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Examination of HIV infection through heterosexual contact with partners who are known to be HIV infected in the United States, 2010–2015

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Abstract

Using data from the National HIV Surveillance System, we examined HIV infections diagnosed between 2010 and 2015 attributed to heterosexual contact with partners previously known to be HIV infected. More than 4 in 10 HIV infections among heterosexual males and 5 in 10 HIV infections among heterosexual females were attributed to this group. Findings may inform the prioritization of prevention and care efforts and resource allocation modeling for reducing new HIV infection among discordant partnerships.

Effective strategies are available for preventing HIV transmission through heterosexual contact. Condom use has been a key method used by discordant couples to reduce transmission risk.¹ Biomedical interventions such as antiretroviral therapy (ART) for treatment of HIV infection and antiretroviral drugs taken for preexposure prophylaxis (PrEP) by uninfected partners have also been shown to reduce HIV transmission risk among heterosexual discordant couples.^{2–5} The World Health Organization, U.S. Centers for Disease Control and Prevention (CDC), Health Resources and Services Administration, and National Institutes of Health recommend that clinical and non-clinical providers offer information on all prevention methods that HIV-discordant couples can use to reduce the risk of HIV transmission during routine care and service visits.^{6,7}

Despite the availability of effective biomedical and behavioral prevention strategies, around 10,000 persons with HIV diagnosed each year in the United States have infections attributed to heterosexual contact.⁸ Many of these infections may be the result of heterosexual contact with partners who were previously known to be HIV infected. Examining the number of persons who acquired HIV infection through heterosexual contact with known HIV-infected partners can inform effective prevention planning and resource allocation to reduce HIV transmission among serodiscordant heterosexual partnerships.

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Using data from the National HIV Surveillance System (NHSS), we determined the number of males and females aged 13 years with HIV diagnosed between 2010 and 2015 who had their infection attributed to heterosexual contact. Data were reported to CDC through December 2016 from 50 U.S. states and Washington, D.C. Classification of HIV transmission risk was based on patient history recorded by health care providers or health department disease investigation specialists.⁸ We included persons who had sex with an opposite sex partner and excluded men who have ever had sexual contact with both men and women and persons who had injected drugs. Persons whose risk factors were not reported were also excluded from the analysis. We further categorized heterosexual contact into one of the four groups: (1) heterosexual contact with injection drug use partners, (2) heterosexual contact with bisexual male (only applied to female), (3) heterosexual contact with partners with unspecified risk, and (4) heterosexual contact with known HIV-infected partners.

Between 2010 and 2015, 43% to 45% of heterosexual males with HIV indicated that they had sex with female partners who were previously known to be HIV infected; 3% to 4% indicated sex with female injection drug use partners; and 52% to 54% indicated sex with female partners with unspecified risk. Among heterosexual females with HIV, 53% to 55% indicated that they had sex with male partners who were previously known to be HIV infected; 3% to 5% indicated sex with male injection drug use partners; about 3% indicated sex with bisexual male, and 37% to 40% indicated sex with male partners with unspecified risk (Table 1). Further examination of individual characteristics showed that blacks/African Americans, 35–44 and 45–54 age groups, and persons residing in the South had higher percentages of persons who reported sexual contact with partners known to be HIV infected. The pattern was the same for males and females.

Our analyses suggest that heterosexual contact with partners known to be HIV infected accounted for more than 4 in 10 HIV infections among heterosexual males and more than 5 in 10 HIV infections among heterosexual females between 2010 and 2015. Many of these infections could have been averted if discordant couples were aware of and were offered effective biomedical and behavioral prevention methods that they could use to reduce the risk of HIV transmission.⁹ A previous study estimated 624,000 heterosexually active adults aged 18–59 years old had substantial risks for acquiring HIV consistent with PrEP indications.¹⁰ Our finding shows, on average, 6,000 males and females per year whose HIV infections were attributed to heterosexual contact with partners known to be HIV infected – pointing out the importance of prioritizing uninfected partners in discordant relationships for PrEP. While viral suppression among persons living with HIV is also an effective mean in reducing HIV transmission,¹¹ approximately 50.1% heterosexual males and 53.4% heterosexual females with diagnosed HIV had viral suppression in 2013, far short of the national goal of 80%.¹² Additionally, an estimated 15.6% of persons living with HIV infection attributed to heterosexual contact are not aware of their infection.¹³ These figures corroborate the call from various guidelines for HIV treatment and PrEP use among discordant partnerships.^{6–7} Health care and service providers could play an important role in getting HIV-infected persons into HIV treatment, raising awareness and increasing delivery of PrEP and other highly effective HIV prevention services to HIV-infected patients and their uninfected partners.¹⁰ As more and more providers adopt the guidelines,^{6–7} we hope to see a reduction in the number of HIV infections attributed to heterosexual contact with

partners who were previously known to be HIV infected. Considering the lifetime HIV treatment costs ranging from \$253,000 to \$402,000 per person,¹⁴ averting HIV infections in discordant partnerships with effective biomedical and behavioral prevention methods is likely to be a cost-saving strategy.

One limitation of our study is that transmission risk is determined based on patient history. The confirmation of partners with documented HIV infection is not required and the time relationship between the sex partner's HIV infection diagnosis and the point in time that the sex partner engaged in the risk behavior cannot be ascertained. Additionally, we excluded men who have ever had sexual contact with both men and women, persons who injected drugs, and persons whose risk factors were not reported or identified.

Despite these limitations, our analyses provide additional insight into heterosexual transmission of HIV in the United States. The number of persons whose infections were attributed to heterosexual contact with partners known to be HIV infected reveals the number of HIV infections that would have potentially been prevented if the combination of effective biomedical and behavior methods were strategically used in discordant partnerships. It is hoped that our data will inform the prioritization of prevention and care efforts and resource allocation modeling for reducing new HIV infection.

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Table 1
 Number of HIV infections attributed to heterosexual contact, by sex and year of diagnosis and selected characteristics, 2010–2015, United States

Characteristics	Male												Female												
	2010		2011		2012		2013		2014		2015		2010		2011		2012		2013		2014		2015		
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	
Reported having sex with an opposite sex partner	6273	100%	5747	100%	5532	100%	5293	100%	5116	100%	5009	100%	7650	100%	7155	100%	6737	100%	6333	100%	6342	100%	6019	100%	
Heterosexual contact with injection drug users	228	3.6%	185	3.2%	167	3.0%	171	3.2%	156	3.0%	134	2.7%	397	5.2%	320	4.5%	253	3.8%	213	3.4%	221	3.5%	206	3.4%	
Heterosexual contact with bisexual men	–	–	–	–	–	–	–	–	–	–	–	–	237	3.1%	223	3.1%	181	2.7%	190	3.0%	193	3.0%	168	2.8%	
Heterosexual contact with partners with unspecified risk	3292	52.5%	2968	51.6%	2973	53.7%	2828	53.4%	2692	52.6%	2618	52.3%	2835	37.1%	2778	38.8%	2714	40.3%	2432	38.4%	2556	40.3%	2428	40.3%	
Heterosexual contact with known HIV-infected partners	2753	43.9%	2594	45.1%	2392	43.2%	2294	43.3%	2268	44.3%	2257	45.1%	4181	54.7%	3834	53.6%	3589	53.3%	3498	55.2%	3372	53.2%	3217	53.4%	
Among persons infected with HIV through heterosexual contact with known HIV-positive partners																									
Race/Ethnicity																									
Black/African American	1754	63.7%	1660	64.0%	1530	64.0%	1374	59.9%	1395	61.5%	1430	63.4%	2764	66.1%	2546	66.4%	2378	66.3%	2330	66.6%	2198	65.2%	2124	0.7	
Hispanic/Latino	518	18.8%	505	19.5%	440	18.4%	464	20.2%	463	20.4%	430	19.1%	674	16.1%	598	15.6%	537	15.0%	528	15.1%	520	15.4%	478	0.1	
White	339	12.3%	325	12.5%	314	13.1%	330	14.4%	301	13.3%	292	12.9%	511	12.2%	497	13.0%	476	13.3%	475	13.6%	485	14.4%	465	0.1	
Other	142	5.2%	104	4.0%	108	4.5%	126	5.5%	109	4.8%	105	4.7%	232	5.5%	193	5.0%	198	5.5%	165	4.7%	169	5.0%	150	0.0	
Age at diagnosis																									
13–24	237	8.6%	211	8.1%	231	9.7%	203	8.8%	201	8.9%	211	9.3%	724	17.3%	664	17.3%	551	15.4%	541	15.5%	521	15.5%	466	0.1	
25–34	600	21.8%	567	21.9%	530	22.2%	557	24.3%	537	23.7%	541	24.0%	1139	27.2%	1015	26.5%	971	27.1%	924	26.4%	906	26.9%	858	0.3	
35–44	789	28.7%	720	27.8%	619	25.9%	592	25.8%	596	26.3%	572	25.3%	1075	25.7%	926	24.2%	873	24.3%	802	22.9%	862	25.6%	765	0.2	
45–54	723	26.3%	694	26.8%	635	26.5%	566	24.7%	578	25.5%	512	22.7%	805	19.3%	797	20.8%	772	21.5%	776	22.2%	648	19.2%	660	0.2	
55+	404	14.7%	402	15.5%	377	15.8%	376	16.4%	356	15.7%	421	18.7%	438	10.5%	432	11.3%	422	11.8%	455	13.0%	435	12.9%	468	0.1	
Region of residence																									
Northeast	662	24.0%	604	23.3%	565	23.6%	510	22.2%	535	23.6%	421	18.7%	837	20.0%	776	20.2%	665	18.5%	591	16.9%	574	17.0%	532	0.2	
Midwest	266	9.7%	231	8.9%	221	9.2%	237	10.3%	188	8.3%	194	8.6%	398	9.5%	385	10.0%	394	11.0%	381	10.9%	339	10.1%	324	0.1	
South	1596	58.0%	1581	60.9%	1432	59.9%	1344	58.6%	1351	59.6%	1448	64.2%	2560	61.2%	2353	61.4%	2179	60.7%	2217	63.4%	2152	63.8%	2097	0.7	
West	229	8.3%	178	6.9%	174	7.3%	203	8.8%	194	8.6%	194	8.6%	386	9.2%	320	8.3%	351	9.8%	309	8.8%	307	9.1%	264	0.1	
Total	2753	100%	2594	100%	2392	100%	2294	100%	2268	100%	2257	100%	4181	100%	3834	100%	3589	100%	3498	100%	3372	100%	3217	100%	