

## Determinants of Antepartum Human Immunodeficiency Virus Testing in a Non-Medicaid Obstetric Population

E. Cardonick,\* S. Daly, M. Dooley, K. Elles, and N.S. Silverman

*Department of Obstetrics and Gynecology, Jefferson Medical College of Thomas Jefferson University, Philadelphia, PA*

### ABSTRACT

**Objective:** To determine voluntary human immunodeficiency virus (HIV) testing rates and factors influencing testing in a private obstetric practice.

**Methods:** Antepartum patients were offered HIV testing after completing a self-assessment questionnaire. Perceived risks and demographics were correlated with testing rates.

**Results:** Overall, 348/600 (58%) women consented to HIV testing. In a univariate analysis, patients with “any” perceived risk(s) were more likely to be tested. Single women and those with an at-risk partner(s) or a history of sexually transmitted disease (STD) were more likely to desire testing. These factors remained independently associated with voluntary testing in a multivariate regression model. No patients tested positive for HIV.

**Conclusions:** In our private obstetric practice, 26% of women perceived themselves at risk for HIV infection, and testing rates depended on the various risks identified. A history of STDs or an at-risk sexual partner were stronger predictors of voluntary testing than was marital status. Focused HIV counseling among pregnant women at relatively low risk for infection may be possible. *Infect. Dis. Obstet. Gynecol.* 6:209–213, 1998. © 1998 Wiley-Liss, Inc.

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### KEY WORDS

HIV screening; risk factors; sexually transmitted disease; pregnancy

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Infection with the human immunodeficiency virus (HIV) is now the fourth leading cause of death for women of reproductive age in the United States and is an increasingly important cause of morbidity and mortality for their children.<sup>1</sup> Neonatal HIV infection and acquired immunodeficiency syndrome (AIDS) are attributable to maternal infection and vertical transmission in over 90% of cases.<sup>2</sup> Despite comprising the largest growing group of newly infected individuals, women, particularly those in minority groups, may not fully benefit from HIV education and testing programs. In 1991, the National Health Interview Survey NHIS-AIDS reported that only 18.8% of reproductive-aged women (ages

18–44 in United States households) reported having been HIV tested.<sup>3</sup>

Controlled trials have demonstrated that the treatment of HIV-infected women during pregnancy with antiretroviral agents, such as zidovudine (AZT), can dramatically lower the risk of maternal-neonatal HIV transmission.<sup>4,5</sup> We have recently demonstrated that knowledge about such therapies is limited among inner-city women at high risk for HIV infection, though the availability of medicine to lower the risk of vertical HIV transmission, even in the absence of clear maternal benefit, was viewed almost uniformly by these women as both important and acceptable.<sup>6</sup> Comprehensive

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\*Correspondence to: Dr. Elyce Cardonick, Department of Obstetrics and Gynecology, 834 Chestnut Street, Suite 4000, Philadelphia, PA 19107. E-mail: cardonil@jefflin.tju.edu

TABLE 1. Patient questionnaire

1. Have you ever had a blood transfusion? If yes, was it before or after 1985?	Yes Before	No After	
2. Have you ever been treated for a sexually transmitted disease? (gonorrhea, chlamydia, syphilis)	Yes	No	
3. Have you ever used street drugs by injection (shooting up)?	Yes	No	
4. Have you had sexual relations with a partner who ever had a blood transfusion?	Yes	No	Don't know
5. Have you had sexual relations with a partner who ever used drugs by injection?	Yes	No	Don't know
6. Have you had sexual relations with a man who ever had sex with other men?	Yes	No	Don't know
7. Have you ever had sexual relations with a partner who might have been at high risk for HIV?	Yes	No	Don't know
8. Do you think that you are at risk at all for being HIV-infected?	Yes	No	

Please check one of the following:

- I would like to be HIV tested.
- I need to think more about HIV testing.
- I do not want to be HIV tested.
- I would like to meet formally with an HIV educator before deciding.
- I have chosen not to fill out this questionnaire.

Signature

Date

HIV counseling and testing in at-risk populations are essential for overall risk assessment, for targeted patient education directed toward risk reduction and behavior modification, and for the early identification and treatment of newly infected individuals and their partners. The obstetrician's and pediatrician's ability to reduce mother-to-child HIV transmission depends on antepartum knowledge of a mother's serostatus.

The issues of pregnancy-related HIV counseling and testing have been addressed in indigent, inner-city populations; however, few studies have addressed screening and its acceptance in presumably low-risk populations. Therefore, we designed this study in the context of instituting a policy of offering HIV testing to all patients within a city-based, non-Medicaid, private practice population. We asked all patients registering for obstetric care to self-assess their HIV risks by means of a checklist questionnaire, then offered HIV testing to them all. We planned to evaluate the acceptance of HIV testing and to assess the degree of perceived risk. We additionally hoped to identify risk factors in the specific patient population that were most directly associated with a voluntary decision to undergo HIV testing. Until these issues are better understood, calls for global public health policies will continue to be based on presumption rather than on documented results.

### SUBJECTS AND METHODS

Patients were recruited from three private obstetric practices whose patients delivered at a common

university hospital. Ninety percent of patients were privately insured. Racial/ethnic demographics of the study population were as follows: 70% Caucasian, 19% African American, 4% Asian, 2% Hispanic or Indian, and 5% for whom information was unreported. Between January 1996 and January 1997, all patients registering for prenatal care were asked to complete a yes-or-no questionnaire that outlined their social and demographic backgrounds in the context of HIV infection risks (Table 1). A cover letter accompanied each questionnaire explaining the project and emphasizing that both completing the survey and consenting to HIV testing were voluntary and in no way linked to the provision of prenatal care. All patients subsequently discussed HIV counseling in light of the results of their individual survey with their physician or nurse practitioner, and HIV testing was then offered to each patient. A separate formal session with an HIV counselor was made available to all patients.

The incidence of individual HIV risk factors was calculated for the population as a whole with comparison of HIV testing acceptance rates made between those with risks and those without them. Comparisons of risk factors as well as testing rates were also made with regards to marital status. Non-continuous data were analyzed with a corrected chi-square and Fisher exact test; pooled two-tailed Student *t* tests were employed for continuous data. Univariate as well as logistic regression analyses were employed to determine the sociodemographic

TABLE 2. HIV testing in pregnancy: risk factor results<sup>a</sup>

Any risk for HIV infection (n = 153)	N	% of all patients with risks
History of STD	106	69%
Partner risk	24	16%
History of blood transfusion	23	15%
Occupational risk	12	7.8%
History of intravenous drug use	1	0.6%

<sup>a</sup>Results add up to > 100% due to patients with multiple risk factors for HIV.

characteristics most associated with acceptance of HIV testing. Statistical significance was accepted at a *P* value < 0.05.

RESULTS

Six hundred women registering for prenatal care completed the questionnaire; only three patients who were approached for participation chose not to complete the survey. The mean age of women in the study group was 30.5 ± 5.5 years; 77% of the women were married. Of the 600 women surveyed, 348 patients consented to HIV testing (58%), with no positive HIV test results identified during the 12-month study period.

Rates of reporting risk factors for HIV infection, abstracted from responses to the questionnaire, are listed in Table 2. As shown, 153 (26%) of the 600 women surveyed in this study identified behaviors or risks that could place them at risk for HIV infection. The risks most commonly identified in this survey were: (1) history of a sexually transmitted disease (STD), (2) an at-risk partner, or (3) a history of blood transfusion.

The relationship of the women's marital status to both the presence of HIV risk factors and to voluntary testing rates is analyzed in Table 3. Single or divorced women were more likely to identify factors associated with an increased risk of HIV infection, particularly a history of STD, and were also more likely than married women to undergo HIV testing (68% vs. 55%; *P* = .006).

In a univariate analysis, outlined in Table 4, patients with any perceived risk for HIV infection were more likely to undergo voluntary testing than those without self-perceived risks. Specifically, we found that women with a history of STD, occupational exposure, or an at-risk sexual partner(s) were

TABLE 3. Association of marital status and HIV risk factors

	Marital status		<i>P</i> value
	Married (n = 461)	Single/Divorced (n = 139)	
Any risk for HIV	94 (20%)	58 (42%)	≤.0001
History of STD	59 (13%)	46 (33%)	≤.0001
Partner risk			
Yes	16 (3.5%)	8 (6%)	NS <sup>a</sup>
Don't know	69 (15%)	21 (15%)	
Tested for HIV	253 (55%)	95 (68%)	.006

<sup>a</sup>NS = not significant.

TABLE 4. Results: risk factors and their impact on HIV testing

	Tested			<i>P</i>
	No	Yes	%	
Any perceived risk factor				
Yes (n = 153)	39	114	75	
No (n = 447)	215	232	52	.001
Specific risk factor				
1. History of sexually transmitted disease				
Yes (n = 106)	23	83	78	
No (n = 494)	229	265	54	.001
2. History of blood transfusion				
Yes (n = 23)	10	13	57	
No (n = 577)	242	335	58	NS
3. History of intravenous drug use				
Yes (n = 1)	1	0	0	
No (n = 599)	251	348	58	NS
4. Occupational risk				
Yes (n = 12)	1	11	92	
No (n = 588)	251	337	57	.02
5. Sexual relations with a partner at risk				
Yes (n = 24)	5	19	79	
No (n = 486)	225	261	54	
Don't know (n = 90)	22	68	75	.001

more likely to be tested for HIV. Women with occupational exposure to HIV, though their absolute number was small, had the highest rate of accepting HIV testing (92%) among any of the identified at-risk subgroups. Overall, just over half of women without self-perceived risk for HIV infection underwent voluntary testing, while only 25% of women acknowledging risk factors or behaviors associated with infection chose not to be tested. The results of a multivariate regression analysis factoring risk factors, age, and marital status into the assessment of determinants of voluntary HIV testing revealed that partner risk, occupational exposure, STD history, and marital status remained signifi-

cantly associated with a decision to undergo HIV testing.

## DISCUSSION

Infection with HIV is an increasing cause of illness and death among women, while perinatally acquired HIV infection in children of women with HIV accounts for the greatest majority of pediatric AIDS cases.<sup>2,7</sup> Pregnancy may be the only opportunity for medical care for at-risk patients. Modifications of routine obstetric practice aimed to decrease neonatal transmission in addition to maternal and neonatal AZT rely on the early identification of HIV-infected pregnant women.

Pregnancy may provide an impetus for testing among women who would otherwise decline it. Assessment of the acceptability of HIV testing for all women, and not just for those in risk groups, is critical for the development of effective testing policies. Irwin et al. evaluated all published studies of HIV testing rates in a variety of at-risk populations. Factors most associated with voluntary HIV testing included the patients' perception of HIV risk, acknowledgment of risk behaviors, confidentiality protection, presenting counseling and testing as "routine" rather than optional, and the providers' belief that HIV testing would benefit the patient.<sup>8</sup>

Antenatal HIV screening policies are extremely variable across the United States. While mandatory testing would have the advantage of identifying all HIV-positive women when they are seeking care, this policy compromises individual autonomy, precludes informed consent, and may discourage highest-risk patients from seeking prenatal care because of fears of either discrimination or denial of health care benefits. A testing method that depends solely on a clinician-patient discussion, particularly at the first medical visit, may not allow assessment of a woman's true risk, as she may be unwilling to disclose sexual history, drug use, or other behaviors that may be seen as socially unacceptable or stigmatizing. In fact, researchers have shown that, in nonpregnant indigent populations, selective testing based solely on HIV risk factors identified through one-on-one interviewing failed to identify over 50% of seropositive women.<sup>9-12</sup> A prior report from our institution further demonstrated that physically removing the HIV counseling and testing process from the medical care sec-

tion of a prenatal clinic significantly increased the patients' acceptance of HIV testing.<sup>13</sup>

The present study was designed to address both the limitations of the previously cited strategies for prenatal HIV testing and the changing nature of HIV infection in women, as heterosexual transmission is increasingly responsible for newly acquired cases.<sup>1</sup> We designed a universally-offered, self-administered questionnaire to be completed by women in a presumably lower-risk setting for HIV infection, i.e., a city-based, non-Medicaid obstetric population. This particular population has traditionally not been widely studied in HIV epidemiology. Attitudes among these women about their own risk for HIV infection, and their acceptance of HIV testing in general, along with identification of demographic factors associated with a decision to undergo testing, needs to be appropriately evaluated. This population may be perceived as "low risk" for HIV infection due to a low prevalence of intravenous drug use; however, heterosexual exposure and occupational risk may be other important HIV risk factors for this particular population. We hoped that the nature of the questionnaire would allow nonconfrontational self-assessment for each woman, along with an introduction to or reinforcement of information about behaviors associated with a risk of HIV infection.

Our study is the largest conducted to date in this type of prenatal population and demonstrates that acceptance of the risk assessment questionnaire among non-indigent pregnant women was almost universal, although over 40% of women completing the survey subsequently declined HIV testing. Approximately one quarter of the women surveyed acknowledged risks for HIV infection, with testing rates significantly higher within this subgroup (75%). Among women without self-identified risk factors, the testing rate was still 52%. Even after controlling for interactions in a multivariate analysis, an STD history for a woman or her partner remained significantly and independently associated with a decision to undergo HIV testing, as did marital status of single or divorced.

Studies conducted in inner-city indigent obstetric settings show testing rates as high as 90%.<sup>11,13,14</sup> In contrast low voluntary testing rates (less than 25%) in private obstetric populations have been reported.<sup>11</sup> In our private obstetric population,

57–92% of patients accepted HIV testing, depending on the specific self-perceived risk factor identified.

In summary, our study offers some insight into HIV risk assessment and testing decisions among women in an obstetric setting traditionally perceived as “low-risk” for HIV infection. First, evaluation of HIV risk factors among these women was almost universally accepted, though a decision to undergo testing was significantly associated with a woman’s perception or acknowledgment of HIV-related risk factors. We acknowledge that the study is limited by lack of HIV seroprevalence data among the women who declined testing; this subgroup may have underestimated their risk or wished to simply avoid testing due to increased but concealed risk for infection. It is also notable that, among the 348 women tested during the study period, none were HIV positive. This questionnaire has since been incorporated into the routine patient management framework of the participating practices. One asymptomatic individual who denied risk factors yet consented to HIV testing during pregnancy was found to be seropositive. The experience of this individual patient, while anecdotal, illustrates the need for incorporating HIV education and testing protocols into all obstetric populations and not limiting efforts to historically high-risk patients.

It is hoped that studies like this one will begin to fill gaps in our approach to providing care and options to all women of reproductive age, in a format that is neither confrontational nor stigmatizing. With demonstrated rates for acceptance of HIV testing that are substantially higher than those reported in other low-risk obstetric settings, our study represents an approach that has shown value for further investigation and refinement. Because there are patients who deny risk factors yet desire HIV testing, because physician–patient interviews may not accurately disclose risk factors, and because some women may not be aware that they have an at-risk heterosexual partner, we encourage universal counseling and voluntary testing for all pregnant women.

## REFERENCES

1. Gupta G: Human immunodeficiency virus testing and counseling: nuts and bolts. *Am J Obstet Gynecol* 175:6:1502–1510, 1996.
2. Ecker J: The cost-effectiveness of human immunodeficiency virus screening in pregnancy. *Am J Obstet Gynecol* 174:716–720, 1996.
3. Centers for Disease Control: HIV testing among women ages 18–44 years—United States, 1991 and 1993. *Morb Mortal Wkly Rep* 45:733–737, 1996.
4. Centers for Disease Control: Recommendations of the U.S. Public Health Service Task Force on the use of zidovudine to reduce perinatal transmission of human immunodeficiency virus. *Morb Mortal Wkly Rep* 43:1–20, 1994.
5. Connor EM, Sperling RS, Gerber R, et al: Reduction of maternal-infant transmission of human immunodeficiency virus type 1 with zidovudine treatment. *N Engl J Med* 331:1173–1180, 1994.
6. Silverman NS, Rohner D, Turner B: Attitudes toward health care, HIV infection and perinatal transmission interventions in a cohort of inner-city, pregnant women. *Am J Perinatol* 14:341–346, 1997.
7. Centers for Disease Control: AIDS among children—United States, 1996. *Morb Mortal Wkly Rep* 43:1005–1010, 1996.
8. Irwin K, Valdiserri RO, Holmberg SD: The acceptability of voluntary HIV antibody testing in the United States: A decade of lessons learned. *AIDS* 10:1707–1717, 1996.
9. Landesman S, Minkoff H, Holman S, McCalla S, Sijin O: Serosurvey of human immunodeficiency virus infection in parturients. *JAMA* 258:2701–2703, 1987.
10. Barbacci M, Repke, JT, Chaisson RE: Routine prenatal screening for HIV infection. *Lancet* 337:709–711, 1991.
11. Segal A: Physician attitudes toward human immunodeficiency virus testing in pregnancy. *Am J Obstet Gynecol* 174:1750–1756, 1996.
12. Sperling R, Sacks S, Mayer L, Joyner M, Berkowitz RL: Umbilical cord blood serosurvey for human immunodeficiency virus in parturient women in a voluntary hospital in New York City. *Obstet Gynecol* 73:179–181, 1989.
13. Silverman NS, Weiner SM: Increased HIV testing with an on-site prenatal clinic counselor. *J Matern Fetal Med* 2:209–213, 1993.
14. Lindsay MK, Peterson HB, Willis S, Slade BA, Gramling J, Williams H, Klein L: Incidence and prevalence of human immunodeficiency virus infection in a prenatal population undergoing routine voluntary human immunodeficiency virus screening, July 1987–June 1990. *Am J Obstet Gynecol* 165:961–964, 1991.



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