

## **HIV TESTING AMONG WOMEN IN THE UNITED STATES**

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### **ABSTRACT**

**Background/Objective:** In every region of the world, more women are living with HIV/AIDS. The rising proportion of HIV cases among women underscores the need to understand the HIV testing behavior among women. The purpose of this study was to determine the proportion of women aged 18 years and older who had ever been tested for HIV in the United States and assess the factors associated with seeking the HIV test.

**Method:** Data from the 2005 National Health Interview Survey (NHIS) were analyzed.

**Results:** Of the 16,838 women, who were interviewed in 2005, 75.8 percent were white, 46.7 percent were married, and 37.4 percent lived in the South. Of these women, 39 percent (n= 6,496) reported to have had been tested for HIV. After fitting these factors in the logistic regression model, African American (Odds Ratio (OR):2.24, 95 percent confidence interval (CI) 1.937-2.585) and Hispanic women (OR:1.27; 95% CI: 1.039-1.558), being pregnant (OR: 3.81, 95% CI: 2.734-5.301), or having a history of sexually transmitted diseases (OR: 4.66, 95% CI: 3.110-6.980) were significantly associated with HIV testing; whereas living in the Midwest (OR: 0.72, 95% CI: 0.625-0.826) was not associated with HIV testing.

**Conclusion:** About 27 years into the HIV epidemic, only 39% of women aged 18 years and older had ever been tested for HIV in the United States. Considering the rising number of HIV cases in this

population, more efforts are needed to increase the proportion of women who become aware of their HIV serostatus in order to link those who are infected to health services.

## INTRODUCTION

While the HIV/AIDS epidemic has historically affected men, more women are living with HIV than ever before in every region of the world. Of the 33.2 million people currently living with HIV worldwide, 15.4 million (46.4%) are female.<sup>1</sup> In 2007, an estimated 2,900 new HIV infections occurred each day among women (ages 15+).<sup>1</sup> In the United States, the number of women living with HIV/AIDS increased from 8 percent in 1985 to 27 percent in 2005.<sup>2</sup> Of the estimated 40,000 new cases of HIV diagnosed annually in the United States, women account for 30 percent of these cases.<sup>3</sup> Ethnic minority women are disproportionately affected. Although African American and Hispanic women together represent about 25% of the United States female population, they account for 81% of the estimated total of HIV/AIDS diagnoses for women.<sup>4</sup> HIV/AIDS-related conditions are now the leading cause of death for African American women aged 25-34 years.<sup>5</sup>

The advent of active antiretroviral therapy (ART) in 1996 has dramatically reduced the HIV morbidity and mortality in countries with access to this therapy. Even developing countries are now experiencing the same benefits following the scale up of ART in poor settings. These benefits underscore the need for early HIV testing. However, the proportions of adults in the United States who get tested for HIV remain low. Current knowledge about HIV testing among women results essentially from studies conducted at antenatal clinics across the country. This study used a community-based representative sample of women in the United States to examine the prevalence of HIV testing and determine the socio-demographic

characteristics associated with HIV testing in this population.

## **METHODS**

### *NHIS Data*

Data from the 2005 National Health Interview Survey (NHIS) were analyzed. Detailed descriptions of the sample design have been described elsewhere.<sup>6</sup> Briefly, the NHIS planners used multistage sampling techniques to select the sample of households and persons for the NHIS. All dwelling units in the U.S. that contain members of the civilian non-institutionalized population aged 18 years and older were eligible for the study. For the sample adult core questionnaire, one adult per family was randomly selected to answer all questions for him or herself; proxy respondents were not allowed. The final response rate for the survey was high, at 74 percent.

### *Statistical Analysis*

Demographic (age in years, gender, marital status, regions) and clinical information (history of sexually transmitted disease (STD) or pregnancy and whether the participant had ever been tested for HIV) were retrieved and analyzed. Bivariate analysis was run using Epi Info, version 3.4.1 (Epi Info, Atlanta, GA) and the logistic regression analysis was run using WesVar version 4.2 (Westvar Inc. Bethesda, MD).

## **RESULTS**

A total of 16,838 women aged 18 years and older participated in the 2005 NHIS. Approximately 76 percent (n =12649) of the participants were white, 44 percent (n =7493) were married, and 37 percent (n = 6297) lived in the South. The average age of participants was 48 years

with a standard deviation of 18 years. Among women who participated in the 1995 survey, 39 percent (n = 6,496) reported to have had been tested for HIV and 2.1 percent (n= 340) reported to be pregnant at the time of the interview. Among those who reported to be pregnant at the time of the interview, 70 percent were white and 71.5 percent were married. Their average age was 28.3 years (SD= 6 years). Of these women, 17.7 percent (n=63) had never been tested for HIV.

Bivariate analysis (Table 1) showed that Black (Odds Ratio (OR) =1.53, 95% confidence interval (CI) 1.41-1.64) and Hispanic women (OR = 1.48, CI: 1.33-1.64) were significantly more likely than white women to have been tested for HIV. Women aged 25 to 39 years (OR = 1.40, CI: 1.27-1.55) were significantly more likely than those aged 18 to 24 years to have been tested for HIV; whereas women who were 40 to 49 years old (OR=0.99, CI: 0.89-1.10) or 50+ (OR=0.37, CI: 0.34-0.41) were less likely to have been tested for HIV than their counterparts. Women who reported either a sexually transmitted disease (OR=1.56, CI: 1.31-1.86) or pregnancy at the time of the interview (OR=1.51, CI: 1.28-1.78) were significantly more likely than their counterparts to have been tested for HIV. However, women from the Midwest (OR= 0.77, CI: 0.71-0.85) and those who were divorced (OR=0.24, CI: 0.21-0.28) were significant less likely to have been tested for HIV than their counterparts.

After controlling for confounding variables using logistic regression analysis (Table 2), Black (Odds Ratio (OR):2.24, 95% confidence interval (CI) 1.937-2.585) and Hispanics women (OR: 1.27; 95% CI: 1.039-1.558) were significantly more likely to have ever been tested for HIV than white women. Women aged 25 to 35 years (OR: 2.176, CI: 1.997-2.371) and those aged 40 to 49 years (OR: 1.312, CI: 1.199-1.436) were significantly more likely to have ever tested for HIV than people aged 18 to 24 years.

However, older women (50+) (OR: .427, CI: 0.392- 0.466) were significantly less likely to have been tested for HIV than their counterparts. Women from the Northeast (OR: 0.83, CI: 0.720-0.964) and those living in the Midwest (OR: 0.72, 95% CI: 0.625-0.826) were significantly less likely to have ever been tested for HIV than women from the West. On the other hand, women from the South (OR: 1.06, CI: 0.926-1.223) were as likely as those living in the West to have ever tested for HIV. Married women (OR: 1.80, CI: 1.588-2.042) were more likely than single women to have ever tested for HIV. Women who reported to be pregnant at the time of the survey (OR: 3.81, 95% CI: 2.734-5.301) or to have a sexually transmitted disease (OR: 4.66, 95% CI: 3.110-6.980) were significantly more likely to have been tested for HIV than their counterparts.

## DISCUSSION

This study was undertaken to characterize women who had ever been tested for HIV in the United States. The results of this study showed that among the 16,838 women aged 18 years and older who participated in the 2005 NHIS, only 39 percent (n = 6,496) had ever been tested for HIV. The proportion of women who had ever been tested for HIV varied widely among ethnic groups. Finding that Black and Hispanic women were more likely than white women to have been tested for HIV is consistent with previous reports.<sup>7</sup> Self perception of risk as well as the concerted effort of public health agencies to target people at high risk for HIV at public antenatal and STD clinics may explain the higher likelihood for minority women getting tested for HIV.

The study also showed that a history of sexually transmitted disease or pregnancy at the time of the interview was strongly associated with HIV testing. Women who reported a history of STD were five times

more likely to be tested for HIV than those who did not. This observation has a significant public health implication considering the United States Public Health Service (USPHS) guidelines issued in 1987 making HIV counseling and testing a priority for persons who practiced high-risk behaviors. The USPHS recommended routine HIV testing for all persons seeking treatment for STDs, regardless of health-care setting.<sup>8</sup> Moreover, pregnant women were four times more likely to be tested for HIV than those who were not pregnant. Again, the increased chances of being tested among pregnant women is in line with the 1995 USPHS's guideline recommending that all pregnant women be counseled and encouraged to undergo voluntary testing for HIV.<sup>9</sup> This recommendation became necessary following the success of the clinical trial 076 which showed a substantial reduction in the perinatal transmission of HIV following the administration of zidovudine to HIV-infected pregnant women.<sup>10</sup> The Centers for Disease Control and Prevention (CDC) modified this recommendation in 2001 by making the HIV screening a routine part of prenatal care.<sup>11</sup>

Reports that 17.7 percent (n= 63) of pregnant women had never been tested for HIV raised concerns about the effectiveness of the prenatal HIV testing approaches in the United States. There are three approaches used for prenatal HIV testing in the United States: "opt-out" voluntary testing, "opt-in" voluntary testing, and the mandatory newborn HIV testing.<sup>12</sup> Under the "opt-out" option, all women receive an HIV test, unless they specifically state that they do not want one; whereas for the opt-in testing, women are informed that a test is available, but they will only be given one if they specifically request it. Under the newborn mandatory HIV testing option, newborns are tested for HIV, with or without the mother's consent, if the mother's HIV status is unknown at delivery. The lack of information about the stage of the pregnancy

does not allow us to state for sure that the prenatal screening system failed in this case. The recent update from the CDC recommending the integration of voluntary HIV testing into routine medical examinations will probably increase the chances to have all pregnant women tested for HIV.

HIV has erroneously been perceived as a disease of young gay men or prostitutes. Therefore older women (50+), perceived to be at low risk, might have not been offered the HIV test. Much of the HIV educational material targets younger people, overlooking older adults. The notion that older adults are asexual endures even as evidence to the contrary accrues. However, older adults may fail to take precautions when they are sexual. Public education that refutes the myth of asexuality in older adults and encourages HIV counseling and testing may serve to prevent increases in infection in this age group.

Finally, this study confirms a regional difference in HIV testing among women in the United States. Women from the Midwest and Northeast were significantly less likely to have been tested for HIV than women from the West. Findings that women from the Northeast and Midwestern were less likely to be tested for HIV generate more questions than explanations. Are women from these areas less likely to test because preventive messages are not successful compared to other parts of the country? Do they hear the messages but see no need to test because they perceive themselves to be at low risk? The low population density in the Midwest as well as the low HIV prevalence in this region may explain the lack of aggressive HIV testing programs in this region.

The strength of this study lies on the fact that, unlike many others studies based on small samples, this study used data from a large and representative sample of the United States population. However, the fact no effort was made to validate the information provided by the

respondents such as history of HIV testing may have led to misclassification.

This study attempted to determine the proportion as well as the characteristics of women who had ever been tested for HIV in the United States using data from the 2005 NHIS. Twenty seven years into the HIV epidemic, the proportion of women who had ever tested for HIV remains low at 39%. More efforts are needed to increase the overall proportion of women who are aware of their HIV serostatus in order to link those who are infected to health services.

### REFERENCES

- Branson BM, Handsfield HH, Lampe MA, Janssen RS, Taylor AW, Lyss SB, Clark JE; Centers for Disease Control and Prevention (CDC). Revised recommendations for HIV screening of pregnant women. *MMWR* 2001;50 (No. RR-19):63--85.
- Centers for Disease Control and Prevention (CDC). HIV and AIDS - United States, 1981-2001. *MMWR* 2001;50:430-434
- CDC. Public Health Service guidelines for counseling and antibody testing to prevent HIV infection and AIDS. *MMWR* 1987;36:509-15.
- CDC. U.S. Public Health Service recommendations for human immunodeficiency virus counseling and voluntary testing for pregnant women. *MMWR* 1995;44
- Centers for Disease Control and Prevention. Revised Recommendations for HIV Screening of Pregnant Women. Perinatal Counseling and Guidelines



Consultation. MMWR. November 9, 2001 / 50(RR19);59-86.

CDC. *HIV/AIDS Surveillance Report, 2005*. Vol. 17. Rev ed. Atlanta: US Department of Health and Human Services, CDC: 2007:1–46. Available at <http://www.cdc.gov/hiv/topics/surveillance/resources/reports/>. Accessed June 28, 2007.

Marie C. McCormick, MD, ScD, Ezra C. Davidson, Jr, MD and Michael A. Stoto, PhD. Preventing perinatal transmission of human immunodeficiency virus in the united states. *Obstetrics & Gynecology* 1999;94:795-798

Michelle A. Rose, Tanya Telfair Sharpe, Kathleen Ralieg, Laurie Reid, Megan Foley, Janet Cleveland. *Journal of Women's Health*. April 1, 2008, 17(3): 321-324.

The National Center for Health Statistics (2005). National Health Interview Survey. National Health Interview Survey. Available at <http://www.cdc.gov/nchs/about/major/nhis/hisdesc.htm>.

UNAIDS, AIDS Epidemic Update 2007: December 2007. Kaiser Family Foundation, “Women and HIV/AIDS in the United States,” May 2008.

[http://www.kff.org/hivaids/upload/6092\\_05.pdf](http://www.kff.org/hivaids/upload/6092_05.pdf)

Westat, Inc. WesVar 4.2, Software for Analysis of Data from complex sample. Available at <http://www.westat.com/wesvar/about/WV4.2%20Manual.pdf>

**Table 1**  
*Unadjusted Analysis of the Association between Demographic and Clinical Characteristics and HIV Testing among Women, 2005 NHIS.*

	Total N= 16,838	(%) of women Who ever tested	OR	95% CI	p
<b>Race</b>					
White	12649	4352 (0.34)	1		
Black	2557	1342 (0.52)	1.53	1.41-1.64	<0.01
Hispanic	1196	609 (0.51)	1.48	1.33-1.64	<0.01
Others	279	117 (0.42)	1.22	0.97-1.53	0.07
<b>Ages</b>					
18-24	1641	756 (0.46)	1		
25-39	4657	3008 (0.64)	1.40	1.27-1.55	<0.01
40-49	3238	1478 (0.45)	0.99	0.89-1.10	0.86
50+	7302	1254 (0.17)	0.37	0.34-0.41	<0.01
<b>History of STD</b>					
Yes	292	246 (0.84)	1.56	1.31-1.86	<0.01
No	9127	4930 (0.54)	1		
<b>Region</b>					
Northeast	2956	1066 (0.36)	0.86	0.78-0.94	<0.01
Midwest	3920	1274 (0.32)	0.77	0.71-0.85	<0.01
South	6297	2619 (0.41)	0.99	0.92-1.07	0.92
West	3665	1537 (0.42)	1		
<b>Marital Status</b>					
Never married	3815	1797 (0.47)	1		
Divorced	2304	260 (0.11)	0.24	0.21-0.28	<0.01
Separated	2420	1012 (0.41)	0.89	0.81-0.97	0.01
Married	7493	2995 (0.40)	0.85	0.79-0.91	<0.01
<b>Pregnant</b>					
Yes	340	277 (0.81)	1.51	1.28-1.78	<0.01
No	9175	4952 (0.54)	1		

2005 NHIS surveys .

**Table 2.**  
*Adjusted Analysis of the Association between Demographic and Clinical Characteristics and HIV Testing among Women, 2005 NHIS*

Variable	OR	95% confidence interval
<b>Race</b>		
Others	0.81	0.559-1.179
Hispanics	1.27	1.039-1.558
Blacks	2.24	1.937-2.585
White	ref	
<b>Age</b>		
50+	0.427	0.392-0.466
40-49	1.312	1.199-1.436
25-39	2.176	1.997-2.371
18-24		ref
<b>Pregnancy</b>		
Yes	3.81	2.734-5.301
No	ref	
<b>History of STDs</b>		
Yes	4.66	3.110-6.980
No	ref	
<b>Region</b>		
Northwest	0.83	0.720-0.964
Midwest	0.72	0.625-0.826
South	1.06	0.926-1.223
West	ref	
<b>Marital Status</b>		
Married	1.80	1.588-2.042
Divorced	1.58	0.890-2.821
Separated	1.85	1.532-2.226
Single	ref	