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Place and sexual partnership transition among young American Indian and Alaska Native Women

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Abstract

Multiple challenges expose American Indian and Alaska Native (AIAN) women to high-risk sexual partnerships and increased risk for HIV/STI. Using a unique sample of sexually-active young AIAN women (n=129), we examined characteristics of last three partners and whether transitional partnerships were associated with different risk profiles, including where partners met, lived, and had sex. Respondents were more likely to have met their previous or current secondary partner (P2) at a friend's or family setting (versus work or social setting) (AOR=3.92; 95% CI: 1.31, 11.70). Condom use was less likely when meeting a partner at friend's or family settings (AOR=0.17; 95% CI: 0.05, 0.59). Sexual intercourse with P2 (compared to P1) usually took place in "riskier" settings such as a car, bar, or outside (AOR=4.15; 95% CI: 1.59, 10.68). Perceived "safe" places, e.g., friend's or family's house, were identified with risky behaviors; thus, homogeneous messaging campaigns may promote a false sense of safety.

Keywords

American Indian/Alaska Native; HIV/AIDS; sexual behavior; place; partnership formation

INTRODUCTION

Multiple challenges such as high rates of poverty and traumatic events (e.g., childhood abuse), and gender-based violence expose American Indian and Alaska Native (AIAN) women to high-risk sexual partnerships and increased risk for HIV and sexually transmitted infections (HIV/STI) STI.(1–3) Epidemiologic evidence points to excessively high case rates of STI among AIAN compared to the general population.(2) Compared to other racial groups, AIAN have the second highest rates of chlamydia and gonorrhea and third highest rate of syphilis (4) potentially resulting in a two- to five-fold increased risk for HIV infection(5, 6). Among AIAN women, the rate of HIV diagnosis (6.9/100,000) was nearly

three times the rate for White females (2.9/100,000) with primary mode of exposure through heterosexual intercourse (67%).(7) AIAN have one of the lowest AIDS survival rates of any ethnic or racial group.(7) Moreover, AIAN experience elevated rates of substance use, intimate partner violence (IPV), and mental health conditions (e.g., generalized anxiety, PTSD and depression) known to increase sexual risk within other populations.(3, 8–11)

Emerging adulthood (frequently defined as 18 – 29 years) is an important time in the life course in developing healthy sexual partnering. This period is often referred to as a time of exploration in love, sexual encounters, identity and world views.(12) For many young adults, emerging adulthood is a period of instability and change in developmental contexts, such as frequent changes in living situations, employment and partner cohabitation and dissolution, with many of these experiences having enduring ramifications over the life course.(12, 13) This is also a period of important cognitive development in sense of self and capacity for self-reflection.(14) As time progresses, the brain develops greater skills in planning and assessing emotions, social information, and risk and rewards.(15)

Representing only 25% of the sexually active population, emerging adults acquire nearly half of all new STI.(16) According to the Centers for Disease Control (CDC) in 2011, rates of chlamydia, gonorrhea, and primary and secondary syphilis were highest for the 20–24 age groups, and for AIAN the rate of STDs are 4 to 5 times than for Whites. The rates of STI among AIAN women are two- to four-times higher than AIAN men.(17, 18) Many other risky behaviors peak during emerging adulthood including binge drinking, substance use, risky driving behaviors, and unprotected sex.(12, 19–21).

Sexual health is influenced by individual risk factors and decisions, but also by sexual partner's characteristics and the position of an individual and partnership within a network of connected people. The network perspective (who is partnering with whom) sheds new light on social and behavioral science by defining the relationships between individuals and patterns and implications of these relationships within a social structural environment.(22) High risk sexual partners, such as those who use intravenous illicit drugs, have a history of incarceration, have multiple or concurrent partners, are HIV positive or have multiple STI, or those that fail to use condoms, put their partners at higher risk for HIV/STI acquisition.(23) Conversely, when both partners are in a long-term monogamous relationship or use condoms correctly and consistently HIV/STI risk is reduced.(24) That said, short-term serial monogamy, a series of "main partners" within a few months,(25) may produce a false sense of sexual health safety.(26–28) For example, HIV tests provides accurate serostatus up to the three months prior to testing;(29, 30) thus an individual practicing short-term serial monogamy may increase HIV/STI exposure to a new partner.(31) Also, research has found individuals who are in relationships characterized as having "friends with benefits" (e.g., friends who also have causal sex) may practice safe sex more frequently; however, those friends are also less likely to be sexually exclusive,(32) have a greater number of lifetime casual sex partners, and often do not reveal their other relationships to their "main/romantic" partners.(33) Partner order may influence HIV/STI transmission risk. The gap between two consecutive partnerships, if filled with a transitional partner of short duration and high risk could pose greater risk for transmission of HIV/STI.(34)

Often influenced by family and peers,(35, 36) emerging adulthood norms and behavior around substance use, sexual behavior, and relationships (37) are shaped by the social conditions where youth are “born, grow, live, and work.”(38) Their environment shapes their development, opportunities and choices (39) and can enhance or deter a safe transition to adulthood.(40) Resource-poor settings can often pose greater exposure to substance misuse, high-risk sexual behavior, and violence.(41, 42) However, risk is also influenced by positive social networks, social support, and cultural factors like role models, mentors, and prosocial activities that facilitate many young adults adopting healthy behaviors.(43–50)

Moreover, the place where one meets his/her partner may dictate sexual behavior. For example, several venue-based studies found men were less likely to disclose their HIV status if they met their male partner in a park, outdoors, or other public place as compared to meeting them online.(51, 52) Similarly where partners first met each other influenced women’s and men’s ability to negotiate condom use (53, 54) and alcohol use prior to and during sex.(55) Understanding where women meet their partners, usually have sex with them, and where partners live is important to craft developmentally and culturally appropriate HIV/STI prevention and sexual health interventions.

The aim of this paper is to understand whether sexual risk behavior differ by place (where partners meet, live, and usually have sex), and partnership characteristics, and how relationships differ by partnership ordering (e.g. Partner 1: person they last had sex with; Partner 2: second most recent partner, and Partner 3: third most recent) in the six months prior to the interview. We use egocentric network data from an understudied population at high risk for HIV/STI: rural American Indian women. We characterize approximately 183 unique partnerships among AIAN women who had sex ($n = 129$) between 15–35 years of age residing on a reservation. Under the guidance of our community partners and to be reflective of the community culture definition of young adults, we expanded the emerging adult age range to 35. We assessed how these partnerships differ in terms of socio-demographic characteristics, sexual risk behavior within partnerships, and characteristics of place (e.g., where partners met, where they most often have sex, where the partner lives) to inform future prevention interventions. Understanding patterns of sexual networks from a cultural perspective may provide important messaging tools that resonate with the end-user to reduce transmission of STI and to promote healthy partnering and sexual behavior.

METHODS

Setting and Population

This study was conducted in full collaboration with a Pacific Northwest tribal reservation community. We used a mix of community-focused nonprobability sampling methods that included respondent-driven, convenience, and venue-based recruitment. Individual interviews were conducted in a private setting via audio, computer-assisted self-interviews (ACASI) during the day, evenings, weekends, and prior to tribal holidays and powwows from August 2011 to December 2011. We provided in-home interviewing if a person were homebound. Our venue recruitment was focused in areas where young AIAN women were known to congregate and socialize, such as tribal housing areas, local powwows, the maternal health clinic, and the local college. Recruitment materials were posted on advisory

board members' and tribal social media websites. Respondents were each compensated \$40. Interviews took up to two hours. The [academic] Institutional Review Board approved the study in April 2011 and survey respondents were provided oral informed consent. The tribal community research team reviewed and approved all study materials.

Based on 2010 census data, approximately 980 AIAN women between the ages of 15–35 live on the reservation.⁽⁵⁶⁾ Our sample of 146 is 14.9% of the eligible population. Respondents were between 15 and 35 years, lived on or near the reservation, self-identified as AIAN and reported ever being sexually active. Of these women, 129 reported a male sexual partner in the last six months and make up our analytic sample for this manuscript. Oral consent was obtained from respondents.

Measures

Sociodemographic characteristics—We assessed age, education (last grade completed), currently in school or employed (full-time, part-time, or temporary); monthly household income, housing stability (homeless, transitional housing, temporary housing, or permanent housing); sexual orientation (heterosexual, homosexual, bisexual or other) and whether or not the individual was currently raising a child.

HIV sexual risk behavior with a male partner—Based upon self-reported sexual histories, we calculated 100% condom use by subtracting the number of vaginal or anal condom-protected sex acts (minus the number of times condoms slipped off, broke or were put on incorrectly) in the last 30 days from the total number of sex acts, then dividing the sum by the number of total sex acts. We dichotomized our measure to represent always (100%) condom use or sometimes/never (<100%) condom use. We also asked respondents for the number of male sexual partners in the last six months. We calculated a measure for six-month cumulative concurrency (i.e., having another sexual partner while they were together) using information about the last three sexual partnerships. For each partner, we asked whether the respondent drank alcohol before having vaginal or anal sex. Responses on a five-point scale ranged from never drank alcohol to drank every time and was dichotomized at never versus any use.

Partnership characteristics—Specific questions for each of the respondent's last three sexual partners assessed partner's race (American Indian/Alaska Native, White, Black/African American, Asian or Pacific Islander and Other); whether her partner had ever been in jail or partner reported concurrency; age difference (age of the respondent and partner when they first met); the partnership length (days), an indicator for a short-term partnership (less than 30 days); and whether the partnership was ongoing was calculated using dates from first and last sex.

Partnership number was identified and coded as Partner 1 (P1): most recent partnership, Partner 2 (P2), second most recent partnership, and Partner 3 (P3) third most recent partnership. All three partnerships were sexually active at some point during the six month assessment prior to the interview.

Place—For each partner, respondents were asked where they first met, where they each lived when they first had sex, and the type of place they usually had sex. Response categories for first met included *work or school*; *family or friend's home or spiritual setting*; or *social setting* (powwows, rodeo, sport event, health club, social club, bars, at a party). Response categories for where they each lived when they first had sex include: *within the same town* (household, neighborhood, town); *elsewhere on the reservation*; or *outside the reservation* (city, state, other). Type of place they usually had sex included: own home or partner's house; friend's house or hotel (i.e., outside the respondent's or partner's own homes but not in an outdoor setting); or outdoor setting (i.e., bar, car, outside or other).

Substance use—Current alcohol dependence and abuse (coded as yes/no) was assessed using the Mini-International Neuropsychiatric Interview (MINI; Mini screen 5.0.0/English version/DSM-IV, 11/1/03).(57) Dependence was defined as the presence of three or more of the seven diagnostic criteria and abuse with one or more of the four in the DSM-IV. Women were asked how often they engaged in binge drinking (i.e., consumed five or more drinks within a couple of hours) in the last 12 months. Responses were on a six-point scale from never to about once a day. We show whether or not the women engaged in any binge drinking in the last 12 months (yes/no). Two separate items asked whether or not they had any marijuana use or illicit drug use (cocaine, crack, crystal, methamphetamine, abuse drugs prescribed to you or prescribed to someone else, or injected drugs other than those prescribed to you) in the past 12 months.

Data Analysis

At the individual level, we compared women who reported one partner versus more than one sexual partner in the last six months. We used chi-square and two-sample t-tests with equal variances to assess bivariate relationships between socio-demographics, substance use, and sexual risk behavior. There were relatively little missing data (less than 1%); therefore no adjustments for missing data were made.

At the partnership level, we assessed the differences in partnership characteristics of P1 compared to P2 and P3. We used multilevel mixed-effects models accounting for dependence by respondents with multiple partners.(58) Specifically, we used multilevel mixed-effects logistic regression for dichotomous variables and multilevel mixed-effects linear regression with an unstructured variance-covariance structure of the random effects for continuous variables. For the multinomial categorical place variables we used generalized linear latent and mixed models with a 'mlogit' link function that identifies the multinomial response.(59) When these models suggested significance, we followed-up with Wald tests and F-tests of the linear hypotheses after estimation to pinpoint group differences.

Next, to assess whether partner order (1st, 2nd, or 3rd) predicted differences in place and characterized potentially risky partnerships, we conducted multivariate multinomial logistic regression models, accounting for clustering at the individual level while controlling for additional partnership characteristics. For these analyses, we computed the relative risk ratio (RRR), which is the relative probability of place (where respondents and partners first met,

lived, and usually had sex) differing across partners.(60) Lastly, we conduct a multivariate logistic regression to determine the odds of a respondent consistently using condoms controlling for place, partner, and partner characteristics.(61)

RESULTS

Table 1 presents socio-demographic, substance abuse, and sexual risk behavior characteristics for 129 sexually active rural AIAN women. A total of 81 (63%) women reported only one sexual partner and an average, of 1.6 partners in the last six months. Although most women overall have high school degrees or higher (74.4%), monthly household incomes were less than \$2000 and 38.8% reported unstable housing.

There were no significant socio-demographic differences between the women who reported one male sexual partner compared to women who reported more than one partner (see Table 1). However, there were several important substance use and sexual risk behavior differences between women with one partner as compared to those with more than one partner. Specifically, women reporting one partner (compared to more than one partner) were less likely to report past 12 months substance use (binge drinking: 25.9% vs. 58.3% $\chi^2 = 13.44, p = 0.001$; alcohol abuse or dependence: 30.9% vs. 56.3% $\chi^2 = 8.07, p = 0.01$; and marijuana use: 29.6% vs. 54.2% $\chi^2 = 7.64, p = 0.01$), and less likely to report drinking alcohol prior to sex (48.2% vs. 72.9% $\chi^2 = 7.56, p = 0.01$). Women with one partner (compared to more than one) in the previous six months were also less likely to use condoms (11.4% vs. 30.0% $\chi^2 = 5.92, p < 0.05$).

The 129 women reported 183 partnerships in the previous six months (Table 2). Overall, most partnerships (83%) were with another AIAN, 48.1% of the partners were ever in jail, and 23.5% of partnerships lasted less than 30 days. Very few reported 100% condom use (19.4%) and over half (53.6%) reported consuming alcohol before sex. About a quarter (23.5%) of the respondents were in concurrent relationships with another partnership, and 28.4% of the respondents reported their partners were in a concurrent partnership.

We found partnership characteristics vary by partner number [i.e., most recent (P1), second most recent (P2), and third most recent (P3)]. Generally, partnership characteristics significantly differed between P2 and P1. Fewer differences were observed between P3 and P1. Partnership two (P2), as compared to P1 and P3, were shorter (539 days vs. 1284 days (P1) and 785 days (P3), $\chi^2 = 8.37, p = 0.01$) with 40% lasting less than 30 days (compared to 17.8% (P1) and 28.6% (P3), $\chi^2 = 7.43, p = 0.05$). However, by definition, P1 was more likely to be ongoing (38.8% vs. 15.0% (P2) and 14.3% (P3) $\chi^2 = 7.10, p = 0.05$) and thus estimates of partnership duration are censored at day of interview. Additionally, there was a trend toward more alcohol consumption prior to sex with P2 than P1 or P3 (65.0% (P2) vs. 51.9% (P1) and 35.7% (P3), $\chi^2 = 4.88, p = 0.10$). Finally, partnership number predicted differences in where partners met, where they lived, and where they typically had sex. Respondents reported that they were less likely to have met P2 at work or school compared to P1 (17.5% (P2) vs. 31.0% (P1), $\chi^2 = 4.49, p = 0.10$), and less likely to live within the same town (27.5% (P2) vs. 42.6% (P1). Lastly, respondents were less likely to report having sex in their own or partner's home with P2 (57.5% (P2) vs. 83.7 (P1) and 92.9 (P3), $\chi^2 = 10.26$

$p < 0.01$), and more likely to report typical sex in a bar, car, outside or other (35.0% (P2) vs. 10.1% (P1)).

As noted in Table 2, P2 appears to be associated with risky characteristics, placing respondents with a second partner at higher risk for HIV/STI. Therefore, in Table 3 we assess the difference in “place” -- where the respondent and partners first met, lived, and usually had sex -- to identify whether partnership (P1, P2, or P3) is associated with differences in risk while controlling for important partnership characteristics such as partner’s race, incarceration history, condom use, alcohol use before sex and whether the partnership is ongoing. In Model 1, assessing place where partners first met, we found that the relative risk of meeting a second partner (P2) at a family or friend’s home versus meeting a partner at work or school was 3.92 times (95% CI: 1.31, 11.70) the risk for P1. Respondents also had 2.48 times higher risk of meeting P2 at a social setting versus work or school than P1, controlling for other demographic and behavioral characteristics. Interestingly, incarceration history was also positively associated with meeting partners at social settings and at a family or friend’s home, relative to meeting at work or school, independent of partner number and other partnership characteristics.

In Model 2, we assessed the association between partner number and where partners lived when they first had sex, independent of other partnership characteristics, but found no significant differences. However, partner number significantly predicted where partners usually had sex (Model 3) even after controlling for other partnership characteristics. We found that the relative risk of typically having sex outside or in a car or bar versus at the partner’s or respondent’s house with P2 was 4.12 times the risk as for P1.

We also found that condom use explained some variation in where partners first met and typically had sex. Respondents were almost six times less likely to use condoms if they met their partner at family, friend’s or spiritual setting (RRR 0.17; 95% CI: 0.05, 0.59) compared to meeting the partner at work or school. However, partners were about three times less likely to be AIAN (RRR 0.32, 95% CI: 0.11, 0.89) and 4.57 times (95% CI: 1.56, 13.36) more likely to use condoms if they usually had sex at a bar, car or in an outside area versus at their or their partner’s house.

To further examine associations between condom use and place, we tested whether characteristics of place were associated with condom use, independent of partner number and other partnership characteristics (Table 4). Respondents were about six times more likely to use condoms if they usually had sex with their partners at a bar, car, or outside (OR: 5.46; 95% CI: 1.12, 26.61) and less likely to use condoms if they drank alcohol before sex (OR: 0.16, 95% CI: 0.04, 0.61).

DISCUSSION

American Indian and Alaska Native women are at-risk for contracting HIV/STI and represent an increasing proportion of incident HIV cases in the U.S.(62) Despite this trend, few studies have attempted to identify specific risk and protective factors within this

population. We examined the role of place in HIV/STI risk behavior, sexual partnering, and partnership characteristics.

Among this population of young rural AIAN women, we found several important HIV/STI protective and risk factors. Overall most women were in monogamous relationships and about a third of the women with more than one partner reported consistent condom use. Though monogamy and condom use is promising, many women in short-term serial monogamous partnerships or concurrent partnerships were not using condoms consistently. This highlights an important risk factor in that short-term serial monogamy may be perceived as safe. Education about condom use specifically as it pertains to new or transitioning relationships would help to reduce this risk.(63, 64)

Our analysis suggests that P2 (the previous partner) was qualitatively different from P1 and P3. This partnership (P2) posed higher HIV/STI risk. Specifically, P2 partnerships were shorter, associated with risky behavior (i.e., alcohol consumption before sex and partnership concurrency), and differed in terms of place (i.e., less likely to live in the same town and more likely to have sex at a bar, car or other outside setting). Higher risk partners were generally not the most recent partner. Indeed, we found the most recent partnerships were healthier and sustainable, and involved less risk. Though this is encouraging, the short time frame with a high-risk partner may have not only placed the respondent at-risk for HIV/STI but the respondent's new partner as well.(23, 34) This finding poses an interesting hypotheses: Does behavior with transitional partners, i.e., P2, represent an experimentation phase, of drugging and sexing, after which the respondent becomes wiser and moves on to a healthier safer partnership?(65) Also critical to understand are the conditions and factors leading to the initial high risk relationships to help inform prevention interventions. Furthermore, exploration into transitional partnerships may help us to better understand resilience and coping within existing social pressures among those who transition out of risky partnerships.

As with many risk behavior studies, we found higher rates of 100% condom use if the respondent met her partner in places typically perceived of as risky like public settings (i.e., bars), and less condom use in typically perceived safe situations like a religious setting or in one's home town.(66–68) Although several studies have found no association between condom use and alcohol use, we found less 100% condom use when respondents used alcohol before sex.(69, 70) This may be due to part to the amount of drinking involved, or in our calculation of condom use. Condoms that broke, slipped off, or were put on incorrectly where not counted as a condom used. This adjustment may have lowered reported condom use. We also found lower risk patterns of network protective and risk patterns when examining partnership characteristics (i.e., place, assortative and disassortative mixing).(71) Specifically, AIAN women who partner with AIAN men were also less likely to usually have sex in cars or outside settings and show a trend toward more 100% condom use. Conversely, non-AIAN partners were thus associated with behavior that place AIAN women at higher HIV/STI risk.

Finally, some perceived “safe” places (family, friend or spiritual gatherings) were identified with risky patterns (meeting high risk partners (P2), partners' incarceration history, and less

condom use). These findings may illustrate a false sense of partners' safety or proxy trust based on where one meets his/her partner (55) and lost opportunities for HIV prevention. (72) Does meeting someone in a perceived "safe" place promote unsafe sexual behavior? Several studies have found where one meets his/her partner hinders condom negotiation (54) and may facilitate high-risk sexually motivated behavior.(73) Specifically, meeting places such bars and social gatherings where the motive is to hook-up require often-difficult, in-person conversations around condom use that may result in not hooking-up. More difficult may be meeting a partner in a perceived safe setting – where those attending are perceived as not at-risk. Here bringing up a discussion about HIV status or condom use may produce identifying stigma - casting suspicions about one's own serostatus, or sexual behavior.(74, 75) Our findings point to the importance of targeting and contextualizing messaging campaigns that are reflective of the cultural setting and venues.(51, 55, 76)

Limitations

There are several limitations to this study. First, the cross-sectional design limits the ability to determine causality and generalizability. Second, we did not use a population-based sample. To reduce selection bias we used multiple sampling techniques and recruited from a wide variety of venues.(77, 78) Although these techniques may introduce over- or under-representation bias, we were able to interview 15% of the eligible population across a wide range of socio-demographic indicators reflective of a rural reservation. Furthermore, given the limited data on this at-risk underserved population and frequent racial misclassification of AIAN women,(79) this study is important to determine both current exposure and prevalent HIV risk factors specific to this population. Identifying specific risk factors provides insight into potential service needs and generates future hypotheses. Third, the reliance on self-report data may result in reporting bias when questions pertain to stigmatizing behaviors such as substance use and sexual activity. The ACASI data collection may have helped with disclosing sensitive information. Overall, missing data was less than 1% and scale reliabilities were well within published reliability coefficients. Lastly, we use a second reported partnership as a proxy for experimentation relationships, even though some may have been long-term relationships that ended within the last six months. Future work should devise and validate a measure to identify experimental or transitional relationships in order to better characterize risk and tailor potential interventions. Despite these limitations, the study has many strengths including the recently obtained data that focus on an underserved population, involvement of the tribal research committee in study design, and identifying protective as well as risk factors for HIV/STI related to place.

Implications and Conclusions

We found that many young AIAN adult women were exposed to high-risk partners in the last six months. Although most of these women transitioned out of the risky partnerships, having had a high-risk partner within this short time frame may have not only placed the respondent at-risk for HIV/STI but the respondent's new partner, as well. Consistent condom use was also less likely when respondents met their partners at friends or family settings. As we found in this study, women are likely to use safe sex practices when meeting a partner at a high-risk place; however, they are less likely to take precautions when meeting a partner in a perceived safe place, even though the partner may be a high-risk partner. Thus

safe sex prevention messages should focus on both safe and high-risk settings in order not to be misleading about when and with whom safe sex should be practiced. Thus, "one size fits all" messaging campaigns may need to be tailored to work across cultures or settings to potentially reduce the likelihood of creating a false sense of sexual safety.

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Respondent characteristics including Socio-demographic, Substance Use, and Sexual Risk Behavior of 129 Rural American Indian Alaskan Native Women who Reported One Male Sexual Partners as Compared to More than One Male Partner in Last 6 Months

Table 1

	Total	One Partner	More than 1 Partner	Test Statistic			
	N = 129(%)	N =81 (62.8)	N = 48 (37.2)				
Socio-Demographics							
Age, mean (s.d.)	24.5	5.7	25.0	5.7	23.6	5.6	1.32
Sexual Orientation: Heterosexual no. (%)	114	88.4	69	85.2	45	93.8	2.15
High school diploma or GED, no. (%)	96	74.4	61	75.3	35	72.9	0.09
Monthly household income (mean \$, sd)	1968	1683	1877	1573	2122	1862	0.80
Unstable housing, no. (%)	50	38.8	30	37.0	20	41.7	0.27
Unemployed, no. (%)	89	69.0	60	74.1	29	60.4	2.63
Currently caring for a child, no. (%)	63	48.8	42	51.9	21	43.8	0.79
Substance Use							
Binge drinking in past 12 mo. (n, %)	49	38.0	21	25.9	28	58.3	13.44***
Alcohol abuse or dependence Dx. (n, %)	52	40.3	25	30.9	27	56.3	8.07**
Marijuana Use in past 12 mo. (n, %)	50	38.8	24	29.6	26	54.2	7.64**
Illicit drug use in past 12 mo. (n, %)	22	17.1	11	13.6	11	22.9	1.86
Sexual Risk Behavior							
100% condom use	20	18.2	8	11.4	12	30.0	5.92*
Drank alcohol before sex	74	57.4	39	48.2	35	72.9	7.56**
Male partners last 6 months, mean (s.d.)	1.6	1.0	1.0	0.00	2.5	0.99	14.08
Cumulative concurrency (cumulative last 6 mos.)	22	17.1	0	0	22	45.8	N/A

Notes. \$ = dollars, s.d. = standard deviation;

* < 0.05,

** < 0.01,

*** < 0.001,

Dx = diagnosis, N/A = not applicable, Concurrency = overlapping sexual partners

Partnership Characteristics including Substance Use, Condom Use and Place first met, lived, and usually had sex for 183 unique partners reported by 129 Native women in 6 months prior to interview, by partner order

Table 2

	Total	%	Partner 1(%)	Partner 2 (%)	Partner 3(%)	Test Statistic	
	183	100.0	129	40	14	7.65	
Partnership & demographic characteristics							
Age differences than 5 years (M, SD)	54	29.5	39	12	3	21.4	0.71
Partner American Indian/Alaskan Native	152	83.1	108	33	11	78.6	0.35
Partnership length in days (M, SD)	1083	1530	1284	539	785	1621	8.37**
Partnership less than 30 days	43	23.5	23	16	4	28.6	7.43*
Partnership ongoing	58	31.7	50	6	2	14.3	7.10*
Condom Use (n=175)							
100% condom use	34	19.4	19	11	4	33.3	3.26
Substance Use							
Drank alcohol before sex	98	53.6	67	26	5	35.7 ^{a,b}	4.88 [^]
Used illicit drug before sex	40	21.9	25	11	4	28.6	
Partnership risk factors							
Reported concurrency (respondent)	43	23.5	27	10	6	42.9	2.17
Reported concurrency (partner)	52	28.4	23	22	7	50.0	4.71 [^]
Partner ever in jail	88	48.1	64	19	5	35.7	1.39
Where respondent first met their partner							
Work or school	53	29.0	40	7	6	42.9 ^b	4.49 [^]
Social Setting	86	47.0	59	22	5	35.7	2.06
Family, friends, or spiritual venue	44	24.0	30	11	3	21.4	0.43
Where partner lived when they first had sex							
Within the same town	71	38.8	55	11	5	35.7 ^b	3.45
Elsewhere on the reservation	77	42.1	50	18	9	64.3 ^a	4.29 [^]
Outside of the reservation	35	19.1	24	11	0	0	<i>t</i>
Where they usually had sex							

	Total	%	Partner 1 (%)	Partner 2 (%)	Partner 3 (%)	Test Statistic
	183	100.0	129	40	14	7.65
Own home or partner's house	144	78.7	108	23	13	92.9 ^b
Friend's house or hotel	12	6.6	8	3	1	7.14
Bar, car, outside or other	27	14.8	13	14	0	0 ^a

Partner order refers to partner 1 (most recent), partner 2 (previous partner), partner 3 (partner prior to partner 2)

Data in table is represented as number and percent unless otherwise noted

test statistics = analyses are conducted using F test, t test and Pearson chi square and Wald chi square as appropriate

All analysis conducted with multilevel mixed effects models accounting for dependence by respondents with multiple partners

[^] p<0.10,

* p<0.05,

** p<0.01

^a partner is significantly different than partner 1

^b partner is significantly different than partner 2

^c partner is significantly different than partner 3

^t Not able to compute partnership differences due to "0" in cells

Table 3

Multivariate predictors of place: where partners first met, first had sex, and usual place of sex.

	Model 1			Model 2			Model 3		
	Where first met partner			Where partner lived when they first had sex			Where partners usually had sex		
	RRR	(SE)	95% CI	RRR	(SE)	95% CI	RRR	(SE)	95% CI
Partner 1	(omitted)			(omitted)			(omitted)		
Partner 2	2.48	1.15	1.00 6.15	*	1.78	0.81 0.73 4.35	1.00	0.69	0.26 3.86
Partner 3	0.52	0.38	0.12 2.21		2.34	1.51 0.66 8.31	0.82	0.93	0.09 7.62
Partner AIAN	1.42	0.63	0.60 3.38		0.57	0.26 0.23 1.38	1.71	1.75	0.23 12.64
Partner has been in jail	2.92	1.12	1.38 6.19	**	1.83	0.61 0.95 3.51	^	0.34	0.23 0.09 1.27
100% condom use	1.07	0.49	0.44 2.62		0.85	0.42 0.32 2.25	1.51	0.95	0.44 5.15
Drank alcohol before sex with partner	0.96	0.38	0.45 2.08		0.88	0.32 0.43 1.78	1.49	0.99	0.40 5.49
Partnership less than 30 days	1.80	0.82	0.73 4.42		1.23	0.65 0.44 3.45	2.76	1.73	0.80 9.45
Partnership is ongoing	2.64	1.13	1.13 6.12	*	0.84	0.38 0.35 2.02	0.45	0.36	0.09 2.15
Intercept	0.46	0.25	0.16 1.35		1.20	0.62 0.44 3.31	0.05	0.06	0.01 0.46
	Family, Friend, Church			Outside reservation			Bar, car, outside, other		
Partner 1	(omitted)			(omitted)			(omitted)		
Partner 2	3.92	2.19	1.31 11.70	**	1.94	0.99 0.71 5.29	4.12	2.00	1.59 10.68
Partner 3	0.85	0.86	0.12 6.16		0.00	0.00 0.00 0.00	0.00	0.00	0.00 0.00
Partner AIAN	2.11	1.24	0.67 6.67		1.36	0.93 0.35 5.22	0.31	0.17	0.11 0.89
Partner has been in jail	3.59	1.86	1.30 9.90	**	0.78	0.35 0.32 1.90	1.07	0.52	0.42 2.77
100% condom use	0.17	0.11	0.05 0.59	**	1.23	0.65 0.43 3.49	4.57	2.50	1.56 13.36
Drank alcohol before sex with partner	0.71	0.34	0.27 1.81		0.66	0.30 0.27 1.63	1.70	0.77	0.70 4.14
Partnership less than 30 days	1.07	0.55	0.39 2.95		2.23	1.27 0.73 6.81	0.62	0.37	0.20 2.00
Partnership is ongoing	3.11	1.48	1.22 7.92	*	1.08	0.51 0.43 2.72	0.68	0.31	0.28 1.66
Intercept	0.25	0.18	0.06 1.00		0.37	0.28 0.08 1.65	0.17	0.12	0.04 0.67

RRR = relative risk ratio, SE = standard error, 95% CI = 95% confidence interval

^
p<0.10,
* p<0.05,
** p<0.01

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Table 4

Multivariate predictors of 100% condom use for 183 partnerships: partner number, place met, lived, and usually had sex and other partnership characteristics

	OR	(SE)	95% CI
<i>Partner number</i>			
Partner 1	(omitted)		
Partner 2	1.46	0.96	0.57 5.32
Partner 3	2.35	2.20	0.37 14.73
<i>Place</i>			
Met at work or school	(omitted)		
Met at a social setting	1.10	0.75	0.29 4.16
Met at family or friend's house or religious setting	0.29	0.28	0.04 1.96
Partner lives in the same household	(omitted)		
Partner lives on the reservation	0.81	0.53	0.22 2.91
Partner lives outside of the reservation	1.26	0.99	0.27 5.91
Usually have sex at partner or respondents house	(omitted)		
Usually have sex at a friend house or hotel	1.66	1.68	0.23 12.11
Usually have sex at a bar, in a car, or outside setting	5.46	4.41	1.12 26.61 *
<i>Partnership characteristics</i>			
Partner AIAN	3.63	3.15	0.66 19.87
Partner has been in jail	0.70	0.41	0.22 2.19
Drank alcohol before sex with partner	0.16	0.11	0.04 0.61 **
Partnership less than 30 days	2.05	1.30	0.59 7.09
Partnership is ongoing	0.29	0.21	0.07 1.24
Intercept	0.60	0.67	0.07 5.26

OR = odds ratio, SE = standard error, 95% CI = 95% confidence interval

[^] p<0.10,

* p<0.05,

*** p<0.01