AIDS Education and Prevention, 18(6), 546–559, 2006


# HIV–RELATED RISK BEHAVIORS, PERCEPTIONS OF RISK, HIV TESTING, AND EXPOSURE TO PREVENTION MESSAGES AND METHODS AMONG URBAN AMERICAN INDIANS AND ALASKA NATIVES

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The goal of this study was to describe HIV risk behaviors, perceptions, testing, and prevention exposure among urban American Indians and Alaska Natives (AI/AN). Interviewers administered a questionnaire to participants recruited through anonymous peer–referral sampling. Chi–square tests and multiple logistic regression were used to compare HIV testing by perception of risk and risk behavior status. Of 218 respondents with seronegative or unknown HIV status, 156 (72%, 95% confidence interval [CI]: 66–78%) reported some HIV risk behavior: 57 (26%, 95% CI: 20–32%) high–risk behavior, and 99 (45%, 95% CI: 39–52%), potentially high–risk. Among respondents reporting high–risk behavior, 44% rated themselves at no or low risk for HIV infection. Overall, 180 re-

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This project funded via Cooperative Agreement TS–0503–16/16 from ATPM/CDC/ATSDR.

The authors acknowledge the contributions of urban American Indian and tribal organizations, urban American Indian and Alaska Native (AI/AN) community members, and the many consultants to this project, without any one of whom this study could not have been conceived or completed. In particular, they acknowledge the Northwest Portland Area Indian Health Board (NPAIHB) administration and tribal delegates who recognized the need to study this issue in AI/AN communities and approved our project plan. The authors thank the executive board, and the medical and administrative staff of the Native American Rehabilitation Association, Inc. (NARA), in Portland, Oregon, for endorsing and helping to implement this project. They also recognize and appreciate the important contributions of all the formative research participants, as well as Karina Walters (University of Washington), Francine Romero (NPAIHB, Portland Area Indian Health Service IRB), Ron Fichtner (formerly CDC), and Scott Kellerman (CDC), all of who helped improve the study design and implementation. They thank Nora Mattek and Brenna Lobb (OHSU MPH students) for their assistance with portions of the data analysis.

The authors must also express their appreciation to their project interviewers, who spent a great deal of time establishing a rapport with the participants and provided much–needed HIV prevention information to participants while collecting high–quality data. Finally, they recognize and thank the survey participants for spending their valuable time and sharing very personal information in the interest of improving the health of American Indians and Alaska Natives.

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spondents (83%, 95% CI: 78–88%) had ever received an HIV test, 79 (36%, 95% CI: 31–57%) in the past year. HIV risk behaviors and perception of risk were independently associated with recent HIV testing after adjustment for gender, income, and homelessness (odds ratio [OR] = 3.6; 95% CI: 1.5–9.0 for high–risk behavior vs. no reported risk behavior, and OR: 3.2; 95% CI: 1.3–7.6, for high vs. no perceived risk). Addressing inaccurate perception of risk may be a key to improving uptake of HIV testing among high–risk urban AI/AN.

The association between drug and alcohol use and sexual behavior that increases the risk of acquiring sexually transmitted infections, including HIV, has been well documented (Coates, Stall, Catania, & Kegeles, 1988; Miller, 2003; Molgaard, Nakamura, Hovell, & Elder, 1988; O'Leary, 2001; Plant, 1990; Schlitz & Sandfort, 2000). High rates of sexually transmitted disease (STD) among American Indians/Alaska Natives (AI/AN) and alcohol and illicit drug use are indicators of the vulnerability of AI/AN people to HIV infection.

Epidemiological studies describe at least a twofold to fivefold increased risk of HIV infection among persons who have other STDs (Centers for Disease Control and Prevention [CDC], 1998a). In 2003 the chlamydia rate among AI/AN was five times higher than among non–Hispanic Whites, the gonorrhea rate was three times higher, and the primary and secondary syphilis rate was twice as high (CDC, 2003c).

Published studies of AI/AN drug users describe the intersection of drug and alcohol use and unsafe sexual behavior and the implications for HIV transmission among AI/AN (Baldwin, Maxwell, Fenaughty, Trotter, & Stevens, 2000; Fenaughty et al., 1998). In 2003 AI/AN people had the highest rates of illicit drug use and alcohol abuse of any race/ethnicity, according to the Survey of Household Survey of Drug Use and Health (Substance Abuse and Mental Health Services Administration [SAMHSA], 2003).

Despite these indicators of risk, HIV diagnosis rates are still relatively low among AI/AN people (Bertolli et al., 2004). Low diagnosis rates might reflect low HIV infection rates, or poor access to or uptake of HIV testing in the AI/AN population. Data from the Behavioral Risk Factor Surveillance System, and an analysis of late diagnoses reported in 25 states with confidential name–based HIV reporting since 1994, suggest that getting tested for HIV infection is as common among AI/AN as among non–AI/AN (Denny, Holzman, & Cobb) and that the proportion of AI/AN persons reported as having an HIV diagnosis in the same month as an AIDS diagnosis (a marker of late HIV testing) was equal to or lower than among other race/ethnic groups (Bertolli et al., 2004). But these data systems have limitations (e.g., the exclusion of persons who do not have telephones, and the exclusion of data from states with the largest AI/AN populations, respectively). Furthermore, with the exception of a study by Walters, Simoni and Harris (2000),the literature on the prevalence of behavioral risk factors for HIV infection is limited to data from studies of specific AI/AN subgroups (Baldwin et al., 1999; Baldwin et al., 2000; Simoni, Sehgal, & Walters, 2004; Fenaughty et al., 1998).

In this article, we report findings from an anonymous survey of HIV risk behaviors, perceptions of risk, HIV testing, and exposure to prevention messages and methods among AI/AN residing in an urban area in the northwestern United States.

## METHODS

This project was conducted in two phases: a formative research phase to define the target population, devise a sampling method, and modify existing survey instruments and a survey administration phase.

### TARGET POPULATION

The target population was AI/AN 18 years or older residing in the four counties that surround Portland, Oregon, including Multnomah, Washington, and Clackamas in Oregon, and Clark in Washington. According to the 2000 U.S. census, approximately 23,000 AI/AN 18 years or older resided in these 4 counties (U.S. Census Bureau, 2000).

We were interested in sampling individuals at high risk for HIV infection, such as those who inject drugs and/or practice unsafe sexual behaviors (i.e., sex with multiple partners without condom use).

### FORMATIVE RESEARCH

To investigate how to effectively recruit AI/AN at high risk of HIV infection, investigators conducted 27 semistructured formative research interviews, with respondents from state, local and urban Indian agencies/organizations. Efforts were made to interview AI/AN individuals, but non–AI/AN working in HIV prevention or education, minority health, or with the urban AI/AN community in any capacity, were also interviewed. Interviewees discussed HIV–related risk behaviors among urban AI/AN, described where high–risk AI/AN reside or congregate, and made suggestions about how to recruit participants.

### PEER–REFERRAL SAMPLING

We devised and implemented a peer–referral technique to obtain a sample of urban AI/AN engaging in high–risk behavior. Because of the sensitive nature of our survey questions, we adapted a technique developed by Heckathorn (1997) to preserve the anonymity of both respondents and their recruits.

Initial respondents ("seeds") were recruited from among persons identified during formative research. Seeds and respondents in five subsequent recruitment waves completed the survey (described below). After completing the survey, each respondent was given flyers with project contact information and was asked (using standardized wording from a script) to recruit members of his or her social network who were known or suspected to be engaging in behaviors that increase exposure to HIV infection. The seeds, as well as recruiters from subsequent sampling waves, were asked to recruit American Indians or Alaska Natives, specifically "people whom you may know or believe are engaging in behaviors that put them at risk for HIV infection." This request did not include an explicit definition of HIV risk behavior, or a request to recruit individuals engaging in specific behaviors. However, respondents had completed the questionnaire, which describes HIV risk behaviors, just before they were asked to recruit others.

To avoid bias from extensive recruitment by certain recruiters, each respondent was offered only five recruitment flyers. Flyers contained a phone number that potential respondents called to schedule interviews. Callers were asked to give only a first name (which need not be their actual first name) to reserve an interview slot; they also reported the color of their recruitment flyer. Because the color of the flyer changed weekly, investigators could track the amount of time between the original respon-

dent's interview and the interview of the person referred but could not match a recruit to the respondent who gave him or her the flyer.

## SURVEY DEVELOPMENT AND ADMINISTRATION

The AI/AN HIV Testing Survey (AI/AN HITS) was modeled after the CDC–sponsored HIV Testing Survey (HITS), which was administered annually in various locations throughout the U.S. to participants recruited through venue–based sampling (CDC, 1998b, 2003b, 2004c). Modifications were made, based on suggestions by AI/AN focus groups, to the wording of questions and answer choices to tailor them to AI/AN respondents. Questions were added about practices that intentionally break the skin, such as body piercing or tattooing (which may lead to HIV exposure if instruments are reused).

Surveys were administered between early August and mid-November 2001, at two sites in the Portland metropolitan area, an urban Indian health clinic, and a downtown office. The project staff that answered phone calls from persons interested in participating queried them about which site their recruiter had mentioned and directed them to that site for an interview. At the interview site the project director confirmed that each potential respondent was AI/AN, 18 years old or older, and a resident of the Portland metropolitan area. Having one individual conduct these in–person eligibility screens limited the likelihood that the same respondent would complete the survey more than once. After obtaining verbal consent, interviewers offered all respondents a handmade medicine bag to honor their participation and administered the questionnaire. Each survey was coded with a unique ID number; no respondent identifiers were recorded.

At the completion of the 35–40-minute survey, the interviewers, who had received training in HIV prevention education techniques, conducted a short, customized HIV prevention session based on risks for HIV infection reported by the respondent. HIV prevention brochures, condoms, and bleach kits were made available, plus a list of community resources for health care, food, housing, financial assistance, counseling, and drug or alcohol treatment (with an emphasis on agencies offering services tailored for AI/AN). At the conclusion of the prevention session, respondents were asked to recruit additional participants from their social network (using the flyers as noted above), and received a $25 payment.

## DATA ANALYSIS

We categorized respondents with seronegative or unknown HIV status into strata that indicated their HIV risk level (defined in Table 1). Respondents were categorized into the high-risk, potentially high risk, or lower risk group based on self–reported sexual, drug use and other risk behaviors. The behaviors included in the high–risk category were those known to be directly associated with acquiring HIV infection that respondents reported engaging in during the past year (e.g., injection drug use with a shared needle, unprotected sex with multiple partners). We also included in the high-risk category lifetime (but not past year) injection drug use with a shared needle (nine respondents reported this behavior). The decision to include lifetime injection drug use with a shared needed in the high-risk category was made because of the difficulty some respondents had in estimating the timing of their risk behaviors.

Respondents classified as being at potentially high risk reported either that they had engaged in the same behaviors as in the high–risk category but had taken precautions to reduce risk (e.g., injection drug use with sterile needles) or had engaged in behaviors associated with lowered inhibitions to engaging in risky behaviors and

**TABLE 1. HIV Risk Groups Based On Self–Reported Behaviors of Used in American Indian/Alaska Native HIV Testing Survey, 2001**

| Risk Group | Criteria (One or more reported per respondent; respondents categorized based on most risky behavior) | *N* (%) [a] |
|---|---|---|
| HIV positive (*N* = 4) | Tested positive for HIV | 4 (100) |
| High–risk (*N* = 57) | Injection drug use (lifetime or past year) with shared needle | 22 (39) |
| | Body piercing (past year) with shared instrument | 6 (10) |
| | Vaginal or anal sex with ≥2 partners (past year) without ever using condoms | 36 (63) |
| | Traded money or drugs for sex (past year) | 10 (18) |
| Potentially high–risk (*N* = 99) | Injection drug use (lifetime or past year), reports always used new/sterile needles | 27 (27) |
| | Body piercing (past year), reports always used new/sterile instrument | 11 (11) |
| | Vaginal or anal sex with ≥2 partners (past year) with inconsistent[b] condom use | 14 (14) |
| | Six or more alcoholic drinks in a single day in the past year | 75 (77) |
| | Other non–injection drug use[c] in the past year | 31 (32) |
| Lower risk (*N* = 62) | Did not report any of the above behaviors | 62 (100) |

[a]Respondents may report more than one risky behavior, therefore, some percentages may add up to > 100% within a risk group. [b]Inconsistent condom use defined as any response but "never" or "always" to condom use with all primary and secondary sex partners. [c]Includes amphetamines (methamphetamine, "speed,", "uppers," "crystal," "crank," "ice"), crack, cocaine (smoked or snorted), heroin (smoked or snorted).

reduced use of precautions to prevent HIV infection (e.g., drinking six or more alcoholic drinks in a single day [binge drinking], or noninjection drug use [methamphetamine, cocaine, and/or heroin]). Respondents who reported more than one risk behavior were categorized based on the behavior of highest risk. Respondents who reported that they had received a positive HIV test result were excluded from the comparative analyses.

Data analyses were conducted using SPSS, Version 12.0 (SPSS, Inc., 2003). We present characteristics of our sample using frequencies and percentages for categorical variables, and means (± standard deviation) for continuous variables. Asymptotic 95% confidence intervals [CIs] were calculated for proportions. We compared HIV testing in the high–risk, potentially high risk, and lower risk groups using chi–square tests of independence and the Mantel–Haenszel chi–square test for trend. We used multiple logistic regression to investigate the associations of risk level (based on self–reported behavior) and personal perception of HIV risk with HIV testing, adjusting for differences in gender, income and homelessness. Trends in regression estimates were assessed using Wald chi–square tests of polynomial contrasts.

## RESULTS

Seventeen seed participants, including six AI/AN health care or social workers, plus 11 others suggested by formative research respondents, were recruited to start the peer–referral process. Between August and November 2001 we conducted 222 AI/AN–HITS interviews, 129 (58%) at the downtown Portland site and 93 (42%) at an urban Indian health facility.

### CHARACTERISTICS OF RESPONDENTS

The characteristics of the respondents are displayed in Table 2. Most respondents (189, 84%) reported "AI/AN only" as their racial category; 213 (96%) were affiliated

with an American Indian tribe (as an enrolled member or descendent), and 7 (3%) reported that they were Alaska Native. The average age of respondents was 36.1 years. More females than males participated in the survey, 125 (56%) vs. 97 (44%). Most respondents (153, 69%) reported household income less than $1,000 per month; few (12, 6%) reported owning a home.

## HIV–RELATED RISK BEHAVIOR AND PERCEPTIONS OF RISK

Among the 222 respondents, 4 (2%, 95% CI: 0–4%) reported they had received a positive HIV test result; for 167 (75%, 95% CI: 70–81%) the most recent HIV test had been negative; and 51 (13%) had never tested or were unsure about their HIV status. Among the 218 respondents who had never received a positive HIV test result, 156 (72%) reported behaviors considered to place them at risk of HIV infection: 57 respondents (26%, 95% CI: 20–32%) reported high risk behaviors, and 99 (45%, 95% CI: 39–52%) potentially high risk behaviors. The remaining 62 respondents (28%, 95% CI: 22–34%) were included in the third risk group, termed "lower risk." These respondents did not report any of the behaviors defining the high and potentially high risk groups but were referred to the study by a peer who presumably believed them to be engaging in risky behavior. The distributions of behaviors in the assigned risk groups are shown in Table 1.

The perceived risk of HIV infection among respondents who had never received a positive HIV test result was distributed as follows: 30 respondents (14%, 95% CI: 9–18%) perceived their risk as "high," 61 (28%, 95% CI: 22–34%) as "medium," 72 (33%, 95% CI: 27–39%) as "low," 48 (22%, 95% CI: 17–28%) as none, and 6 (3%, 95% CI: 1–5%) answered "don't know." We observed a statistically significant trend of increasing perceived risk as the risk level of reported behavior increased from "lower" to "high" ($p_{trend}$ = .001).

However, for the majority of respondents, perceived risk was discordant with self–reported risk behaviors. Among the 57 respondents reporting high–risk behavior, 11 (19%) perceived their risk of acquiring HIV as "high," 21 (38%) perceived their risk as "medium," and 24 (43%) perceived their risk as "low" or "none." Within the high-risk group, those who engaged in injection drug use or skin piercing with an unsterile needle or other unsterile instrument were somewhat more likely, but not significantly more likely, to perceive their risk as "low/none" (13, 52%) than were persons who had sex with multiple partners without a condom (13, 36%), or who traded sex for money or drugs (2, 20%) ($p$ = .19).

Among the 99 respondents who reported potentially high risk behavior, 14 (14%) perceived their risk as "high," 29 (29%) perceived their risk as "medium," and 55 (56%) perceived their risk as "low" or "none." This overall distribution of perceived risk was similar among subgroups of those at potentially high risk, including those who engaged in injection drug use or skin piercing with a reportedly "new" needle or other instrument; persons having sex with multiple partners, sometimes without a condom; and those who engaged in noninjection drug use and/or binge drinking.

## HIV TESTING BEHAVIOR

Overall, 180 of 218 respondents (83%, 95% CI: 77–88%) who reported seronegative or unknown HIV status had received an HIV test at least once during their lifetime and 79 (36%, 95% CI: 30–43%) had been tested in the past year. As shown in Figure 1, both lifetime prevalence of HIV testing and percentage of respondents who received an HIV test in the past year increased significantly with increasing risk level of reported behavior ($p_{trend}$< .001). Figure 1 also shows the percentages of re-

**TABLE 2. Characteristics of 222 American Indian/Alaska Native Residents of the Portland, Oregon Metropolitan Area Who Participated in the HIV Testing Survey, 2001**

| | N[a] | Percentage (%) or Mean ± *SD* |
|---|---|---|
| Gender | | |
| Male | 97 | 44% |
| Female | 125 | 56% |
| Age | 222 | 36.1 ± 11.5 |
| Race | | |
| AI/AN only | 186 | 84% |
| AI/AN + other race | 36 | 16% |
| Living situation | | |
| Rent home | 117 | 54% |
| Own home | 12 | 6% |
| Live w/family or friends | 47 | 22% |
| Hotel or rooming house | 12 | 6% |
| Homeless | 22 | 10% |
| Mission, shelter | 8 | 4% |
| Monthly household income | | |
| Less than $500 | 98 | 44% |
| $500–$999 | 55 | 25% |
| $1000–$1999 | 41 | 19% |
| $2000 or more | 27 | 12% |

[a]Some sample sizes total less than 222 due to missing data.

spondents in the high risk, potentially high–risk, and lower risk groups who said they sought HIV testing on a regular basis (every 6 months or at the same time every year), but the trend was not statistically significant ($p_{trend}$ = .19). For 52 (29%) of the 180 respondents ever tested, the most recent HIV test received was anonymous.

Results from a multiple logistic regression model indicated that the odds of having received an HIV test in the past year were 3.6 and 1.9 times higher for respondents reporting high–risk behavior (95% CI: 1.5–9.0) and potentially high–risk behavior (95% CI: 0.8–4.2), respectively, compared with respondents who reported no risky behavior, after adjustment for perceived risk, gender, income, and housing ($p_{trend}$ = .005). Results from the same model indicated that the odds of having received an HIV test in the past year were 3.2 times higher (95% CI: 1.3–7.6) for those who perceived their personal risk of acquiring HIV infection as "high" compared with those who perceived themselves to be at low or no risk for HIV infection. The odds of having received an HIV test in the past year were not significantly different among those who perceived their risk as "medium" compared with those who perceived themselves to be at low or no risk (OR: 1.0, 95% CI: 0.5–2.0).

The most frequently reported location of respondents' last HIV test was an Indian Health Service facility, an urban Indian clinic, or a tribal facility: 65 of 180 respondents (36%, 95% CI: 29–43%) who had tested for HIV at least once in their lifetime were last tested in one of these types of facilities. Whereas 158 respondents who had ever tested (87%, 95% CI: 83–93%) indicated that they would be comfortable going to a Tribal or urban Indian health center for an HIV test, 113 (64%, 95% CI: 55–70%) received their last HIV test at a non–Native facility. Overall, 198 of 218 respondents (91%, 95% CI: 87–95%) reported that if they were to get an HIV test,

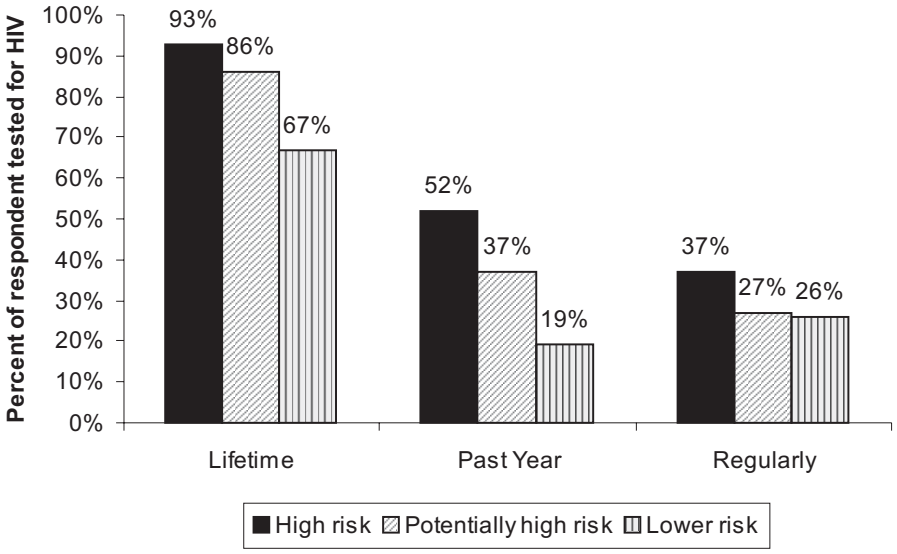


**FIGURE 1. Percentage of respondents from the American Indian/Alaska Native HIV Testing Survey who reported lifetime, past year and regular HIV testing, stratified risk status (Risk status definitions explained in Table 1.)**

they would list their race as American Indian or Alaska Native on the test form. There were no significant differences by risk level in comfort with testing at a native facility or in intention to report AI/AN race on an HIV test form.

Among respondents who had tested for HIV at least once, 154 (86%) reported they did so to "know where they stood." Forty–six (25%) tested because it was required by court order, or they did so in jail or as part of a drug or alcohol treatment program. Of those who received an HIV test in the past year, 58 (74%) indicated that they delayed seeking testing, and of the latter group, 64% said they delayed for 6 months or more.

Reasons for avoiding testing for those who did not receive an HIV test in the past year, and reasons for delaying testing among those who did receive an HIV test are presented in Table 3. The most frequently reported reasons for avoiding or delaying testing included "thought I was HIV negative" (67% and 41% of those who did not test and delayed testing, respectively) and "not likely exposed to HIV" (57% and 35%, respectively). Of those who delayed testing, 51 (65%) stated that they were afraid of finding out if they were HIV-positive or did not want to think about being HIV-positive; 35 (25%) of those who avoided testing gave this reason. Among those who delayed testing, 9 (12%) stated that they delayed testing because they were "worried [their] name would be reported to the government if [they] tested positive," 14 (18%) were "worried about who would find out [their] test results," and 8 (10%) were "concerned that [their] name would be reported to an insurance company or [their] employer if [they] tested positive." In comparison, the proportions of those who avoided HIV testing who cited these reasons were somewhat lower: 3%, 9%, and 3%, respectively.

**TABLE 3. Reasons Given for Avoiding or Delaying HIV Testing, American Indian/Alaska Native HIV Testing Survey, Portland Metropolitan Area, 2001**

| | Reasons for Not Testing (those who did not test in past year) ($n$ = 138)[a] | | Reasons for Delaying Testing (those who tested in past year) ($n$ = 78)[a] | |
|---|---|---|---|---|
| | $n$ | %[b] | $n$ | %[b] |
| Little you could do about it if positive | 9 | 7% | 10 | 13% |
| Not likely exposed to HIV | 78 | 57% | 27 | 35% |
| Afraid of finding out if HIV positive | 14 | 10% | 22 | 28% |
| Thought you were HIV negative | 92 | 67% | 32 | 41% |
| Did not want to think about being HIV positive | 21 | 15% | 29 | 37% |
| Worried name would be reported to government if positive | 4 | 3% | 9 | 12% |
| Unsure of where to get tested | 11 | 8% | 7 | 9% |
| Worried about who would find out test results | 12 | 9% | 14 | 18% |
| Did not have time | 22 | 16% | 24 | 31% |
| Concern that name reported to insurance or employer if positive | 4 | 3% | 8 | 10% |
| Other reason | 21 | 15% | 7 | 9% |
| No reason for avoiding testing given | 16 | 12% | *n/a* | *n/a* |
| No delays in testing reported | *n/a* | *n/a* | 20 | 26% |

[a]$n$ = 139 respondents reported they did not receive HIV test past year. Seventy–nine respondents reported that they did receive HIV test in past year. Data on reasons for avoiding or delaying testing were missing for one respondent in each column. [b]Respondents could give more than one reason, thus percentages in each column add up to > 100%.

### EXPOSURE TO PREVENTION MESSAGES

Most respondents—177 (81%, 95% CI: 76–87%)— had been exposed to some HIV prevention messages in the past year. Respondents in the different risk groups, as well as those tested versus not tested in the past year, did not differ significantly with regard to exposure to HIV prevention messages. However, there were some differences among the compared groups in exposure to different types of media for conveying HIV prevention messages. For example, high–risk respondents were somewhat more likely to report receiving information from the Internet than the other two groups (16% vs. 7% potentially high and 9% lower risk, $p_{trend}$ = .18). Those who received an HIV test in the past year were more likely to have received an HIV prevention brochure than those who had not received testing in the past year (49% vs. 22%, $p < .001$), whereas those reporting high–risk and potentially high–risk behavior were more likely than those who reported no risk behavior to have received free condoms in the past year (68%, 63%, and 40% in the high-risk, potentially high risk, and lower risk groups, respectively, $p = .003$). The percentage of respondents who reported ever receiving some type of counseling session for HIV/STD prevention was low (17% overall) and did not differ by risk group or testing history.

## DISCUSSION

In this study of urban AI/AN, participants recruited other AI/AN participants whom they believed to be at high risk of HIV infection, but only 26% of respondents reported engaging in behaviors directly associated with acquiring HIV infection, and 45% reported behaviors potentially associated with acquiring HIV infection. These results were obtained even though our criteria for classification into the high-risk category may have slightly overestimated risk. (Nine persons in the high-risk group reported injection drug use with a shared needle in their lifetime but not in the past year.)

It is noteworthy that although the peers who referred individuals into the study presumably believed them to be at high risk of HIV infection, the individuals themselves did not report behaviors we defined as highly risky, and more than half rated their personal risk of acquiring HIV as "low" or "none." However, more than three fourths of this group engaged in binge drinking of alcohol and 32% engaged in noninjection drug use. "Blackouts" during binge drinking may impair both judgment (increasing the chance of engaging in unsafe sex) and memory of such behavior, so it is possible that these effects may explain the discordance between a peer's perception of an individual's HIV risk and the individual's perception of his or her personal risk. Alternatively, it is possible that denial of risky behavior may explain this discordance in perceptions of risk or that respondents accurately reported their behavior and their peers were misperceiving their risk.

However, the link between alcohol and drug use and sexual behaviors that are associated with HIV infection has been documented by studies among both non–AI/AN and AI/AN (Baldwin et al., 2000; Coates et al., 1988; Miller, 2003; Molgaard et al., 1988; O'Leary, 2001; Plant, 1990; Schlitz & Sandfort, 2000; Stall, McKusick, Wiley, Coates, & Ostrow, 1986; Stevens & Estrada, 2000; Walters, Simoni & Harris, 2000; Walker et al., 1996; Woods et al., 1996), and HIV prevention programs targeting AI/AN may need to emphasize this link.

Among the urban AI/AN respondents in our survey, the lifetime prevalence of HIV testing was high (83%); it was comparable to lifetime prevalence of testing among the 2001 national HITS survey respondents (81% overall) (CDC, 2004c); and also to the prevalence reported among Oregon HITS respondents in 1996 and 1998 (83% in both years) (Adams et al., 2003). Both the national and Oregon HITS surveys were inclusive of all races/ethnicities, and were focused on high–risk populations recruited through venue–based sampling.

The Behavioral Risk Factor Surveillance Survey (BRFSS) also provides an estimate of lifetime HIV testing among AI/AN. Based on 1997–2000 BRFSS data, Denny et al. (2003) reported that 49.5% of AI/AN in 36 states had ever received an HIV test during this period. In addition, Walters et al. (2000) reported that 58% of a convenience sample of urban AI in the New York metropolitan area had ever had an HIV test. Whereas these two studies report AI/AN–specific data, the sampling methods were likely to have resulted in the recruitment of proportionately more low risk respondents than in our study, possibly explaining their lower testing rates.

A higher proportion (26%) of AI/AN respondents in our survey reported they were tested because "it was required" in jail, by court order, or by an alcohol or drug treatment program compared with participants in the HITS 2002 survey (10%) (CDC, 2004d). Thus, although lifetime prevalence of HIV testing was similar to that in other populations, the lifetime prevalence of voluntary counseling and testing was lower among AI/AN in our survey than among respondents in the HITS 2002 survey. This result underscores the need for programs linking AI/AN correctional facility detainees and drug and alcohol treatment inpatients to community health programs upon release/discharge (CDC, 2003a).

Although reported lifetime prevalence of HIV testing was high among our survey respondents (93% of the high-risk group and 86% of the potentially high risk group had received an HIV test), only just over half of the high–risk group and just over one third of the potentially high risk group had been tested in the past year, even though most of those in each group had been exposed to HIV prevention messages. The percentage of respondents in our high–risk group who received an HIV test in the past

year was similar to that reported by participants in the 2001 national HITS survey (52% vs. 50%, respectively) (CDC, 2004c). There is an increasing recognition of the importance of routine HIV testing in medical care settings in promoting knowledge of serostatus (CDC, 2004b). Our results indicate that efforts to improve the uptake and frequency of HIV testing among urban AI/AN are needed.

The frequency of testing may be related to access to testing services and comfort with seeking services (Worthington & Meyers, 2002). Although most survey respondents reported being comfortable with testing at Native health care facilities, almost two–thirds had received their last test at a non–Native facility. However, we did not explicitly ask why respondents chose to be tested in a Native or non–Native facility, or if respondents perceived they had a choice about where to seek testing. Alternative HIV testing opportunities for AI/AN may need to be developed and evaluated. In 2004, the CDC funded projects to demonstrate new methods for offering HIV testing in AI/AN populations, particularly those based on rapid testing methods (CDC, 2004a).

Our results indicate that the odds of having been tested for HIV in the past year were more than three times higher among those who perceived themselves at high risk of acquiring HIV infection than among those who perceived their risk as low or nonexistent. Perception of personal risk as low may help to explain why some AI/AN in our survey who had engaged in high–risk and potentially high risk behaviors had not received an HIV test recently. Almost half (43%) of respondents reporting high–risk behaviors and more than half (56%) of those reporting potentially high–risk behaviors reported their chances of getting infected as "low" or "none," but the degree of discordance between risk perception and self–reported risk behavior differed among subgroups engaging in different risk behaviors.

Our results suggest that several heterogeneous risk subgroups exist in the adult urban AI/AN community. Mitchell, Kaufman, & Beals (2004) developed four risk group clusters for young adult AI/AN based on risk behaviors, knowledge, efficacy, perceived risk and expectations. More research is needed to describe the prevention needs of risk subgroups; it is likely that a combination of interventions, some targeted at the entire community, and some targeted at distinct subgroup(s), will be required to effectively reduce the spread of HIV among AI/AN.

Surveillance data are widely used for resource planning and allocation (Nakashima & Fleming, 2003), and it is therefore critical that AI/AN who test for HIV infection be recognized as AI/AN, and be reported to a state or local health department for inclusion in local and national HIV surveillance summary data. Most respondents in our survey indicated that they would list their race/ethnicity as AI/AN if they were tested for HIV infection. This has positive implications for correctly classifying the race of AI/AN in HIV/AIDS surveillance data. However, opportunities for racial misidentification still exist, and have been reported for HIV and STD surveillance data in the Northwest (Cordes, Courogen, & Baham, 2006; Puuka, Jackson & Stehr–Green, 2003), and elsewhere in the United States (Thoroughman et al., 2002).

Most of our respondents had received an HIV test at a non–Native health care facility. Confidential HIV test sites, unless they are located on tribal lands, are required to report cases of HIV infection to the local or state health department where HIV reporting is required by state law. Tribal HIV test sites on tribal lands are required to comply with tribal laws, but not with state laws. The accuracy of AI/AN case counts are affected by the extent to which these facilities participate in case reporting (Bertolli et al., 2004).

### LIMITATIONS

Our study was subject to some limitations, including potential sampling, response, and recall biases. The peer–referral sampling technique used in this study was modified from a respondent–driven sampling technique. Respondent–driven or chain–referral sampling techniques (Goodman, 1961; Heckathorn, 1997; Heckathorn, Broadhead, Anthony, & Weakliem, 1999; Spreen & Zwaastra, 1994) can be useful to survey a hard–to–reach or "hidden" population, as they allow initial respondents to assist in recruiting other individuals in their social network. In this study we used the Heckathorn (1997) method, but without secondary incentives, which would have required keeping respondents' names and contact information (which was not possible in the context of an anonymous survey). With a sampling method in which group affiliation affects selection, the members recruited by each individual reflect both the recruiter's biases and the prevalence of different types of members within the population (Heckathorn, 1997). Our anonymous sampling procedure prohibited assessment of and correction for such bias through examination of homophily and heterophily of recruitment patterns. However, we did limit the number of persons participants could recruit, which addressed bias toward recruiters with large personal networks.

To preserve anonymity, we did not ask individuals to verify their AI/AN heritage. We expected, but could not verify, that the peer–referral sampling technique resulted in recruitment of respondents who were, in fact, AI/AN, as members of the urban AI/AN community were assisting in the recruitment of other community members. As an additional measure to ensure that respondents were AI/AN, we asked respondents to report their tribal affiliation, and, if applicable, the location of the home reservation of their tribe during eligibility screening. Because we did not collect any personal identifying information on the survey, it is possible that a person could have responded to the survey more than once. However, we had one consistent individual conducting the in–person eligibility screening before the interview took place. This should have minimized duplication of respondents.

All risk status information, testing history and prevention exposures collected for this study were self–reported. Some individuals may have been reluctant to admit to some high–risk behaviors, resulting in the potential to misclassify some persons to a lower level risk group. In addition, inaccurate recall may have caused some misclassification. The potential for resulting bias and the direction of any potential bias from these sources is difficult to predict.

## SUMMARY AND CONCLUSION

Most urban AI/AN surveyed had been tested for HIV infection at least once. Although persons at high risk and potentially high risk were more likely to have been tested in the past year than those at lower risk, a substantial proportion of each of these groups had not been tested in the past year (only just over half of high–risk, and fewer potentially high risk respondents, reported testing within the year prior to the interview.) Perceived risk level was strongly associated with receiving HIV testing in the past year, independently of self–reported risk behaviors and sociodemographic covariates. Nearly half of respondents reporting high–risk or potentially high risk behaviors underestimated their personal risk of HIV infection, even though most had been exposed to HIV prevention messages or methods. Our results indicate that addressing inaccurate perception of risk may be a key to improving uptake of HIV testing among high–risk urban AI/AN.

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