local legislative mandates pertaining to both HIV and STD reporting requirements and maintain HIV surveillance data in the Enhanced HIV/AIDS Reporting System (eHARS), a browser-based application designed for HIV/AIDS reporting, developed by CDC. Software for STD surveillance data included STD-MIS in Washington, DC and NYC, PRISM in MDC, and NAT-P (a locally developed Oracle-based system) in AZ. The eHARS and STD registries from each of the 4 sites include both laboratory and provider reports of HIV or STD and date of diagnosis, as well as other demographic and clinical information.

All GCs diagnosed in each of the 4 sites for the period January 1, 2000, to December 31, 2008, were collected from STD data registries and matched to their local HIV registries. Each site independently performed a deterministic match[13] of its HIV and STD registries using a combination of variables including first name, last name, date of birth, and gender. After exact matches were accepted, potential matches were reviewed manually using additional variables that varied by site. These included race/ethnicity, social security number, address, city, zip code, and reporting provider. HIV-GC coinfected cases were defined as persons diagnosed with gonorrhea, with an HIV diagnosis date at least 60 days before the date of gonorrhea diagnosis, to exclude coinfections acquired simultaneously, and identify persons who had HIV infection at the time they were diagnosed with GC. Multiple diagnoses of gonorrhea per person were included in case counts. Demographic data including age at time of STD diagnosis, gender, and race were obtained from the STD database. Each site independently completed descriptive analyses on the coinfection rates by various demographic characteristics using SAS Software 9.2. These surveillance data were provided for this study in aggregate, analyzed to inform program planning, and did not involve human research; therefore, this study did not require institutional review board approval.[14]

RESULTS

A total of 205,689 GCs were diagnosed at the 4 sites during 2000–2008. During 2000–2008, overall GC numbers declined at 3 of the 4 sites: by 14% in NYC, 21% in AZ, and 10% in DC. MDC GCs increased 10% overall. The male-to-female ratio of overall GCs for the period was 1.0 in NYC, 1.1 in MDC, and 1.2 in DC and AZ during the study period (Table 1).

During this study period, 4.6% (9471/205,689) of the reported GCs occurred among persons with previously diagnosed HIV: 5.5% (5930/107,786) in NYC, 7.3% (1312/17,910) in DC, 4% (1504/40,214) in MDC, and 2% (725/39,779) in AZ. The percent of GCs with HIV coinfection increased in all jurisdictions over the study period from 3% (367/12,314) in 2000 to 7% (752/10,553) in 2008 in NYC ($P < 0.001$), 6.4% (142/2211) to 6.7% (155/2302) in DC ($P < 0.001$), 2% (91/3917) to 4% (165/4265) in MDC ($P < 0.001$), and 0.7% (31/4400) to 3% (91/3486) in AZ ($P < 0.001$) (Fig. 1). The overall male-to-female ratio of HIV-GC coinfected cases for the period was 6.4 in NYC, 3.2 in both DC and MDC, and 29.2 in AZ

(Table 1). Across all the 4 jurisdictions, 7.4% of male GCs had been previously diagnosed with HIV. The highest male coinfection rates were 10.5% in DC and 9.3% in NYC. In each of the 4 jurisdictions, the majority of HIV/GC coinfections were among men: 87% (5127/5927) in NYC, 76% in both DC (1000/1311) and MDC (1144/1504), and 97% (701/725) in AZ. Among male GCs in each jurisdiction, HIV coinfection was highest among the age groups 40–44 and 45–49 years. Among male GCs, the race/ethnicity group with the highest percent HIV coinfection was white non-Hispanic in each jurisdiction: 22% in NYC, 11% in DC (11%), 11% in MDC, and 7% in AZ (Table 1).

Only 1.5% of female GCs occurred among women with previously diagnosed HIV. Of the female cases in the 4 study sites, DC had the highest coinfection (3.7%) followed by MDC (1.9%) (Table 1). Similar to men, among women in each jurisdiction, coinfections were most common among those in the age groups of 40–44 year olds and 45–49 year olds. Among female GCs, the race/ethnicity group with the highest percent HIV coinfection was white non-Hispanic in NYC (4.5%) and DC (5.6%) and black non-Hispanic in MDC (2.4%) and AZ (0.2%) (Table 1).

DISCUSSION

Matching STD and HIV surveillance registries allowed us to identify and describe the persons who acquired gonorrhea subsequent to HIV diagnosis in 4 diverse jurisdictions. Despite declines in overall GC counts in 3 of the 4 jurisdictions and only a modest increase in MDC, the proportion of GCs that occurred in persons with existing HIV infection increased during 2000–2008 in all of the 4 jurisdictions, with some more than doubling. The majority of GC-HIV coinfections occurred among men. Using surveillance data, we identified groups of HIV-infected persons who are at increased risk for transmitting HIV, as indicated by subsequent acquisition of GC. These data can inform efforts to target STD prevention services to high-risk persons living with HIV/AIDS.

When HIV-infected persons acquire other STDs, there is clear evidence of unprotected sexual contact and thus the potential for HIV transmission to uninfected partners. In accordance with earlier CDC guidance,[5] these persons and their partners should be prioritized for HIV prevention efforts. Presumably, many of these patients are receiving HIV primary care at the time of STD diagnosis. National recommendations include antiretroviral treatment initiation for all HIV-infected patients.[15] HIV care providers should prioritize HIV-infected patients with STDs for prevention strategies such as initiation of antiretroviral therapy and adherence support,[2] behavioral counseling[3,4], partner testing and referral,[8] routine STD screening,[5] and possibly preexposure prophylaxis for HIV for their uninfected sexual partners.[6]

The high male-to-female ratios we found suggest that many GC-HIV coinfections are occurring in the population of men who have sex with men (MSM), a hypothesis supported by increases in syphilis among men, particularly MSM, in each jurisdiction over the same interval[16] and that MSM represent the bulk of prevalent and new HIV diagnoses among men in each jurisdiction.[17–20] Rectal gonorrhea has been linked to an increased risk of HIV acquisition,[21,22] and *Neisseria gonorrhoeae* with reduced susceptibility to cephalosporins has emerged among MSM in multiple regions, further supporting the need for enhanced surveillance and intervention among this group.[23] Annual gonorrhea screening rates among HIV-infected MSM in various jurisdictions are estimated to be quite low, ranging from 14% to 18% for urethral screening and from 2.0% to 8.5% for oral/rectal screening.[24] Once locally validated for off-label use, nucleic acid amplification testing, typically used for urethral, cervical, and urine testing, can be used for the detection of gonorrhea infection in oral and rectal sites and should be incorporated into annual screening protocols for HIV-infected and noninfected MSM.[25] HIV primary care sites continue to serve as sentinel surveillance and intervention sites for HIV and STD prevention. HIV providers have a responsibility to engage their patients in preventing the spread of HIV using a full range of current HIV prevention strategies.

Notifying sex partners of HIV and/or STD exposure and referring them for testing and treatment remains an effective public health method for identifying undiagnosed infection.[8] Within each of the 4 jurisdictions, persons with syphilis and those with newly diagnosed HIV infection are prioritized for partner services. This analysis identified a large number of GC infections diagnosed among persons previously diagnosed with HIV. Current, administratively separated surveillance practices and programs would neither identify nor prioritize these cases for partner services or confirmation of linkage to primary HIV care. Efforts to improve HIV/STD data and program integration in local health departments may result in improvements in these public health services. Limited data exist on the outcomes of partner services for patients coinfected with HIV and another STD; however, partner service efforts may benefit from on-site assignment of communicable disease investigators within large HIV care clinics.[26,27] Public health programs should work within local legal frameworks[28] to evaluate the prioritization of HIV-infected persons with incident STDs for intensive partner services, behavioral counseling, and HIV case management as a recommended part of CDC’s Program Collaboration and Service Integration initiative.[29]

There are several limitations to this analysis and the use and interpretation of these data. Underestimates of coinfections likely occurred due to differences in matching variables, jurisdictional reporting, and reporting delays. Information regarding risks of HIV transmission, such as sexual network, risk behaviors, condom use, and HIV medication adherence were not analyzed; therefore, these data cannot be used to describe contemporaneous HIV medical control efforts or ongoing risk behaviors. These data reflect increases in coinfection case counts and not rates at which persons with HIV acquire GC. Anatomical site of GC infection was not available for these cases, thus genital versus nongenital (oral, rectal) infection could not be quantified. This analysis did not consider chlamydial infections because the number of chlamydia cases reported among HIV-infected persons is smaller (given the female preponderance of reported chlamydia) and did not allow for a detailed analysis. Finally, these data do not control for screening practices. Thus, increases in coinfections could be due to increases in routine screening for STDs among persons with HIV, especially at nongenital sites.

Public health programs with interest in prioritizing high-risk HIV-infected persons should consider the use of real-time data integration and analysis to identify STD/HIV coinfected persons and consider restructuring priorities for partner service delivery for those who might not otherwise receive public health interventions, including HIV care review, referral, and behavioral counseling. Although this cross-match of the STD and HIV registries at the 4 sites yielded valuable surveillance trends and identified opportunities for future real-time identification of coinfected persons for public health intervention purposes, the process was retrospective and labor intensive. Routine even real-time integration of STD/HIV surveillance data systems should be evaluated as a means to improve prevention and intervention services for persons exposed to or infected with HIV and other STDs.

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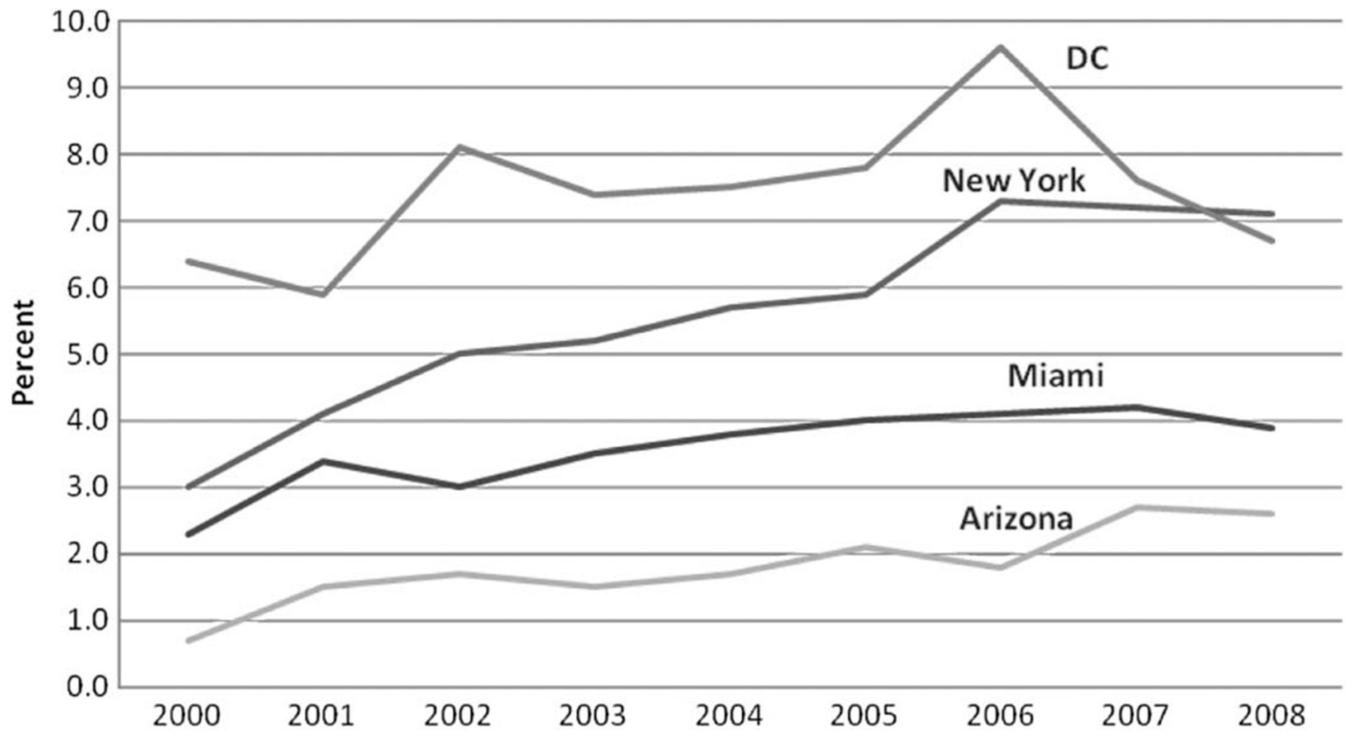

FIGURE 1.

Percent of GC cases coinfected with HIV: 2000–2008.

*Chi-square significance for trend $P < 0.001$ for each of the 4 sites.

TABLE 1.

Total Reported GCs and Number (%) of Cases Coinfected With HIV (NYC, AZ, MDC, and DC, 2000–2008)

	NYC		AZ		MDC		DC		Total	
Characteristics	**GC, N**	**GC/HIV Coinfected (%)**	**GC, N**	**GC/HIV Coinfected (%)**	**GC, N**	**GC/HIV Coinfected (%)**	**GC, N**	**GC/HIV Coinfected (%)**	**GC, N**	**GC/HIV Coinfected (%)**
Total	107,786	5930 (6)	39,779	725 (2)	40,214	1504 (4)	17,910	1312 (7)	205,689	9471 (5)
Men	54,941	5127 (9)	21,560	701 (3)	21,360	1144 (5)	9540	1000 (11)	107,401	7972 (7)
Age, yr										
<19	8875	78 (0.9)	3458	8 (0.2)	3673	25 (0.7)	1590	55 (4)	17,596	166 (0.9)
20–29	25,697	1287 (5)	10,213	151 (1.5)	10,361	235 (2)	3909	270 (7)	50,180	1943 (4)
30–39	13,380	2164 (16)	4782	281 (6)	4371	438 (10)	2277	363 (16)	24,810	3246 (13)
40–49	5521	1340 (24)	2323	202 (9)	2238	362 (16)	1226	258 (21)	11,308	2162 (19)
>50	1468	258 (18)	865	59 (7)	717	84 (12)	538	54 (10)	3588	455 (13)
Women	52,671	800 (2)	18,114	24 (0.1)	18,854	360 (2)	8310	311 (4)	97,949	1495 (1.5)
Age, yr										
<19	19,576	82 (0.4)	5939	1 (0)	7386	48 (0.6)	3264	64 (2)	36,165	195 (0.5)
20–29	23,471	206 (0.9)	8690	12 (0.1)	8945	168 (2)	3479	128 (4)	44,585	514 (1)
30–39	6804	295 (4)	2505	8 (0.3)	1802	98 (5)	938	75 (8)	12,049	476 (4)
40–49	2216	179 (8)	811	3 (0.4)	592	41 (7)	397	37 (9)	4016	260 (7)
≥50	604	38 (6)	169	0 (0.0)	129	5 (4)	232	7 (3)	1134	50 (4)
Male/Female Case Ratio	1.0	6.4	1.2	29.2	1.1	3.2	1.2	3.2	1.1	5.3
Race/ethnicity										
White										
All	3172	615 (19)	10,331	403 (4)	5283	372 (7)	596	131 (22)	19,382	1521 (8)
Male	2680	592 (22)	5501	397 (7)	3080	339 (11)	524	127 (24)	11,785	1455 (12)
Female	490	22 (5)	4830	6 (0.1)	2203	33 (1.5)	71	4 (6)	7594	65 (0.9)
Black										
All	32,486	2006 (6)	7357	66 (0.9)	26,660	859 (3)	12,424	919 (7)	78,927	3850 (5)
Male	19,276	1732 (9)	4500	61 (1)	13,731	552 (4)	6568	666 (10)	44,075	3011 (7)
Female	13,204	274 (2)	2857	5 (0.2)	12,929	307 (2)	5849	253 (4)	34,839	839 (2)
Hispanic										
All	9103	817 (9)	12,017	117 (1)	4016	226 (6)	255	27 (11)	25,391	1187 (5)

Characteristics	NYC		AZ		MDC		DC		Total	
	GC, N	GC/HIV Coinfected (%)	GC, N	GC/HIV Coinfected (%)	GC, N	GC/HIV Coinfected (%)	GC, N	GC/HIV Coinfected (%)	GC, N	GC/HIV Coinfected (%)
Male	4535	726 (16)	6654	111 (2)	2321	209 (9)	163	25 (15)	13,673	1071 (8)
Female	4564	91 (2)	5363	6 (0.1)	1695	17 (1)	90	2 (2)	11,712	116 (1)
American Indian/Alaska Native										
All	159	16 (10)	3024	26 (0.9)	53	1 (2)	52	4 (8)	3288	47 (1)
Male	122	16 (13)	1165	24 (2)	29	1 (3)	32	4 (13)	1348	45 (3)
Female	37	0 (0)	1859	2 (0.1)	24	0 (0)	20	0 (0)	1940	2 (0.1)
Other/Unknown										
All	2172	124 (6)	7026	113 (2)	4202	46 (1)	4583	231 (5)	17,983	514 (3)
Male	1465	121 (8)	3821	108 (3)	2134	43 (2)	2253	178 (8)	9673	450 (5)
Female	706	3 (0.4)	3205	5 (0.2)	1946	3 (0.2)	2280	52 (2)	8137	63 (0.8)
GC diagnosis year										
2000	12,314	367 (3)	4400	31 (0.7)	3917	91 (2)	2211	142 (6)	22,842	631 (3)
2001	13,964	579 (4)	3799	58 (1.5)	3842	132 (3)	2324	137 (6)	23,929	906 (4)
2002	13,755	694 (5)	4091	71 (2)	3987	120 (3)	2042	166 (8)	23,875	1051 (4)
2003	14,179	738 (5)	4689	71 (1.5)	3633	127 (4)	1895	141 (7)	24,396	1077 (4)
2004	11,434	652 (6)	4210	72 (2)	3817	143 (4)	1938	145 (8)	21,399	1012 (5)
2005	10,625	631 (6)	4581	94 (2)	3725	149 (4)	1645	128 (8)	20,576	1002 (5)
2006	10,638	778 (7)	5498	101 (2)	4300	178 (4)	1449	139 (10)	21,885	1196 (6)
2007	10,324	739 (7)	5025	136 (3)	4524	188 (4.2)	2105	159 (8)	21,978	1222 (6)
2008	10,553	752 (7)	3486	91 (3)	4265	165 (4)	2301	155 (7)	20,605	1163 (6)