

AN ABSTRACT OF THE DISSERTATION OF

Megan A. Cahn for the degree of Doctor of Philosophy in Public Health presented on June 8, 2015.

Title: Use of Sexual and Reproductive Health Services among American Indians and Alaska Natives including the Role of the Great Recession: Evidence from the National Survey of Family Growth.

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American Indians and Alaska Natives (AIAN) have more negative sexual and reproductive health outcomes than non-Hispanic whites. Little is known, however, about the factors that lead to sexual and reproductive health disparities for AIANs, including the role of sexual and reproductive health services (SRHS).

Logistic regression analyses were performed on data from the 2002 and 2006-2010 National Survey of Family Growth to 1) provide baseline data on SRHS use prior to the implementation of the Affordable Care Act for a nationally representative sample of AIAN women and men, 2) identify factors associated with SRHS use among AIANs, and 3) assess the impact of the Great Recession on AIAN SRHS use.

AIAN women in urban areas were less likely to receive SRHS and birth control services than non-Hispanic whites. Additionally, AIAN women living in the South and with incomes above 133% of the federal poverty level were less likely than non-Hispanic white women to use birth control services. Conversely, AIAN men were equally likely as non-Hispanic whites to use birth control services. AIAN women and men were as likely or more likely to use STI/HIV services than their non-Hispanic white counterparts. Additionally, AIANs use of SRHS did not change as a result of the Recession. However, disparities in birth control service use between AIANs and NHWs persisted during the Recession.

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Use of Sexual and Reproductive Health Services among American Indians and
Alaska Natives including the Role of the Great Recession: Evidence from the
National Survey of Family Growth

by
Megan A. Cahn

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I understand that my dissertation will become part of the permanent collection of Oregon State University libraries. My signature below authorizes release of my dissertation to any reader upon request.

Megan A. Cahn, Author

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Chapter 1: Introduction

American Indians and Alaska Natives (AIAN) have more negative sexual and reproductive health outcomes than non-Hispanic whites. Little is known, however, about the factors that lead to sexual and reproductive health disparities for AIANs. Researchers studying other populations have suggested that poor sexual and reproductive health outcomes are related to insufficient use of sexual and reproductive health services. However, few researchers have examined sexual and reproductive health service use by AIANs and findings from the few studies that exist are not nationally representative and do not include men's experiences accessing services (Andrews, Heise, & Asetoyer, 2004; Gattozzi & Asetoyer, January 2008; Kingfisher, Asetoyer, & Provost, February 2012; Leston, Jessen, & Simons, 2012).

Without a better understanding of AIAN sexual and reproductive health service use patterns, it is difficult to develop policies that reduce sexual and reproductive health disparities. Evidence on AIAN sexual and reproductive health can benefit policy discussions in two important areas: 1) implementation of the Affordable Care Act and 2) resource allocation during times of economic recession.

The Affordable Care Act initiated changes to health service delivery systems and health insurance coverage. These changes have the potential to close gaps in health outcomes between AIANs and non-Hispanic whites. However, limited baseline data on the use of sexual and reproductive health services among AIAN is available to adequately evaluate the impact of the Affordable Care Act.

Additionally, researchers have shown there is a link between health service use and periods of economic downturn for other populations. However, researchers have not specifically examined AIAN health service use related to recessions. In order to develop policies that can mitigate the impact of economic recessions on AIAN sexual and reproductive health outcomes, evidence of service use patterns before, during, and after economic downturns is needed.

The purpose of this dissertation was three-fold: 1) to provide baseline data on sexual and reproductive health service use prior to the implementation of the Affordable Care Act for a nationally representative sample of AIAN men and women, 2) to explore

factors potentially associated with sexual and reproductive health service use for AIANs, and 3) to examine the impact of the Great Recession on AIAN sexual and reproductive health service use. Throughout the dissertation AIAN sexual and reproductive health service use is compared to that of non-Hispanic whites.

All analyses were conducted using secondary data from the National Survey of Family Growth (NSFG). The NSFG offered several advantages for studying AIAN sexual and reproductive service use. A major benefit of the NSFG was the relatively large AIAN sample size, which facilitated the use of regression models that are generally lacking from other studies of AIAN populations. Additionally, the sample was representative of the U.S. household population. Therefore, results may be generalized to the U.S. population of AIANs. The NSFG also included data on AIAN men, who have received relatively little attention in the sexual and reproductive health literature, especially at a national level. Unlike previous data collected on AIAN sexual and reproductive health services, which focused on the *availability* of services in IHS and tribal health facilities, the NSFG provided data on AIAN service *use* in a variety of health care settings. Last, the time period of data collection allowed for examination of sexual and reproductive health service use prior to the implementation of the Affordable Care Act and before, during, and after the Great Recession.

The specific aims of this dissertation were to:

1) Explore differences in sexual and reproductive health service use in the last 12 months by AIAN women compared to non-Hispanic whites, and examine variations by selected characteristics.

- Hypothesis 1.1: AIAN women are less likely to report a sexual and reproductive health service visit or contraceptive visit in the past 12 months than non-Hispanic white women, after adjusting for covariates.

- Hypothesis 1.2: Sexual and reproductive health service utilization varies by predisposing, enabling, and need factors.

2) Explore differences in sexual and reproductive health service use in the last 12 months by AIAN men compared to non-Hispanic whites, and examine variations by selected characteristics.

- Hypothesis 2.1: AIAN men are more likely to report a sexual and reproductive health service visit in the past 12 months than non-Hispanic white men, after adjusting for covariates.
- Hypothesis 2.2: Sexual and reproductive health service utilization varies by predisposing, enabling, and need factors.

3) Compare sexual and reproductive health service use by AIAN women to non-Hispanic whites before and after the start of the Recession, controlling for selected characteristics.

- Hypothesis 3.1: AIAN women report using fewer sexual and reproductive health services, including birth control services, after the start of the Recession than before, after adjusting for covariates.
- Hypothesis 3.2: AIAN women are less likely to report using a birth control method after the start of the Recession than before, after adjusting for covariates.
- Hypothesis 3.3: AIAN women report using different birth control methods before and after the start of the Recession, after adjusting for covariates.

Chapter 2: Literature Review

In this chapter I present a review of the relevant literature with a focus on four areas of study. First, I discuss the sexual and reproductive health (SRH) of AIANs to describe the public health problem leading to my research. Second, I present the limited research on sexual and reproductive health services (SRHS) for AIANs to identify gaps in the literature. Third, I review literature on factors associated with SRHS use that inform my selection of predictors in my empirical models. Fourth, I discuss the association between SRHS use and economic recessions, a factor of interest in my study.

Sexual and Reproductive Health of American Indians and Alaska Natives

AIANs have worse SRH outcomes than NHWs. According to the Centers for Disease Control and Prevention, compared to NHWs, AIANs have higher rates of all major STIs (Centers for Disease Control and Prevention, 2012c). For example, AIANs are over four times as likely as NHWs to have chlamydia or gonorrhea (Centers for Disease Control and Prevention, 2012c). Additionally, the incidence of HIV among AIANs (9.7/100,000) is greater than among NHWs (7.3/100,000) (Centers for Disease Control and Prevention, 2012b). In fact, from 2007 to 2010, AIANs were the only racial or ethnic group that experienced an increase in HIV diagnosis rates (Centers for Disease Control and Prevention, 2012b).

AIANs also have higher rates of teen pregnancy and birth compared to NHWs. In the 1997-2003 Youth Behavioral Risk Survey, compared to NHWs, AIAN teen females were three times as likely to report having ever been pregnant and teen males were three times as likely to report having impregnated someone (Rutman, Park, Castor, Tualii, & Forquera, 2008). Additionally, the teen birth rate is consistently higher among AIANs than NHWs, even though both groups have experienced declines in teen births in the past decade (Hamilton, Martin, & Ventura, 2012).

Few researchers have studied other fertility outcomes among AIANs, including unintended pregnancy and abortion. However, researchers have found that urban AIAN women are 77% more likely than urban NHW women to report an unintended pregnancy (Urban Indian Health Institute, May 2010). Additionally, compared to urban NHW

women, urban AIANs are twice as likely to report having two or more abortions (Urban Indian Health Institute, May 2010).

Thus, AIANs experience SRH disparities associated with STIs, HIV, teen pregnancy and birth, unintended pregnancy, and abortion. Due to the health, educational, and financial problems associated with these SRH outcomes, programs and policies are needed to address the disparities (; Basch, 2011; Chesson, Collins, & Koski, 2008; Gipson, Koenig, & Hindin, 2008; Monea & Thomas, 2011; National Campaign to Prevent Teen and Unplanned Pregnancy, 2011). Improving SRHS provision to AIANs may be one intervention that could address these SRH problems.

American Indians and Alaska Natives and SRHS

Previous researchers who studied other populations have suggested that poor SRH outcomes are related to insufficient use of SRHS, including birth control methods (Fonarjian, Drostin, Garrett, & Montalvo, 2012; Huber & Ersek, 2009). Although a substantive literature exists on SRHS use, few researchers have examined SRHS *use* among AIANs. Previous researchers generally focused instead on the *availability* of SRHS and barriers to SRHS use in Indian Health Service (IHS) and tribally operated clinics.

SRHS Use among American Indians and Alaska Natives. Researchers who examined SRHS use among AIANs focused on a limited number of services, including prenatal care, Pap smears, and birth control methods. In general, AIANs were less likely than NHWs to use any of these services. Specifically, AIANs were more likely than NHWs to enter into prenatal care late in pregnancy (32.6 vs 13.1%) and to receive inadequate prenatal care (44.6 vs. 23.9%) (Johnson, Call, & Blewett, 2010). Additionally, compared to 84% of NHWs, 78% of AIANs had received a Pap smear in the last three years (Steele, Cardinez, Richardson, Tom-Orme, & Shaw, 2008).

Previous researchers also found birth control use rates were lower among AIANs than NHWs. Among teens, AIANs were less likely than NHW teens to have used a birth control method the last time they had sex (The National Campaign to Prevent Teen and Unplanned Pregnancy, August 2009; Urban Indian Health Institute, May 2010). Furthermore, in a sample of urban women, AIAN women aged 15-44 at risk for

unintended pregnancy were less likely than NHWs to report using a birth control method (Urban Indian Health Institute, May 2010). Thus, for the small number of services examined, AIANs experienced SRHS use disparities.

Availability of SRHS for American Indians and Alaska Natives.

Researchers also have studied the availability of SRHS for AIANs in IHS and tribally operated clinics. These researchers found that the clinics offered some SRHS, including well-woman screening, contraception, and pregnancy and STI testing (Urban Indian Health Institute, December 2009). However, AIANs using these health centers had limited access to emergency contraception, abortion services, prenatal and maternity care, and outreach and education on SRH (Andrews et al., 2004; Gattozzi & Asetoyer, January 2008; Hart, 2010; Kingfisher et al., February 2012; Leston et al., 2012; Urban Indian Health Institute, December 2009; S. I. H. B. Urban Indian Health Institute, December 2009). For instance, less than half of IHS pharmacies offer emergency contraception (Gattozzi & Asetoyer, January 2008). Additionally, less than half of urban IHS clinics offer prenatal or maternity care and none offer abortion services (Andrews et al., 2004; Urban Indian Health Institute, December 2009). Research participants explained these services were limited because providers could refuse to offer services they objected to and because of funding and provider shortages (Gattozzi & Asetoyer, January 2008; Kingfisher et al., February 2012; Urban Indian Health Institute, December 2009). Although SRHS availability may not equate to SRHS use, a lack of SRHS for AIANs may lead to lower rates of SRHS use.

Barriers to SRHS Use among American Indians and Alaska Natives.

Even if SRHS are available to AIANs, they may not use services if there are too many barriers. Researchers note a number of barriers to SRHS use for AIANs, including embarrassment, confidentiality concerns, historical mistrust of the U.S. government, and discrimination. Specifically, for young Alaska Natives, embarrassment and fears about confidentiality have prevented SRHS use because the youth generally lived in small communities and knew the provider personally (Leston et al., 2012). Although confidentiality concerns have not been studied as a barrier to SRHS use for other AIAN

populations, for many rural or tribal land based AIANs who live in similar small communities, confidentiality concerns may be a barrier to care.

Historical mistrust of the U.S. government may present another barrier to SRHS use for AIAN women. Between the early 1970s and early 1980s, the U.S. government practiced forced sterilization of AIAN women. During this time, more than 42% of childbearing aged AIAN women were sterilized (Hart, 2010). Although not well studied, this governmental practice may negatively influence AIAN women's use of SRHS and prescription birth control methods, which may contribute to the high rates of unintended pregnancy and abortion experienced by AIAN women.

An additional barrier to SRHS use is discrimination. Providers noted that AIAN women who received SRHS often experienced discrimination based on race, sex, and religion, which could limit further SRHS use (Kingfisher et al., February 2012). Taken together these barriers may reduce AIANs use of SRHS despite the great need evidenced by high rates of STIs, HIV, and unintended and teen pregnancies among AIANs.

Based on these studies, AIANs are less likely than NHWs to use select SRHS, have limited access to SRHS, and experience numerous barriers to care. Although these studies provide insight into SRHS use among AIANs, numerous gaps in the literature still exist.

Gaps in the Literature on SRHS for American Indians and Alaska Natives.

First, researchers have not studied AIAN men's SRHS use. One research team assessed AIAN men's intentions to use birth control and family planning services and found over three-fourths of men surveyed intended to use these services (Rink et al., 2012). However, intention to use services does not ensure SRHS use occurred. Further research on AIAN men's SRHS use is needed to address AIAN men's SRH disparities.

Second, researchers have only studied a limited number of SRHS. To my knowledge, no previous researcher has studied STI testing or birth control service use among AIANs. Additionally, previous studies on birth control method use were limited to teens and urban AIANs (The National Campaign to Prevent Teen and Unplanned Pregnancy, August 2009; Urban Indian Health Institute, May 2010). To understand SRHS use among AIANs, a wider array of SRHS needs to be studied.

Third, only one previous study employed National Survey of Family Growth data (Urban Indian Health Institute, May 2010). This prior work was limited to urban AIANs and only assessed birth control method use. In order to compare AIAN SRHS use patterns to other previously studied populations (i.e. NHWs), analyses of NSFG data on AIAN SRHS use is warranted.

My research builds on previous studies by examining men's SRHS use, exploring a wider variety of SRHS, and using data from the National Survey of Family Growth.

Factors Associated with SRHS Use

In addition to the previously mentioned gaps in the literature, researchers have not examined factors associated with SRHS use among AIANs. In my study I aim to identify factors associated with AIAN SRHS use. Below, I review the literature on factors associated with SRHS use for other populations to inform my selection of factors that might be relevant for AIANs. I organize the factors into three sections: predisposing, enabling, and need factors to align with the project's conceptual framework outlined in Chapter 3.

Predisposing Factors. Predisposing factors are characteristics indicative of a person's status in society that lead some people to be more likely to use health services than others (Andersen, 1995). Such characteristics include, age, sex, and beliefs about health and the health care system. In my study, I include the following predisposing factors: race/ethnicity, age, and education. Here I present results from previous researchers who found SRHS use is associated with these predisposing factors for other populations.

Race/ethnicity. Several researchers have examined variations in SRHS use by race and ethnicity, but have only focused on NHWs, non-Hispanic Blacks (NHBs), and Hispanics. These researchers identified racial and ethnic disparities in SRHS use that varied by service type. For women and men, NHBs were more likely to receive an STI/HIV service than NHWs (Chabot, Lewis, Thiel de Bocanegra, & Darney, 2011; Frost, 2013; Hall, Moreau, & Trussell, 2012; Kalmuss & Tatum, 2007). NHB and Hispanic men were also more likely than NHW men to receive birth control services (Chabot et al., 2011; Kalmuss & Tatum, 2007). However, NHB women were less likely

to receive birth control services than NHW women (Chabot et al., 2011; Frost, 2013; Hall et al., 2012; Kalmuss & Tatum, 2007). Similarly, birth control use was lower among women of color than among NHW women (Frost, Singh, & Finer, 2007; Huber & Huber, 2009; Upson, Reed, Prager, & Schiff, 2010). When women of color used contraceptives, they were less likely to use a prescription contraceptive method than NHWs (Nearns, 2009).

Age. Researchers have also studied the association between SRHS use and age. SRHS use was more common among women and men aged 15-34 than among those aged 35-44 (Chabot et al., 2011; Frost, 2013; Hall et al., 2012; Kalmuss & Tatum, 2007). Additionally, women aged 15-17 were less likely to report using SRHS than women aged 18-24 (Hall et al., 2012). Age related SRHS use differences may be attributed partly to differences in sexual activity. When only sexually active women were included in analyses, researchers found no significant difference in use of contraceptive services based on age (Hall et al., 2012).

Age was also associated with birth control use. Among women aged 18-44, women aged 18-34 were more likely than those aged 35-44 to report birth control use (Culwell & Feinglass, 2007).

Education. The relationship between education and SRHS use has been investigated for women, but not for men. Among women, those with lower levels of education were less likely to report SRHS use in the past year (Borrero, Schwarz, Creinin, & Ibrahim, 2009; Frost, 2013; Hall et al., 2012; Potter, Trussell, & Moreau, 2009). Women with lower levels of education were also less likely to report using any contraceptive method (Frost et al., 2007) or a prescription method (Frost & Darroch, 2008; Nearns, 2009).

Enabling Factors. Enabling factors that influence health service use include financial resources and the organization of the health care system. In my study, enabling factors include: poverty status, health insurance, engagement with the health care system, and pregnancy history. Below I present a review of the literature on the association between these enabling factors and SRHS use for other populations.

Poverty Status. The relationship between poverty and SRHS use varied by gender. For men, poverty and SRHS use were not associated (Chabot et al., 2011; Kalmuss & Tatum, 2007). However, women with lower incomes were less likely to report SRHS use, including contraceptive services (Hall et al., 2012; Potter et al., 2009). Additionally, women with lower incomes were more likely to report contraceptive nonuse (Mosher, Martinez, Chandra, Abma, & Willson, 2004; Upson et al., 2010) and method failure or discontinuation than women with higher incomes (Ranjit, Bankole, Darroch, & Singh, 2001).

Health Insurance. Insurance status is also associated with SRHS use. Women and men who were uninsured, for even part of the last year, were less likely to report using any SRHS, any contraceptive service, and any STI/HIV service than those with insurance (Chabot et al., 2011; Frost, 2013; Hall et al., 2012; Kalmuss & Tatum, 2007). SRHS use also varied by insurance type. Individuals with public insurance, including Medicaid, were more likely to report SRHS use than those with private insurance (Chabot et al., 2011; Frost, 2013; Kalmuss & Tatum, 2007).

Engagement with Health Care System. For men and women, contact with the health care system was associated with an increased likelihood of reporting SRHS use. Men who received a physical exam and those with a usual source of care were more likely to report SRHS use (Chabot et al., 2011; Kalmuss & Tatum, 2007). For women, receipt of a SRHS, especially contraceptive counseling in the past year, was associated with contraceptive use (Culwell & Feinglass, 2007; Frost et al., 2007; Upson et al., 2010).

Pregnancy History. Use of SRHS, including birth control services, was less common among women who had never been pregnant or given birth. However, among sexually experienced women, birth control service use was less common for women who had two or more births than for nulliparous women (Hall et al., 2012).

Need Factors. A person's perception of their health status and previous diagnoses with a health problem are considered need factors that influence health service use. In my study, I include the following need factors: relationship status, number of opposite-sex sexual partners, and health status. Here I present research findings on the association between these need factors and SRHS use.

Relationship Status. Married and cohabiting women were more likely to use SRHS (Frost, 2013; Hall et al., 2012); however, married and cohabiting men were less likely to use SRHS than their unmarried and non-cohabiting peers (Chabot et al., 2011). Additionally, women in long term relationships who were at risk for unintended pregnancy were more likely to report contraceptive use than women who were not currently in a relationship (Frost et al., 2007). However, women in relationships were less likely to report current use of prescription contraceptive methods (Culwell & Feinglass, 2007).

Number of Opposite-Sex Sexual Partners. For women and men, sexual history was associated with SRHS use. Women who had sex were more likely than women who had never had sex to report using SRHS (Frost, 2013). Additionally, women and men with multiple sexual partners in the past year were more likely to report SRHS use, including STI/HIV service use, than those with fewer or no partners (Frost, 2013; Hall et al., 2012; Kalmuss & Tatum, 2007).

Health Status. Researchers have examined the association between women's, but not men's, health status and SRHS use. Women with a history of gynecological health problems, including early or late onset of menarche (Hall et al., 2012), pelvic inflammatory disease, ovarian cysts, uterine fibroids, or ovulation problems (Hall et al., 2012; Potter et al., 2009) were more likely to report using SRHS in the past year. However, women who reported general poor health were less likely to use prescription contraceptive methods than women who report good health (Culwell & Feinglass, 2007).

Summary. In conclusion, few researchers have examined factors associated with SRHS use among AIANs. Numerous researchers have studied SRHS use and associated factors for other populations. Based on this literature, I have included factors deemed significant in SRHS use in other populations.

Economic Recessions and SRHS Use

Another area of interest in my study is the association between the economic recession of 2007-2009 (“the Great Recession”) and SRHS use. Researchers have reported changes in women’s and men’s use of SRHS over time (Chabot et al., 2011; Kalmuss & Tatum, 2007). However, few researchers have studied changes in SRHS use associated with economic recessions. None have studied changes to SRHS use among AIANs during a recession.

Below I discuss the literature on the association between economic recessions and health and health service use from time periods prior to the Great Recession. I then narrow my focus to the literature on health service use changes associated with the Great Recession. Finally, I present the literature on changes in SRH and SRHS use associated with the Great Recession.

Economic Recessions, Health, and Health Service Use- Earlier Time Periods.

Numerous researchers have found that health improves during economic recessions (e.g. Dehejia & Lleras-Muney, 2004; Neumayer, 2004; Ruhm, 2000, 2003). One reason posited for improved health is the greater availability of leisure time for engaging in health promoting activities, including medical care use, during periods of unemployment. However, unemployment is often also tied to insurance loss, which may reduce medical care seeking behaviors (Ruhm, 2000).

Researchers who examined the relationship between unemployment and health service use during time periods prior to the Great Recession generally found declines in health service use when unemployment rates were high (e.g. Ruhm, 2000, 2003). For example, in a study using Behavioral Risk Factor Surveillance System (BRFSS) data, respondents were less likely to report using preventive services, including Pap smears, when unemployment rates increased (Ruhm, 2000). Similarly, in a study using National Health Interview Survey data, increases in state unemployment rates were associated with decreases in hospitalizations and doctor visits (Ruhm, 2003).

However, not all researchers found a negative relationship between health service use and unemployment. In another study of BRFSS data, periods of high unemployment were associated with pregnant women receiving earlier and more extensive prenatal care

(Dehejia & Lleras-Muney, 2004). Additionally, in another study, seniors were more likely to receive certain cardiovascular procedures during periods of recession (Ruhm, 2007). Thus, health service use during recessions generally declines, however, service use patterns may vary based on service type.

The Great Recession and Health Service Use. Similar to researchers studying earlier time periods, researchers studying the impact of the Great Recession overwhelmingly found declines in health service use, including physician visits, inpatient stays, and prescription drug use during the Great Recession (Burgard & Hawkins, 2014; Dorn et al., 2012; Kaiser Family Foundation, April 2009; Kozman, Graziul, Gibbons, & Alexander, 2012; Lusardi, Schneider, & Tufano, March 2010; Mortensen & Chen, 2013; Schaller & Huff Stevens, 2014). Additionally, researchers found declines in service use for all racial groups. However, they also found racial and economic disparities. More specifically, NHBs and Hispanics experienced greater declines in service use than did NHWs (Burgard & Hawkins, 2014; Mortensen & Chen, 2013). Also, Americans who were unemployed, lost wealth due to the Great Recession, or lost their health insurance were more likely to report reducing their use of health services during the Great Recession (Lusardi et al., March 2010; Schaller & Huff Stevens, 2014).

Only one research team studying health service use during the Great Recession found no change in health service use associated with unemployment. Researchers in this study employed administrative data to assess for changes in prescription drug use. The researchers found no difference in the sale of therapeutic drugs, including oral contraceptives, as unemployment increased (Kozman et al., 2012). Other researchers suggest that people may have switched from brand-name to generic prescription drugs during the Great Recession (Cunningham, 2012), which may account for the lack of observed difference. Alternatively, the researchers controlled for state-level and temporal factors that other researchers did not assess, which may explain the difference in findings.

Based on these studies, health service use appeared to decline during the Great Recession. However, changes in health service use varied by race and economic standing. In addition, when more rigorous data analysis tools were used, no differences were found.

The Great Recession, SRH, and SRHS Use. Changes in SRHS use during periods of recession may vary from other health services due to a desire for fewer children during periods of economic uncertainty, especially among low income women (Alan Guttmacher Institute, September 2009; Najari, Schlegel, & Goldstein, 2014). Consistent findings of reductions in fertility during recessions (Cherlin, Cumberworth, Morgan, & Wimer, 2013) may be due to individuals making behavioral changes to successfully avoid pregnancy during times of economic uncertainty. For example, during the Great Recession, the general fertility rate declined by 9% with the greatest declines in fertility occurring in the states with the highest rates of unemployment (Cherlin et al., 2013).

Declines in fertility and changes in the desire for (more) children during the Great Recession may be associated with increased use of more effective birth control methods to prevent pregnancy. Most effective methods require a medical visit. Thus, it is possible that women may actually increase their use of SRHS during periods of recession. However, constraints imposed by a recession, including loss of income and insurance, coupled with reductions in funding for programs for low-income women may prevent women from using SRHS.

In previous studies, researchers found changes in SRHS use patterns associated with the Great Recession. In some cases, these changes reflect declines in SRHS use during the Great Recession. For example, women reported postponing doctor visits for gynecological or birth control services (Alan Guttmacher Institute, September 2009; American Congress of Obstetricians and Gynecologists, May 5, 2009). Additionally, some women described not using birth control all the time during the Great Recession (Alan Guttmacher Institute, September 2009; American Congress of Obstetricians and Gynecologists, May 5, 2009). Financial concerns were associated with these changes. In fact, over a quarter of women in one study reported having difficulty paying for birth control during the Great Recession (Alan Guttmacher Institute, September 2009).

Conversely, researchers also found increases in SRHS use that reflected a desire to prevent pregnancy during the Great Recession. For instance, some women described being more careful with birth control and switching to new birth control methods to

reduce the risk of pregnancy (Alan Guttmacher Institute, September 2009; American Congress of Obstetricians and Gynecologists, May 5, 2009). Additionally, researchers found that men were more likely to receive a vasectomy during and after the Great Recession than before the Great Recession (Najari et al., 2014).

To date, changes in AIAN health service use during recessions have not been examined. However, given the reported changes in SRHS use among other populations during the Great Recession, I anticipate AIANs are less likely to use SRHS during the Great Recession than before the recession began. I also expect that AIANs are less likely to use birth control methods during than before the Great Recession. Last, I anticipate that the types of birth control methods AIANs used will be different during the Great Recession than before.

Summary

In conclusion, AIANs experience worse SRH outcomes than NHWs. However, few researchers have examined SRHS use among AIANs. Previous researchers have also not studied the factors associated with SRHS use for AIANs. In particular, no researcher has examined the association between SRHS use and economic recessions.

My study will fill several of the gaps in the existing literature by examining AIAN women's and men's use of SRHS and by focusing on a wider variety of SRHS than have previously been studied. In addition, I will examine factors associated with SRHS use among AIANs. I will also add to the academic literature by exploring changes in SRHS use among AIANs associated with the Great Recession. In the next chapter I describe the methods I will employ to address these research aims.

Chapter 3: Methods

This chapter begins with a discussion of the theory that informed this study. The next sections describe the data sets analyzed, the study sample, and the measures used in the study. Finally, the last section presents the analyses conducted.

Theoretical Perspectives

This dissertation was grounded in Andersen's Behavioral Model of Health Services Use. At its most basic level, Andersen's model (Figure 1 at end of chapter) posits that a person's health behaviors, including their use of health services, is a product of a variety of factors, including predisposing characteristics, enabling resources, and need (Andersen, 1995). More recent iterations of the model also include health care system factors and external environmental factors that may influence a person's health behaviors. Additionally, measures of an individual's health status have been added to the model.

The conceptual framework (Figure 2 at end of chapter) providing the foundation for this study is based on work by Andersen (Andersen, 1995). Andersen posited that some people are more likely to use health services due to their status in society, including their age and sex, and due to their beliefs about their health and the health care system. These characteristics are referred to as predisposing factors in Andersen's model. The predisposing factors for this study include race/ethnicity, age, and education.

Andersen's enabling characteristics refer to the resources available to an individual to finance their health behaviors and the organization of health services available. For this work, enabling resources included, poverty status, health insurance status, region of country where the respondent resides, urban-rural residential setting, pregnancy history, whether an individual has a usual source of care, received a physical exam, received a testicular exam, or received a SRHS, and current community economic conditions, measured by unemployment rates.

Andersen further asserted that an individual needs to perceive they have a health condition or have been diagnosed with a health condition, in order for health care utilization to occur. In Andersen's model these factors are referred to as 'need' characteristics. For this dissertation, need characteristics included general health status,

history of gynecological problems, marital/cohabitation status, number of opposite sex sexual partners in last year, and fecundity status. Factors selected for inclusion in the models were identified by previous researchers (see Chapter 2) to be significantly associated with the dependent variables of interest.

Not all factors are included in each analysis due to the availability of data or the appropriateness of including the variable. These discrepancies are noted in italics in the model diagram. For instance, usual source of care and receipt of a physical or testicular exam are only used in the analyses of men's service use, while pregnancy history, gynecological problem, and fecundity status are only used in the analyses of women's service use. Likewise, use of SRHS as an independent variable is only relevant to the examination of birth control use as a dependent variable.

Although Andersen presents numerous other factors impacting service use in his model, the work presented here focused on the factors presented in Figure 2. Some factors were omitted due to a lack of data in the secondary data set. Others were omitted due to sample size issues, which limited the number of variables that could be included in the models. A high degree of discernment was used to select variables for inclusion in the empirical model.

Also missing from the framework are measures of the health care system. Again, the use of a secondary data set limited the variables that could be included. Contextual data regarding the availability of health care providers in a respondent's community were available. However, these data were not current for the point in time of the respondent's interview, and for this reason were excluded.

Additionally, the conceptual framework presented does not evaluate the relationship between use of health services and health outcomes. Although an attempt is made to describe the sexual health status of AIANs overall and in relation to those from other racial groups, the cross-sectional nature of the survey prevents an assessment of causality.

Data Source

The National Survey of Family Growth (NSFG) is a U.S. national household probability sample survey of women and men 15-44 years old. Conducted by the National Center for Health Statistics (NCHS), the NSFG provides national estimates on factors associated with pregnancy and birth outcomes, including contraceptive use, sexual activity, general health information, and SRHS use (Centers for Disease Control and Prevention, 2012a).

NSFG data have been collected seven times. The first six NSFG surveys were conducted in cycles in one year or less, with data collection in 1973, 1976, 1982, 1988, 1995, and 2002. Beginning in 2006, continuous data collection in four-year increments began (Centers for Disease Control and Prevention, 2012a). This dissertation utilized data from the 1995, 2002, and 2006-2010 cycles.

For the 2006-2010 cycle, individuals were selected for participation through a multistage area probability sample. In the first stage, the country was broken into 2,402 primary sampling units (PSUs) and a random sample of 110 PSUs was drawn. In the second stage, census blocks within each PSU were stratified to allow for oversampling of Black and Hispanic persons and a list of housing units in the census blocks was created. From the list of housing units in each census block, housing units were randomly selected in the third stage. In the fourth stage, interviewers visited the selected housing units to identify individuals eligible for the survey, including those living away from home attending college and living in university housing, fraternities, or sororities. If more than one individual in the household was eligible, the interviewer selected the participant based on a sampling procedure that ensured over-representation of 15-19 year olds and females. The fifth stage of sampling focused on screening and interviewing a sample of individuals from the selected housing units who had not been successfully contacted during the fourth stage, in order to increase representation of these types of housing units in the final sample (Centers for Disease Control and Prevention, 2012a).

Data were collected in nearly the same fashion in 2002 as in 2006-2010. The one exception is that in 2002, the researchers oversampled for Hispanics by selecting an

additional 11 PSUs (121 PSUs total) with large numbers of Hispanic persons residing in those areas (Lepkowski, Mosher, Davis, Groves, & Van Hoewyk, 2010).

The NCHS contracted with the University of Michigan's Institute for Social Research to collect the 2002 and 2006-2010 data. The 2002 data were collected from 12,571 interviews (7,643 women, 4,928 men) completed between March 2002 and February 2003. Between June 2006 and June 2010, 10,403 men and 12,279 women were interviewed. In-person, face-to-face interviews were conducted by trained, professional female interviewers using laptop computers.

Interviewers provided written and verbal explanations of the survey and informed respondents that participation was voluntary. Participants ages 18-44 consenting to participate in an interview signed a consent form. A signed consent form from a parent or guardian and a signed assent form from the participant were required for all participants ages 15-17 years (Lepkowski, Mosher, & Davis, 2006).

Interviewers entered participants' responses into the computer using computer assisted personal interviewing (CAPI). For more sensitive topics, including substance use, forced sexual intercourse, and STI/HIV risk behaviors, data were collected with the audio computer-assisted self-interview (ACASI) procedure in which respondents enter their own responses into the laptop computer without having to report them to the interviewer. This allowed respondents to listen to questions through earphones and enter their own responses in the computer, minimizing the influence of an interviewer in reporting. Interviews of females lasted on average 85 minutes for the 2002 survey and 71 minutes for 2006-2010 survey. Interviews of males lasted approximately 60 minutes for the 2002 survey and 52 minutes for 2006-2010 survey. The overall response rate for the 2002 NSFG was 68% and for the 2006-10 NSFG was 77% (75% men and 78% women) (Lepkowski et al., 2010).

To allow for consistency in analyses of the survey, NSFG staff imputed values for missing values for a subset of variables that are frequently utilized by researchers. Most imputations were performed using regression analyses. A small number of values were imputed using logical imputation. Restrictions were set on imputed values to ensure they

were within the appropriate range and to ensure consistency with other variables to which the respondent had provided an answer.

In this study, the following variables had imputed values: number of years of education, Hispanic origin, number of pregnancies, priority coded birth control method used at interview, history of endometriosis, history of fibroids, ever been treated for pelvic inflammatory disease, ever tested for HIV outside of blood donation, priority coded current insurance status, and poverty status. With the exception of ever tested for HIV (0.7%), current insurance status (1.1%) and poverty status (11%), less than 0.2% of values were imputed.

Study Sample

All analyses were restricted to respondents who identified as AIAN or NHW. The NSFG captures racial classification through responses to the question, “Which of the groups describes your racial background? Please select one or more groups.” The racial groups presented were: “American Indian or Alaska Native;” “Asian;” “Native Hawaiian or Other Pacific Islander;” “Black or African American;” “White.” Individuals who reported multiple racial groups were then asked to identify which racial group best described their racial background. Individuals were also asked about their ethnic background through the question, “Are you Hispanic or Latino(a), or of Spanish origin?” with answer options of “Yes” or “No.”

In all analyses, respondents are classified as AIAN if they only listed American Indian or Alaska Native as their racial group, or selected American Indian or Alaska Native as the race that best described their racial background. Therefore, the AIAN racial group included respondents regardless of Hispanic origin.

Non-Hispanic whites (NHWs) were selected as the reference group because NHWs generally have the best SRH outcomes, including lower rates of unintended pregnancy and STIs/HIV than most other racial groups (Centers for Disease Control and Prevention, 2012a, 2012b; Cubbin et al., 2002). A respondent was considered NHW if they:

- selected only white as the racial group that describes them, or

- listed white as the race that best describes them, if they selected multiple racial categories.

Any NHW who selected multiple races and listed American Indian or Alaska Native as part of their race was excluded from analyses. Additionally, white respondents who identified their ethnicity as Hispanic were excluded from analyses.

Based on these classifications, the 2002 NSFG includes 357 AIAN women and 4,055 NHW women. The 2006-2010 NSFG includes 1,742 AIANs respondents (819 women and 923 men) and 11,514 NHW respondents (6,196 women and 5,322 men). In the 2000 Census, 4.1 million people identified their race as AIAN either alone or in combination with another race and 194.6 million identified themselves as non-Hispanic White alone. This number jumped to 5.2 million AIANs and 196.8 million NHWs in the 2010 Census (O. o. M. H. U.S. Department of Health and Human Services, 2012). Thus, the 2002 NSFG sample represents approximately 0.009% of AIANs and 0.002% of NHWs, and the 2006-2010 sample represents approximately 0.03% of AIANs and 0.006% of NHWs (Appendix 1). These percentages are generally larger than those for other CDC surveys (e.g. the National Health and Nutrition Examination Survey) (Centers for Disease Control and Prevention, 2011). This may be because NSFG data were collected only intermittently prior to 2006, while the other surveys collect data continuously and over time obtain larger sample sizes than the NSFG. Although the NHW sample size in the NSFG is generally large enough to conduct analyses, the AIAN sample size may not be sufficiently large for more complex analyses.

Specific Aim 1. Public use and restricted access data from the 2006-2010 NSFG female in-person interviews were used. The analysis was restricted to the 7,015 women who identified as AIAN (n = 819) or NHW (n = 6,196).

Specific Aim 2. Public use and restricted access data from the 2006-2010 NSFG male in-person interviews, including the ACASI portion of the survey, were used. This analysis was limited to the 6,245 men who identified as AIAN (n = 923) or NHW (n = 5,322).

Specific Aim 3. Public use and restricted access data from the 2002 and 2006-2010 NSFG female in-person interviews were pooled. The analysis was restricted to the 4,412 women in 2002 and 7,015 in 2006-10 who identified as American Indian/Alaska Native (n = 1,176) or non-Hispanic white (n = 10,251). This aim also used data from the 1995 NSFG female interviews, but these data were not pooled with the other survey years. Analyses were restricted to the 6,723 women who identified as AIAN (n = 282) and NHW (n = 6,441).

Additionally for Aim 3, the NSFG data were merged with state and county unemployment data from the U.S. Bureau of Labor Statistics. The merge matched NSFG respondents to unemployment rates by year of interview and county and state of residency at the time of interview.

Measures

Dependent Variables.

Specific Aim 1. Three measures of women's SRHS use in the past year were created: 1) use of any birth control service, 2) use of any STI/HIV service, and 3) use of any SRHS.

- **1) Use of any birth control service (BC service)** was constructed from a series of questions in the *Birth Control and Medical Service in the Past 12 months* section of the survey.

BC services included:

- contraceptive check-up, counseling, method provision
- sterilization counseling or provision
- emergency contraceptive counseling or provision
- **2) Use of any STI/HIV service** was constructed from questions in the *Birth Control and Medical Service in the Past 12 months* and *HIV testing and AIDS knowledge/counseling* sections of the survey.

STI/HIV services included:

- STI counseling, testing, or treatment
- HIV testing outside of blood donation
- **3) Use of Any SRHS.** Women who reported receiving any BC or STI/HIV service or who reported receiving one of the following services was considered to have used a SRHS.

- Preventive services: Pap smear or pelvic exam
- Pregnancy services: pregnancy test, abortion, prenatal care, or post-partum care

Specific Aim 2. Two measures of men's health service use in the past year were created: 1) use of any birth control service and 2) use of any STI/HIV service.

- **1) Use of any birth control service (BC service)** was constructed from a series of questions contained in two sections of the survey: *Use of Family Planning Clinic* and *Health Services*.

BC services included:

- Counseling about birth control methods, sterilization, or abortion
- Receipt of a birth control method
- **2) Use of any STI/HIV service** was constructed from questions contained in four sections of the survey: *Use of Family Planning Clinic*, *Health Services*, *HIV testing and AIDS knowledge/counseling*, and the ACASI portion of the survey.

STI/HIV services included:

- STI counseling, testing, or treatment
- HIV counseling and testing outside of blood donation

Specific Aim 3. Two measures of SRHS use and two measures of birth control use were utilized:

- **1) use of any BC service**
- **2) use of any SRHS**
- **3) use of any birth control method at time of interview (BC method)**
- **4) use of any birth control method requiring a medical visit at time of interview (medical BC method)**

The SRHS and BC service measures were constructed in the identical fashion as in Aim 1, but included data from the 2002 survey.

Both birth control use variables were constructed from the variable CONSTAT1, which was a priority coded birth control measure. Women were asked about all methods of birth control they were using at the time of interview. For women who reported only one form of birth control, this method was entered into CONSTAT1. For women who reported multiple forms of birth control, the NSFG staff prioritized the methods from most to least effective. The most effective method reported was listed in CONSTAT1.

Regression analyses of birth control use at interview were limited to women at risk for unintended pregnancy, characterized by:

- sexually active in last three months
- fecund
- not pregnant, not postpartum, and not seeking pregnancy.

Regression analyses for use of a birth control method requiring a medical visit were limited to women using some form of birth control at time of interview.

Medical birth control methods included:

- pill, patch, ring, diaphragm, injectable (Depo-Provera, Lunelle), implant, IUD

Non-medical birth control methods included:

- condoms (male and female), spermicidal foam, jelly, or cream, rhythm method, withdrawal, safe period, suppository, Today sponge, other

Women using emergency contraceptives were omitted from the analyses because EC was both a medical and non-medical method during the study period.

Independent Variables. Variables are organized under the headings Predisposing, Enabling, and Need Factors to coincide with their placement in the theoretical model. Unless otherwise indicated, all variables are used in all analyses.

Predisposing Factors.

Race. The independent variable of primary interest in these analyses was race. A dichotomous variable was created with the following categories: 1=AIAN , 2=NHW.

Age. Age at time of interview was constructed as a categorical variable from the continuous variable AGER with the following categories: 15-19, 20-24, 25-34, and 35-44 years.

Education. Respondent's education level was constructed into a categorical variable from the variable HIEDUC, which measured the respondent's highest completed year of school or highest degree received. The constructed variable had the following categories: no high school diploma or GED, high school graduate/GED, some college/Associate degree, bachelors degree or higher.

Enabling Factors- All analyses.

Poverty Status. Poverty status was constructed into a dichotomous variable from the variable POVERTY, which captured the respondent's poverty level income status accounting for family size. The created variable contained the categories: $\leq 133\%$ of the Federal Poverty Level (FPL) and $>133\%$ FPL. Medicaid eligibility under the Affordable Care Act has a cut point of 133% FPL. Using this poverty measure allowed for a discussion of potential policy implications associated with Medicaid.

Health Insurance Status. Due to potential endogeneity issues, all models were run once without health insurance variables. The models were re-run including insurance variables to allow for comparability with other studies. Health insurance status was modeled in two ways. First, a person's insurance status for the year was constructed from the variable numnocov. The new dichotomous variable had the following categories: uninsured < 3 months; uninsured 3+ months. This variable allowed for testing of the implications of the ACA's short-term coverage gap exemption.

The type of coverage a person had at the time of interview was also included. The constructed variable had the following categories: private (private plan, Medi-Gap, single service plan), public (Medicaid, CHIP, state-sponsored; Medicare, military, other gov't; IHS), and uninsured. The variable was constructed from the variables, curr_ins and nowcover01-04.

Region of Country. Data from the restricted use file were obtained to measure the region of the country where a respondent lived at the time of interview. States were combined into regions based on the U.S. Census Bureau regions as follows:

- Northeast: ME, NH, VT, MA, RI, CT, NY, NJ, PA
- Midwest: OH, IN, IL, MI, WI, MN, IA, MO, ND, SD, NE, KS
- South: DE, MD, DC, VA, WV, NC, SC, GA, FL, KY, TN, AL, MS, AR, LA, OK, TX
- West: MT, ID, WY, CO, NM, AZ, UT, NV, WA, OR, CA, AK, HI

Rural/Urban Setting. The dichotomous restricted use variable “rural” was used to measure whether a respondent resided in an urban or rural setting.

Enabling Factors- Male Analyses.

Usual Source of Care. For all analyses of the male data, a dichotomous variable (yes/no) was constructed from the variable usualcar, which measured whether a man reported having a place he usually goes when he is sick or needs advice about health. This variable was not available in the female datasets.

Received physical exam. For the analyses of male data measuring use of a BC or STI/HIV service, receipt of a physical exam (physical) was captured by a constructed dichotomous variable (yes/no). This variable was created from the variable physexam, which measured whether a man reported receiving a routine physical exam in the last 12 months. This variable was also not available in the female datasets.

Received testicular exam. For the analyses of male data measuring use of a BC or STI/HIV service, receipt of a testicular exam was captured by a constructed dichotomous variable (yes/no). This variable was created from the variable testichk, which measured whether a man reported having his testicles examined by a doctor or other medical care provider in the past 12 months.

Enabling Factors- Female Analyses.

Pregnancy History. For the analyses of the female data measuring use of SRHS and BC services, a woman’s pregnancy history was measured by a dichotomous constructed variable (ever pregnant/never pregnant). This variable was created from the continuous variable pregnum, which captured the total number of pregnancies a woman had experienced. Pregnancy history is considered an enabling factor because women who have been pregnant are presumed to have greater interactions with the health care system than women who have not been pregnant

Regional Economic Conditions. For selected analyses for Aim 3, average annual state and county unemployment data from the U.S. Bureau of Labor Statistics were used to measure the economic conditions of the region where the respondent lived at the time of interview. The unemployment rates were not seasonally adjusted. Separate models were fit using continuous, standardized unemployment statistics at the county and state levels. Additionally, separate models were fit using the continuous, standardized state unemployment rate for females and the state unemployment rate for males.

Time. For selected analyses for Aim 3, variables measuring whether a woman was interviewed before, during, or after the recession were included. To allow for sensitivity analyses, the time variable was created in several ways. The variable CMINTVW, which captured the month and year a woman was interviewed was used to create the time variables. The following time variables were created:

Recession1: Individuals who were interviewed in 2002, 2003, 2006, or 2007 were coded 0 for the pre-recession period. Respondents interviewed in 2008-2010 were coded 1, representing the Recession/post-Recession period. This time variable matches to the timeline of the Recession, which the NBER reported began in December 2007 and ended in June 2009 (National Bureau of Economic Research, 2013).

Recession2: Individuals who were interviewed in 2002, 2003, 2006, 2007, or January 1-May 31, 2008 were coded 0 for the pre-recession period. Respondents interviewed from June 1, 2008 through 2010 were coded 1, representing the Recession/post-Recession period. Because respondents were asked about service use in the last 12 months, individuals interviewed early on in the Recession period may have used services prior to the start of the Recession. This time variable attempts to adjust for those individuals who may have used services prior to the start of the Recession, but were interviewed after the start of the Recession.

Recession3: Individuals who were interviewed in 2002, 2003, 2006, 2007, and 2008 were coded as 0 for the pre-recession period. Respondents interviewed in 2009 and 2010 were coded 1, representing the Recession/post-Recession period. Like Recession2, this variable attempts to adjust for those individuals who may have used services prior to the start of the Recession, but were interviewed after the start of the Recession. This

measure captures everyone in the pre-recession who might have used services prior to the start of the Recession. It is the most conservative of the Recession measures.

Recession B: Individuals interviewed in 2002, 2003, and June 2006-November 2007 were coded “3” to represent the pre-Recession period, which coincided with the time period before the NBER stated the Recession began in December 2007. Respondents interviewed from December 2007 through November 2008 were coded “2” to represent the early Recession period, which coincided with the U.S. stock market collapse in late 2008. Individuals interviewed from December 2008 through June 2010 were coded “1” for the Recession/Post-Recession period.

All Recession/post-Recession groups included persons interviewed after the end of the Recession because the NSFG asked respondents about service use in the prior 12 months. Additionally, the impacts of the Recession did not immediately cease when the Recession ended. Thus, SRHS use could have continued to have been impacted in the short-term following the end of the Recession.

Linear Time Trend. A continuous variable measuring interview year was also created to capture changes in SRHS use over time that may have been unrelated to the Recession.

State Fixed Effects. Dummy variables for each state were created to capture unobserved state-level characteristics that may be associated with SRHS use that should be controlled for when assessing for the impact of the Recession.

Use of SRHS. For analyses of birth control use for Aim 3, SRHS use, a dichotomous variable (yes/no) measuring whether a woman used any sexual or reproductive health service in the last 12 months, was included as a predictor variable. The specifications for the creation of this variable can be found in the description of SRHS under the dependent variable section for Aim 1.

Need Factors- All Analyses.

Marital/Cohabitation Status. A constructed dichotomous measure of marital and cohabitation status was created from the variable rmarital with the following categories: currently married or cohabiting; never married or not currently cohabiting, including persons who were widowed, divorced, and separated.

Number of Sexual Partners Past Year. A categorical variable capturing the number of opposite-sex sexual partners a person had in the past year was created from the variables *partslr* and *hadsex*. The created variable consisted of the following categories: never had sex; had sex, but no partners in the last 12 months; 1 partner in the last 12 months; 2+ partners in the last 12 months.

General Health Status. A dichotomous variable was constructed to capture a person's self-reported general health status from the variable *genhealt* and consisted of the categories: excellent/very good/good health; fair/poor health. Decisions regarding the creation of this variable were made based on sample size and previous research utilizing self-rated general health status as a measure.

Need Factors- Female Analyses.

Fecundity. For all analyses of the female data sets, except for the birth control use analyses, a woman's fertility status was constructed from the variable *fecund*, which captured a woman's fertility status based on a number of other fertility measures in the study. The constructed variable consisted of the categories: surgically sterile; impaired sterility (sterile-nonsurgical, subfecund, infertile for 36+ months); fecund.

History of Gynecological Problems. A dichotomous variable (ever had gynecological problem/never had), was constructed from a series of questions asking whether a woman had ever been diagnosed with ovarian cysts, uterine fibroids, endometriosis, or ovulation problems, or had ever been treated for pelvic inflammatory disorder.

Data Analyses

All statistical analyses were conducted through the NCHS Research Data Center's ANDRE system using SAS software, version 9.2 (SAS Institute, Inc., Cary, NC). To account for the complex sampling design of the survey, the SAS SURVEY command series, which allows for the inclusion of stratum, panel, and weight variables, was used for all analyses. SAS SURVEY commands utilize the Taylor series approximation variance estimation procedure. The sample weights, provided by the NSFG staff, adjust for over- and under-sampling of specific subgroups, nonresponse bias and adjust

estimates to U.S. Census Bureau projections of the number of persons in each age-sex-race-ethnicity subgroup.

Descriptive Analyses. Most variables in these analyses are categorical. For these variables, frequency distributions and proportions were run for the full sample and stratified by race. Chi-square tests were run to assess for significant differences in proportions for the independent and dependent variables between racial groups.

Means and standard deviations were obtained for the few continuous and ordinal variables for the full sample and also stratified by race. Chi-square tests were conducted for each independent variable to assess for differences in distributions by race. Using the PROC GAM command, the continuous independent variables age, education, and poverty, were plotted against the dependent variables to assess for normality. None of the continuous independent variables had a linear relationship. Age had a quadratic relationship with the dependent variables in the female analyses and education had a quadratic relationship with the dependent variables in the male analyses. Instead of utilizing quadratic terms for age and education in selected models, categorical versions of age, education, and poverty were selected for inclusion in the final models to allow for continuity of independent variables among aims and to improve interpretability. The continuous unemployment rate variables in Aim 3 were standardized to have a mean of 0 and a standard deviation of 1 before being included in regression models.

All independent variables were cross-tabulated against each other and tests of significance were run to assess multicollinearity. Several independent variables (unintended pregnancy history, number of lifetime sexual partners, age at menarche, mother's and father's educational attainment, and employment status) were dropped from the models based on these assessments.

Missingness was assessed for all variables. Because the NSFG staff imputed values for many of the most commonly used variables (e.g. age, poverty, education), few individuals lacked sufficient data to be included in analyses. In the event that a person's response was missing for a variable, they were excluded from the analysis. Missingness in regression analyses never exceeded 1.2% of the total AIAN and NHW sample.

Sensitivity analyses were run to determine if the missing values would impact results. I found no evidence that the missing values could change the results.

Cross-tabulations and tests of significance were run for the dependent variables against all independent variables selected for inclusion in regression models. These analyses were conducted to better understand the bivariate relationship between the covariates and dependent variables. These analyses were run for the full sample and stratified by race. All bivariate analyses used weighted data.

Regression Analyses.

Aim 1. Explore differences in sexual and reproductive health service use in the last 12 months by AIAN women compared to non-Hispanic whites, and examine variations by selected characteristics.

- Hypothesis 1.1: AIAN women are less likely to report a sexual and reproductive health service visit or contraceptive visit in the past 12 months than non-Hispanic white women, after adjusting for covariates.
- Hypothesis 1.2: Sexual and reproductive health service utilization varies by predisposing, enabling, and need factors.

Three logistic regression models were fit for Aim 1 to estimate the likelihood of receiving specific SRHS in the last 12 months. The equations for these models are presented below. Each regression model was run for the full sample, with and without survey weights. Interaction terms between the race variable and the poverty, age, rural setting, region, and insurance measures were all included together in the model to determine whether the impact of these variables on the use of SRHS varied between AIANs and NHWs. Odds ratios and average changes in predicted probabilities were obtained.

The same models were run separately for each racial group with the race and interaction terms removed. Running the models separately by race allowed for a deeper understanding of the association between the independent variables and SRHS use specific to the AIAN population.

Due to the numerous interaction terms included in the model and the potential for insufficient power to detect differences in service use by race, models that included only

significant interaction terms were also run. Interaction terms were selected by adding one interaction term at a time and evaluating its significance (p-value was less than 0.05).

Equation 1.

$$y = \begin{cases} 1, & \text{if used any birth control service in last 12 months} \\ 0, & \text{if not used any birth control service in last 12 months} \end{cases}$$

p = probability of using any birth control service in last 12 months

$$\begin{aligned} \text{logit}(p) = & \alpha + \beta_1(\text{AIAN_NHW}) + \beta_2(\text{Age}_1) + \beta_3(\text{Age}_2) + \beta_4(\text{Age}_3) + \beta_5(\text{Education}_1) + \\ & \beta_6(\text{Education}_2) + \beta_7(\text{Education}_3) + \beta_8(\text{Rural}) + \beta_9(\text{Region}_1) + \beta_{10}(\text{Region}_2) + \beta_{11}(\text{Region}_3) \\ & + \beta_{12}(\text{Poverty}) + \beta_{13}(\text{Public Insurance}) + \beta_{14}(\text{Uninsured}) + \beta_{15}(\text{Not married/cohabiting}) + \\ & \beta_{16}(\text{Sexual partners}_1) + \beta_{17}(\text{Sexual partners}_2) + \beta_{18}(\text{Sexual partners}_4) + \beta_{19}(\text{Fair/poor} \\ & \text{health}) + \beta_{20}(\text{Never gynecological problem}) + \beta_{21}(\text{Never pregnant}) + \beta_{22}(\text{Surgically} \\ & \text{sterile}) + \beta_{23}(\text{Subfecund}) + \beta_{24}(\text{AIAN_NHW*Age}_1) + \beta_{25}(\text{AIAN_NHW*Age}_2) + \\ & \beta_{26}(\text{AIAN_NHW*Age}_3) + \beta_{27}(\text{AIAN_NHW*Rural}) + \beta_{28}(\text{AIAN_NHW*Region}_1) + \\ & \beta_{29}(\text{AIAN_NHW*Region}_2) + \beta_{30}(\text{AIAN_NHW*Region}_3) + \beta_{31}(\text{AIAN_NHW*Poverty}) + \\ & \beta_{32}(\text{AIAN_NHW*Public Insurance}) + \beta_{33}(\text{AIAN_NHW*Uninsured}) \end{aligned}$$

Equation 2.

$$y = \begin{cases} 1, & \text{if used any STI/HIV service in last 12 months} \\ 0, & \text{if not used any STI/HIV service in last 12 months} \end{cases}$$

p = probability of using any STI/HIV service in last 12 months

$$\begin{aligned} \text{logit}(p) = & \alpha + \beta_1(\text{AIAN_NHW}) + \beta_2(\text{Age}_1) + \beta_3(\text{Age}_2) + \beta_4(\text{Age}_3) + \beta_5(\text{Education}_1) + \\ & \beta_6(\text{Education}_2) + \beta_7(\text{Education}_3) + \beta_8(\text{Rural}) + \beta_9(\text{Region}_1) + \beta_{10}(\text{Region}_2) + \beta_{11}(\text{Region}_3) \\ & + \beta_{12}(\text{Poverty}) + \beta_{13}(\text{Public Insurance}) + \beta_{14}(\text{Uninsured}) + \beta_{15}(\text{Not married/cohabiting}) + \\ & \beta_{16}(\text{Sexual partners}_1) + \beta_{17}(\text{Sexual partners}_2) + \beta_{18}(\text{Sexual partners}_4) + \beta_{19}(\text{Fair/poor} \end{aligned}$$

health) + β_{20} (Never gynecological problem) + β_{21} (AIAN_NHW*Age₁) +
 β_{22} (AIAN_NHW*Age₂) + β_{23} (AIAN_NHW*Age₃) + β_{24} (AIAN_NHW*Rural) +
 β_{25} (AIAN_NHW*Region₁) + β_{26} (AIAN_NHW*Region₂) + β_{27} (AIAN_NHW*Region₃) +
 β_{28} (AIAN_NHW*Poverty) + β_{29} (AIAN_NHW*Public Insurance) +
 β_{30} (AIAN_NHW*Uninsured)

Equation 3.

$$y = \begin{cases} 1, & \text{if used any SRHS in last 12 months} \\ 0, & \text{if not used any SRHS in last 12 months} \end{cases}$$

p = probability of using any SRHS in last 12 months

logit (p) = α + β_1 (AIAN_NHW) + β_2 (Age₁) + β_3 (Age₂) + β_4 (Age₃) + β_5 (Education₁) +
 β_6 (Education₂) + β_7 (Education₃) + β_8 (Rural) + β_9 (Region₁) + β_{10} (Region₂) + β_{11} (Region₃) +
 β_{12} (Poverty) + β_{13} (Public Insurance) + β_{14} (Uninsured) + β_{15} (Not married/cohabiting) +
 β_{16} (Sexual partners₁) + β_{17} (Sexual partners₂) + β_{18} (Sexual partners₄) + β_{19} (Fair/poor
health) + β_{20} (Never gynecological problem) + β_{21} (Never pregnant) + β_{22} (Surgically
sterile) + β_{23} (Subfecund) + β_{24} (AIAN_NHW*Age₁) + β_{25} (AIAN_NHW*Age₂) +
 β_{26} (AIAN_NHW*Age₃) + β_{27} (AIAN_NHW*Rural) + β_{28} (AIAN_NHW*Region₁) +
 β_{29} (AIAN_NHW*Region₂) + β_{30} (AIAN_NHW*Region₃) + β_{31} (AIAN_NHW*Poverty) +
 β_{32} (AIAN_NHW*Public Insurance) + β_{33} (AIAN_NHW*Uninsured)

Aim 2. Explore differences in sexual and reproductive health service use in the last 12 months by AIAN men compared to non-Hispanic whites, and examine variations by selected characteristics.

- Hypothesis 2.1: AIAN men are more likely to report a sexual and reproductive health service visit in the past 12 months than non-Hispanic white men, after adjusting for covariates.

- Hypothesis 2.2: Sexual and reproductive health service utilization varies by predisposing, enabling, and need factors.

Two logistic regression models were fit for Aim 2 to estimate the likelihood of receiving specific SRHS in the last 12 months. The equations for these models are presented below. Each regression model was run for the full sample. Interaction terms between the race variable and the poverty, age, rural setting, region, and insurance measures were included to determine whether the impact of these variables on the use of SRHS varies by race. Odds ratios and average changes in predicted probabilities were obtained.

The same models were run separately for each racial group with the race and interaction terms removed. Running the models separately by race allowed for an understanding of the association between the independent and SRHS use specific to the AIAN population.

Due to concerns regarding insufficient power to detect differences in service use by race because of the inclusion of numerous predictor variables, reduced models that included only significant interaction terms were also fit.

Equation 1.

$$y = \begin{cases} 1, & \text{if used any birth control service in last 12 months} \\ 0, & \text{if not used any birth control service in last 12 months} \end{cases}$$

p = probability of using any birth control service in last 12 months

$$\begin{aligned} \text{logit}(p) = & \alpha + \beta_1(\text{AIAN_NHW}) + \beta_2(\text{Age}_1) + \beta_3(\text{Age}_2) + \beta_4(\text{Age}_3) + \beta_5(\text{Education}_1) + \\ & \beta_6(\text{Education}_2) + \beta_7(\text{Education}_3) + \beta_8(\text{Rural}) + \beta_9(\text{Region}_1) + \beta_{10}(\text{Region}_2) + \beta_{11}(\text{Region}_3) \\ & + \beta_{12}(\text{Poverty}) + \beta_{13}(\text{Public Insurance}) + \beta_{14}(\text{Uninsured}) + \beta_{15}(\text{Usual source of care}) + \\ & \beta_{16}(\text{No physical exam}) + \beta_{17}(\text{No testicular exam}) + \beta_{18}(\text{Not married/cohabiting}) + \\ & \beta_{19}(\text{Sexual partners}_1) + \beta_{20}(\text{Sexual partners}_2) + \beta_{21}(\text{Sexual partners}_4) + \beta_{22}(\text{Fair/poor} \\ & \text{health}) + \beta_{23}(\text{AIAN_NHW*Age}_1) + \beta_{24}(\text{AIAN_NHW*Age}_2) + \beta_{25}(\text{AIAN_NHW*Age}_3) + \\ & \beta_{26}(\text{AIAN_NHW*Rural}) + \beta_{27}(\text{AIAN_NHW*Region}_1) + \beta_{28}(\text{AIAN_NHW*Region}_2) + \end{aligned}$$

$$\beta_{29}(\text{AIAN_NHW*Region}_3) + \beta_{30}(\text{AIAN_NHW*Poverty}) + \beta_{31}(\text{AIAN_NHW*Public Insurance}) + \beta_{32}(\text{AIAN_NHW*Uninsured})$$

Equation 2.

$$y = \begin{cases} 1, & \text{if used any STI/HIV service in last 12 months} \\ 0, & \text{if not used any STI/HIV service in last 12 months} \end{cases}$$

p = probability of using any STI/HIV service in last 12 months

$$\begin{aligned} \text{logit}(p) = & \alpha + \beta_1(\text{AIAN_NHW}) + \beta_2(\text{Age}_1) + \beta_3(\text{Age}_2) + \beta_4(\text{Age}_3) + \beta_5(\text{Education}_1) + \\ & \beta_6(\text{Education}_2) + \beta_7(\text{Education}_3) + \beta_8(\text{Rural}) + \beta_9(\text{Region}_1) + \beta_{10}(\text{Region}_2) + \beta_{11}(\text{Region}_3) \\ & + \beta_{12}(\text{Poverty}) + \beta_{13}(\text{Public Insurance}) + \beta_{14}(\text{Uninsured}) + \beta_{15}(\text{Usual source of care}) + \\ & \beta_{16}(\text{No physical exam}) + \beta_{17}(\text{No testicular exam}) + \beta_{18}(\text{Not married/cohabiting}) + \\ & \beta_{19}(\text{Sexual partners}_1) + \beta_{20}(\text{Sexual partners}_2) + \beta_{21}(\text{Sexual partners}_4) + \beta_{22}(\text{Fair/poor} \\ & \text{health}) + \beta_{23}(\text{AIAN_NHW*Age}_1) + \beta_{24}(\text{AIAN_NHW*Age}_2) + \beta_{25}(\text{AIAN_NHW*Age}_3) + \\ & \beta_{26}(\text{AIAN_NHW*Rural}) + \beta_{27}(\text{AIAN_NHW*Region}_1) + \beta_{28}(\text{AIAN_NHW*Region}_2) + \\ & \beta_{29}(\text{AIAN_NHW*Region}_3) + \beta_{30}(\text{AIAN_NHW*Poverty}) + \beta_{31}(\text{AIAN_NHW*Public} \\ & \text{Insurance}) + \beta_{32}(\text{AIAN_NHW*Uninsured}) \end{aligned}$$

Aim 3. Compare sexual and reproductive health service use by AIAN women to non-Hispanic whites before and after the start of the Recession, controlling for select characteristics.

- Hypothesis 3.1: AIAN women report using fewer sexual and reproductive health services after the start of the Recession than before, after adjusting for covariates.
- Hypothesis 3.2: AIAN women are less likely to report using a birth control method after the start of the Recession than before, after adjusting for covariates.
- Hypothesis 3.3: AIAN women report using different birth control methods before and after the start of the Recession, after adjusting for covariates.

In addition to the descriptive statistics already described, several other statistical procedures were run for Aim 3. Average individual unemployment rates from the NSFG were calculated and tests of significance were run for each year of the survey and for the recessionary cut points. The same tests were conducted using state, county, state female, and state male unemployment statistics from the U.S. Bureau of Labor Statistics. Additionally, mean unemployment rates by time (year or recession period) were calculated stratified by the dependent variables. Cross-tabulations and tests of significance between unemployment rates and the dependent variables were run using categorical versions of the state and county unemployment data.

Several logistic regression models were fit to assess the relationship between the economic recession, race, and SRHS and birth control use. The main independent variables of interest are race and impact of the economic recession. The impact of the economic recession was measured in two ways. First, state and county unemployment data from the U.S. Bureau of Labor Statistics were used. Unemployment rates were matched to each respondent's state or county of residency for the year they were interviewed (Equation 1, 2). Second, a dichotomous variable capturing the time points of pre-recession and during/after recession (referred to here as post-recession) (Equation 3, 4, 5) was created. Additionally, a linear time trend variable was utilized (Equation 2, 5). Interaction terms between the race variable and the economic recession measures were included to determine whether the impact of the recession on the use of SRHS and birth

control varies by race. The models were all run for the full sample and separately by race, with the race and interaction terms removed. Each equation below was fitted for each dependent variable of interest:

- 1) Use of any SRHS
- 2) Use of any BC service
- 3) Use of any BC method
- 4) Use of any medical BC method

The same covariates are used in the BC method analyses, with the following exceptions.

- Not included: fecundity status and number of sexual partners
- Added: use of SRHS

Equation 1. Impact of the recession measured by unemployment data.

Unemployment data was modeled in four ways: state unemployment rate-full population, state unemployment rate-females, state unemployment rate-males, county unemployment rate.

$$y = \begin{cases} 1, & \text{if used any SRHS in last 12 months} \\ 0, & \text{if not used any SRHS in last 12 months} \end{cases}$$

p = probability of using any SRHS in last 12 months

$$\begin{aligned} \text{logit}(p) = & \alpha + \beta_1(\text{AIAN_NHW}) + \beta_2(\text{Age}_1) + \beta_3(\text{Age}_2) + \beta_4(\text{Age}_3) + \beta_5(\text{Education}_1) + \\ & \beta_6(\text{Education}_2) + \beta_7(\text{Education}_3) + \beta_8(\text{Rural}) + \beta_9(\text{Region}_1) + \beta_{10}(\text{Region}_2) + \beta_{11}(\text{Region}_3) \\ & + \beta_{12}(\text{Poverty}) + \beta_{13}(\text{Public Insurance}) + \beta_{14}(\text{Uninsured}) + \beta_{15}(\text{Not married/cohabiting}) + \\ & \beta_{16}(\text{Sexual partners}_1) + \beta_{17}(\text{Sexual partners}_2) + \beta_{18}(\text{Sexual partners}_4) + \beta_{19}(\text{Fair/poor} \\ & \text{health}) + \beta_{20}(\text{Never gynecological problem}) + \beta_{21}(\text{Never pregnant}) + \beta_{22}(\text{Surgically} \\ & \text{sterile}) + \beta_{23}(\text{Subfecund}) + \beta_{24}(\text{Unemployment Rate}) + \beta_{25}(\text{AIAN_NHW*Age}_1) + \\ & \beta_{26}(\text{AIAN_NHW*Age}_2) + \beta_{27}(\text{AIAN_NHW*Age}_3) + \beta_{28}(\text{AIAN_NHW*Rural}) + \\ & \beta_{29}(\text{AIAN_NHW*Region}_1) + \beta_{30}(\text{AIAN_NHW*Region}_2) + \beta_{31}(\text{AIAN_NHW*Region}_3) + \end{aligned}$$

$$\beta_{32}(\text{AIAN_NHW*Poverty}) + \beta_{33}(\text{AIAN_NHW*Public Insurance}) + \\ \beta_{34}(\text{AIAN_NHW*Uninsured}) + \beta_{35}(\text{AIAN_NHW*Unemployment Rate})$$

Equation 2. Impact of the recession measured by unemployment data and a linear time trend, indexed by a respondent's year of interview was included. Unemployment data was modeled in four ways: state unemployment rate-full population, state unemployment rate-females, state unemployment rate-males, county unemployment rate. Unemployment rate is indexed by a respondent's residential location and time of interview. The time trend was included to rule out changes in SRHS use over time due to factors unrelated to the Recession.

The time trend was modeled in several ways with a reduced model to determine the best way to measure the association between time and service use. Comparisons of AICs were made for models with a flat time trend, a linear time trend, and time entered into the model as a categorical variable. A flat time trend, measured by the absence of a time variable, in the model, would indicate that service use did not change over time. In the SRHS and birth control service models, the linear time trend was preferred. In the birth control at interview and birth control requiring a medical visit models, a flat time trend was preferred.

$$y = \begin{cases} 1, & \text{if used any SRHS in last 12 months} \\ 0, & \text{if not used any SRHS in last 12 months} \end{cases}$$

p = probability of using any SRHS in last 12 months

$$\text{logit}(p) = \alpha + \beta_1(\text{AIAN_NHW}) + \beta_2(\text{Age}_1) + \beta_3(\text{Age}_2) + \beta_4(\text{Age}_3) + \beta_5(\text{Education}_1) + \\ \beta_6(\text{Education}_2) + \beta_7(\text{Education}_3) + \beta_8(\text{Rural}) + \beta_9(\text{Region}_1) + \beta_{10}(\text{Region}_2) + \beta_{11}(\text{Region}_3) \\ + \beta_{12}(\text{Poverty}) + \beta_{13}(\text{Public Insurance}) + \beta_{14}(\text{Uninsured}) + \beta_{15}(\text{Not married/cohabiting}) + \\ \beta_{16}(\text{Sexual partners}_1) + \beta_{17}(\text{Sexual partners}_2) + \beta_{18}(\text{Sexual partners}_4) + \beta_{19}(\text{Fair/poor} \\ \text{health}) + \beta_{20}(\text{Never gynecological problem}) + \beta_{21}(\text{Never pregnant}) + \beta_{22}(\text{Surgically} \\ \text{sterile}) + \beta_{23}(\text{Subfecund}) + \beta_{24}(\text{Unemployment Rate}_{ij}) + \beta_{25}(\text{AIAN_NHW*Age}_1) +$$

$$\beta_{26}(\text{AIAN_NHW*Age}_2) + \beta_{27}(\text{AIAN_NHW*Age}_3) + \beta_{28}(\text{AIAN_NHW*Rural}) + \\ \beta_{29}(\text{AIAN_NHW*Region}_1) + \beta_{30}(\text{AIAN_NHW*Region}_2) + \beta_{31}(\text{AIAN_NHW*Region}_3) + \\ \beta_{32}(\text{AIAN_NHW*Poverty}) + \beta_{33}(\text{AIAN_NHW*Public Insurance}) + \\ \beta_{34}(\text{AIAN_NHW*Uninsured}) + \beta_{35}(\text{AIAN_NHW*Unemployment Rate}_{ij}) + \beta_{36}(\text{Time}_i)$$

Equation 3. Impact of the recession is measured by time cut points for pre- and post-recessionary periods. Recession was modeled in five ways:

Recession1:

- pre-recession: 2002, 2003, 2006, 2007
- post-recession 2008-2010

Recession2:

- pre-recession: 2002, 2003, 2006, 2007, Jan1-May31 2008
- post-recession Jun1 2008-2010

Recession3:

- pre-recession: 2002, 2003, 2006, 2007, 2008
- post-recession 2009, 2010

Recession_B:

- pre-recession: 2002, 2003, 2006, Jan-Nov2007
- early recession: Dec07-Nov08
- post-recession: Dec08-Jun2010

Linear time trend variable:

- year of interview: 2002, 2003, 2006, 2007, 2008, 2009, 2010

$$y = \begin{cases} 1, & \text{if used any SRHS in last 12 months} \\ 0, & \text{if not used any SRHS in last 12 months} \end{cases}$$

p = probability of using any SRHS in last 12 months

$$\text{logit}(p) = \alpha + \beta_1(\text{AIAN_NHW}) + \beta_2(\text{Age}_1) + \beta_3(\text{Age}_2) + \beta_4(\text{Age}_3) + \beta_5(\text{Education}_1) + \\ \beta_6(\text{Education}_2) + \beta_7(\text{Education}_3) + \beta_8(\text{Rural}) + \beta_9(\text{Region}_1) + \beta_{10}(\text{Region}_2) + \beta_{11}(\text{Region}_3) + \\ + \beta_{12}(\text{Poverty}) + \beta_{13}(\text{Public Insurance}) + \beta_{14}(\text{Uninsured}) + \beta_{15}(\text{Not married/cohabiting}) +$$

$$\begin{aligned}
& \beta_{16}(\text{Sexual partners}_1) + \beta_{17}(\text{Sexual partners}_2) + \beta_{18}(\text{Sexual partners}_4) + \beta_{19}(\text{Fair/poor health}) + \beta_{20}(\text{Never gynecological problem}) + \beta_{21}(\text{Never pregnant}) + \beta_{22}(\text{Surgically sterile}) + \beta_{23}(\text{Subfecund}) + \beta_{24}(\text{Post-recession}) + \beta_{25}(\text{AIAN_NHW*Age}_1) + \\
& \beta_{26}(\text{AIAN_NHW*Age}_2) + \beta_{27}(\text{AIAN_NHW*Age}_3) + \beta_{28}(\text{AIAN_NHW*Rural}) + \\
& \beta_{29}(\text{AIAN_NHW*Region}_1) + \beta_{30}(\text{AIAN_NHW*Region}_2) + \beta_{31}(\text{AIAN_NHW*Region}_3) + \\
& \beta_{32}(\text{AIAN_NHW*Poverty}) + \beta_{33}(\text{AIAN_NHW*Public Insurance}) + \\
& \beta_{34}(\text{AIAN_NHW*Uninsured}) + \beta_{35}(\text{AIAN_NHW*Post-Recession})
\end{aligned}$$

Equation 4. Impact of the Recession is measured by time cut points for pre- and post-recessionary periods. Additionally, state fixed effects were added to the model to control for differences in unmeasured state characteristics that may have influenced the use of services.

$$y = \begin{cases} 1, & \text{if used any SRHS in last 12 months} \\ 0, & \text{if not used any SRHS in last 12 months} \end{cases}$$

p = probability of using any SRHS in last 12 months

$$\begin{aligned}
\text{logit}(p) = & \alpha + \beta_1(\text{AIAN_NHW}) + \beta_2(\text{Age}_1) + \beta_3(\text{Age}_2) + \beta_4(\text{Age}_3) + \beta_5(\text{Education}_1) + \\
& \beta_6(\text{Education}_2) + \beta_7(\text{Education}_3) + \beta_8(\text{Rural}) + \beta_9(\text{Poverty}) + \beta_{10}(\text{Public Insurance}) + \\
& \beta_{11}(\text{Uninsured}) + \beta_{12}(\text{Not married/cohabiting}) + \beta_{13}(\text{Sexual partners}_1) + \beta_{14}(\text{Sexual partners}_2) + \beta_{15}(\text{Sexual partners}_4) + \beta_{16}(\text{Fair/poor health}) + \beta_{17}(\text{Never gynecological problem}) + \beta_{18}(\text{Never pregnant}) + \beta_{19}(\text{Surgically sterile}) + \beta_{20}(\text{Subfecund}) + \beta_{21}(\text{Post-recession}) + \beta_{26}(\text{AIAN_NHW*Age}_1) + \beta_{27}(\text{AIAN_NHW*Age}_2) + \\
& \beta_{28}(\text{AIAN_NHW*Age}_3) + \beta_{29}(\text{AIAN_NHW*Rural}) + \beta_{30}(\text{AIAN_NHW*Poverty}) + \\
& \beta_{31}(\text{AIAN_NHW*Public Insurance}) + \beta_{32}(\text{AIAN_NHW*Uninsured}) + \\
& \beta_{33}(\text{AIAN_NHW*Post-Recession}) + \beta_{34-80}(\text{State})
\end{aligned}$$

Equation 5. A linear probability model was fit to assess the impact of the recession controlling for state fixed effects and a linear time trend. Recession was

measured by recession cut points like in Equations 3 and 4. The linear time trend variable assessed for changes over time due to other unmeasured factors. An interaction between state and time was added to the model. The interaction term controlled for differences in unmeasured state level characteristics that may have changed over time.

$$y = \begin{cases} 1, & \text{if used any SRHS in last 12 months} \\ 0, & \text{if not used any SRHS in last 12 months} \end{cases}$$

p = probability of using any SRHS in last 12 months

$$\begin{aligned} y = & \beta_0 + \beta_1(\text{AIAN_NHW}) + \beta_2(\text{Age}_1) + \beta_3(\text{Age}_2) + \beta_4(\text{Age}_3) + \beta_5(\text{Education}_1) + \\ & \beta_6(\text{Education}_2) + \beta_7(\text{Education}_3) + \beta_8(\text{Rural}) + \beta_9(\text{Poverty}) + \beta_{10}(\text{Public Insurance}) + \\ & \beta_{11}(\text{Uninsured}) + \beta_{12}(\text{Not married/cohabiting}) + \beta_{13}(\text{Sexual partners}_1) + \beta_{14}(\text{Sexual} \\ & \text{partners}_2) + \beta_{15}(\text{Sexual partners}_4) + \beta_{16}(\text{Fair/poor health}) + \beta_{17}(\text{Never gynecological} \\ & \text{problem}) + \beta_{18}(\text{Never pregnant}) + \beta_{19}(\text{Surgically sterile}) + \beta_{20}(\text{Subfecund}) + \\ & \beta_{21}(\text{Recession}) + \beta_{26}(\text{AIAN_NHW*Age}_1) + \beta_{27}(\text{AIAN_NHW*Age}_2) + \\ & \beta_{28}(\text{AIAN_NHW*Age}_3) + \beta_{29}(\text{AIAN_NHW*Rural}) + \beta_{30}(\text{AIAN_NHW*Poverty}) + \\ & \beta_{31}(\text{AIAN_NHW*Public Insurance}) + \beta_{32}(\text{AIAN_NHW*Uninsured}) + \\ & \beta_{33}(\text{AIAN_NHW*Recession}) + \beta_{34-80}(\text{State}) + \\ & \beta_{81-127}(\text{State*Linear Time Trend}) + \mu \end{aligned}$$

To assess for potential biases in the analysis caused by a time trend, the SURVEYMEANS command was used to obtain the mean number of SRHS used by AIANs in 1995 and in 2002. The SURVEYREG command was then used to assess for significant differences in means by survey year.

All regression models were run with un-weighted data. Aim 1 and 2 analyses were also run with weighted data to allow for comparison. Adjustments for multiple comparisons were made using the Benjamini-Hochberg method, which limited the false discovery rate to be at most 5%. Model fit for all models in all aims was assessed by pseudo-R². Model selection statistics, including AIC and BIC were obtained.

Figure 1. Andersen's Behavioral Model of Health Services Use

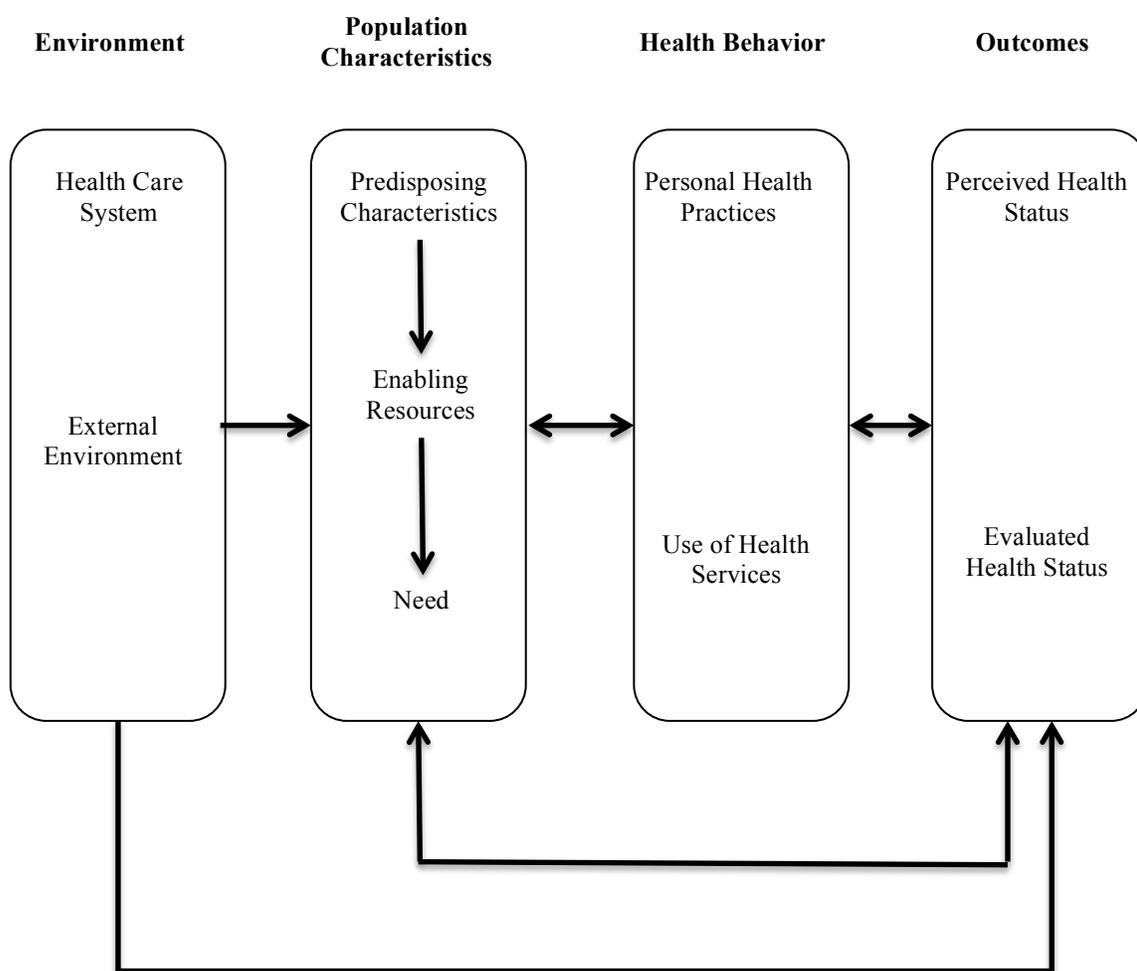
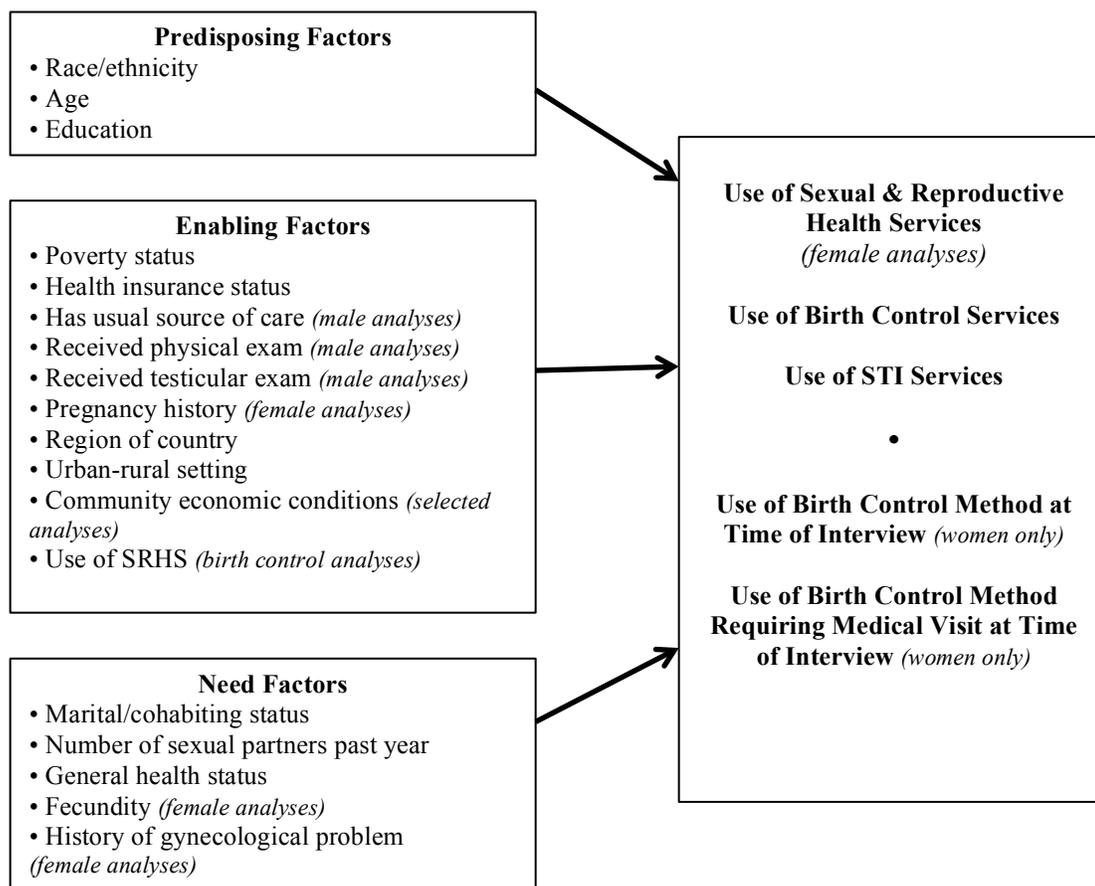


Figure adapted from Andersen, R. M. (1995). Revisiting the Behavioral Model and access to medical care: does it matter? *Journal of Health and Social Behavior*, 36(March), 1-10.

Figure 2. Project Conceptual Framework



Chapter 4: Results

In this chapter I report the results of the analyses I conducted to test each research hypothesis. I present the results separately for each specific aim. Within each aim, I report characteristics of the AIAN sample compared to the NHW sample. I also summarize results of the bivariate and logistic regression analyses.

Aim 1 Results

Aim 1: Explore differences in sexual and reproductive health service use in the last 12 months by AIAN women compared to NHW women, and examine variations by selected characteristics.

Sample Characteristics. In Table 1.1, I provide the weighted demographic and sexual health characteristics for the full sample and separately for AIAN and NHW women. The sample consisted of 7,015 women, 819 AIANs (12%) and 6,196 NHWs (88%). The average age of AIAN women was 29 years. AIANs had low levels of education: over 40% did not have a high school diploma, while less than 10% had a bachelor's degree. Over half of AIANs had family incomes at or below 133% FPL. About one-third of AIANs had public insurance, 44% were uninsured, and 24% had private insurance. AIANs were more likely to live in urban than rural areas, and over half lived in the Western U.S. Over half of AIANs were married or cohabiting. Most women in the sample were fertile, were sexually active in the past year, and most had only one sexual partner. AIANs were generally in good overall health and just under one-quarter reported a gynecological problem. Seventy-percent of AIANs had ever been pregnant.

NHW women were similar in age to AIANs and similar proportions were married and sexually active. However, NHW women were significantly more educated, more likely to live in the Midwest and South, had higher family incomes, were less likely to be publicly insured or uninsured, were less likely to report fair/poor health, and more likely to report a gynecological problem (Table 1.1).

Service Use. Over two thirds (68%) of AIAN women used at least one SRHS, 35% used a birth control service, and 25% used an STI/HIV service in the last 12 months (Table 1.2). AIANs were more likely to use Pap smears, pelvic exams, and birth control method provision than any other SRHS.

Similar proportions of AIAN and NHW women used SRHS overall and STI/HIV services. However, AIANs were less likely to use birth control services. Interestingly, even though rates of birth control and sterilization counseling were similar for both racial groups, AIAN women were less likely to receive a birth control method.

AIAN women were also less likely to use preventive SRHS, including a Pap smear or pelvic exam. In contrast, AIANs were significantly more likely than NHWs to use an HIV test. Additionally, AIANs were more likely than NHWs to use pregnancy related services, including an abortion, pregnancy test, prenatal care, or post-partum care.

Bivariate Results- Factors Associated with SRHS Use. In Table 1.3, I provide the results of chi-square tests I used to assess for associations between service use and the selected covariates. For AIANs, factors significantly associated with service use in bivariate analyses, included:

- AIAN women who had ever been pregnant were more likely than AIAN women who had never been pregnant to report using SRHS.
- AIAN women who were sexually active in the past year were more likely than AIAN women who had never had sex or had not had sex in the past year to report using SRHS, BC, and STI/HIV services.
- AIAN women who were aged 20-34 were more likely to report using SRHS, BC, and STI/HIV services compared to AIAN women aged 15-19 and 35-44.
- SRHS use was greater for AIAN women with a bachelor's degree than AIAN women with lower levels of education.
- Married/cohabiting AIAN women were more likely to use SRHS, but not BC or STI/HIV services than AIAN women who had never been married or who were not currently cohabiting.
- AIAN women with public insurance were more likely than privately insured and uninsured AIAN women to use STI/HIV services.

Similar factors were significantly associated with SRHS use among NHWs. Additionally, rural/urban residency, region, poverty status, general health status, and history of a gynecological problem were significantly associated with service use for the NHW sample (Table 1.4).

Regression Results.

Hypothesis 1.1: AIAN women are less likely to report a SRHS visit or BC service visit in the past 12 months than NHW women, after adjusting for covariates.

I found that racial disparities in service use varied by service type and subgroup (Table 1.5). After adjusting for covariates, AIAN women were as likely or less likely than NHW women to use SRHS and BC services. However, AIAN women were as likely or more likely to use STI/HIV services than NHW women. Significant disparities in service use included:

- Among urban women, AIANs were 40% less likely than NHWs to use SRHS and BC services, but 40% more likely to use STI/HIV services.
- Among Southern women, AIANs were 60% less likely to use BC services than NHWs. In contrast, among Northeastern women, AIANs were 130% more likely than NHWs to use STI/HIV services.
- Among women with incomes above 133% FPL, AIANs were 30% less likely to use BC services, but 40% more likely to use STI/HIV services than NHWs.
- AIAN women aged 25-34 were more likely to use STI/HIV services than their NHW counterparts.
- Although I found no significant racial differences in SRHS or BC service use for each insurance subgroup, among privately insured women AIANs were 70% more likely than NHWs to use STI/HIV services.

Hypothesis 1.2: SRHS utilization varies by predisposing, enabling, and need factors.

To determine which factors were associated with SRHS use for AIANs, I conducted logistic regression analyses on the AIAN subsample. In Table 1.6, I present the results of these analyses. I also include results for the NHW subsample in Table 1.7 to allow for comparison.

Few covariates were significantly associated with service use among AIAN women, after controlling for covariates. These relationships varied by service type, but the directions of these associations were generally consistent with associations previous researchers have identified. Additionally, most factors that were significantly associated with service use in bivariate analyses remained significant in multivariate analyses. Factors significantly associated with service use, included age, number of sexual partners, rural/urban residency, pregnancy history, fecundity status, and health insurance status. Important findings included:

- Younger AIAN women were more likely than AIAN women aged 35-44 to use SRHS, BC, and STI/HIV services.
- AIAN women who had never had sex or had not had sex in the past year were 70-100% less likely to use SRHS, BC, and STI/HIV services. In contrast, AIAN women with two or more partners were 140% more likely than AIAN women with one partner to use STI/HIV services.
- Rural AIAN women were 40% more likely to use SRHS than urban AIANs. Interestingly, rural/urban residency was not significantly associated with either BC or STI/HIV service use for AIANs.
- Publicly insured AIAN women were 90% more likely than privately insured AIAN women to use STI/HIV services, even after controlling for need characteristics. However, AIANs use of SRHS or BC services did not vary by insurance type. And, for all services, uninsured AIAN women were as likely as privately insured AIAN women to use services.

Aim 2 Results

Aim 2: Explore differences in sexual and reproductive health service use in the last 12 months by AIAN men compared to NHW men, and examine variations by selected characteristics.

Sample Characteristics. In Table 2.1, I present the weighted demographic and sexual health characteristics for the full sample and for both racial groups separately. The sample consisted of 6,245 men, 923 AIAN (11%) and 5,322 NHWs (89%). On average, AIAN men were 29 years old and had low levels of education. Over half of AIAN men did not have a high school diploma, while only 5% had a bachelor's degree. A substantial proportion of AIAN men (42%) had incomes at or below 133% FPL. About one-third of AIANs were privately insured, while 51% were uninsured, and 14% were publicly insured. Over half of AIANs reported having a usual source of care. AIANs were more likely to live in urban areas and in the Western region. Most AIANs were sexually active in the past year, and over half were married or cohabiting. AIANs were generally in good overall health.

NHW men were similar to AIAN men in age and similar proportions were married/cohabiting and sexually active. However, NHWs compared to AIANs were significantly more educated, had higher family incomes, were more likely to live in the Midwest and South, to have private insurance, and to have a usual source of care. NHWs were also less likely to report being in fair/poor health.

Service Use. Few AIAN men used SRHS and rates of SRHS use were similar among NHW men. About 10% of men, regardless of race, used a BC service and less than a quarter used an STI/HIV service in the last 12 months (Table 2.2). AIAN men were more likely to use STI testing and treatment than any other SRHS. Interestingly, although similar proportions of AIANs and NHWs used an HIV test or an STI test or treatment, AIANs were significantly more likely than NHWs to use STI and HIV counseling.

Bivariate Results- Factors Associated with SRHS Use. In Table 2.3, I provide the results of chi-square tests I used to assess for associations between service use and the

selected covariates. For AIANs, factors significantly associated with BC and STI/HIV service use in bivariate analyses, included:

- AIAN men aged 15-24 were more likely than AIAN men aged 25-44 to use a BC service.
- Publicly insured AIAN men were more likely to use STI/HIV services than privately insured and uninsured AIANs.
- AIAN men with a usual source of care were more likely to use BC and STI/HIV services than AIAN men without a usual source.
- None of the need characteristics, including marital status, number of female sexual partners, and general health status were associated with BC or STI/HIV service use among AIAN men.

Similar factors were significantly associated with SRHS use among NHWs. Other significant predictors of STI/HIV service use among NHWs included rural/urban residency and marital status (Table 2.4).

Regression Results.

Hypothesis 2.1: AIAN men are more likely to report a SRHS visit in the past 12 months than NHW men, after adjusting for covariates.

Similar to the findings for the female sample previously discussed, racial disparities in service use varied by service type and subgroup (Table 2.5). After adjusting for covariates, AIAN men were as likely as NHW men to use BC services in all subgroups analyzed. However, AIAN men were as likely or more likely than NHWs to use STI/HIV services. Significant differences in STI/HIV service use included:

- Among men aged 15-19 and 35-44, AIAN men were respectively 120% and 100% more likely than their NHW counterparts to use STI/HIV services.
- AIAN men with incomes greater than 133% FPL, were 50% more likely than their NHW counterparts to use STI/HIV services.
- Among privately insured men, AIANs were 100% more likely to use STI/HIV services than NHWs. Notably, among publicly insured or uninsured men, AIAN were as likely as NHW men to use STI/HIV services.

- Among urban men, AIANs were as likely as NHWs to use STI/HIV services. However, rural AIAN men were 220% more likely than rural NHW men to use STI/HIV services.
- AIAN men in the Northeast were 120% more likely to use STI/HIV services than NHW men.

Hypothesis 2.2: SRHS utilization varies by predisposing, enabling, and need factors.

To determine which factors were associated with SRHS use for AIAN men, I conducted logistic regression analyses on the AIAN subsample. In Table 2.6, I present the results of these analyses. I also include results for the NHW subsample in Table 2.7 to allow for comparison.

Few factors were significantly associated with BC or STI/HIV service use among AIAN men. Significant predictors of SRHS use among AIAN men varied by service and included age, having a usual source of care, receipt of a physical exam, receipt of a testicular exam, and number of sexual partners. With the exception of insurance status, factors significantly associated with service use in bivariate analyses remained significant after controlling for other covariates. A few findings are specifically worth noting.

For both BC and STI/HIV services, connectedness to the health care system was associated with service use for AIAN men. Specifically, AIAN men with a usual source of care were 240% more likely to use BC services and 90% more likely to use STI/HIV services than AIAN men who did not have a usual source of care. Additionally, AIAN men who had received a physical exam were 60% more likely to use BC services than AIAN men who had not received a physical. In general, these associations mirror those for NHW men with one important exception; having a usual source of care was not associated with an increased likelihood of receiving SRHS for NHW men like it was for AIAN men.

A few findings were unexpected. First, SRHS was not significantly associated with either health insurance status or rural/urban residency. Health insurance status and rural/urban residency were significantly associated with SRHS use among NHW men and the direction of the associations were consistent with those identified by previous researchers.

Also unexpected were the limited number of associations between need characteristics and SRHS use among AIAN men. The only need characteristic associated with SRHS use for AIAN men was number of sexual partners and only for STI/HIV services. As expected, AIAN men with one sexual partner were 80% more likely than AIAN men who had never had sex to use STI/HIV services. Surprisingly, however, AIAN men who had never had sex were as likely to use BC services as AIAN men with one partner. Additionally, AIAN men with two or more partners who were at perceived increased risk for unintended pregnancy and STIs/HIV were no more likely to use SRHS than AIAN men with one partner.

Aim 3 Results

Aim 3: Compare SRHS use by AIAN women to NHW women before and after the start of the Great Recession, controlling for selected characteristics.

Note: In this section, “service” refers to the SRHS and BC service use measures.

Sample Characteristics. In Table 3.1, I provide the weighted demographic and sexual health characteristics for the full sample and separately for AIANs and NHWs. The sample consisted of 11,427 women, 1,176 AIANs (7%) and 10,251 NHWs (93%). The average age of AIANs was 28 years. AIANs had low levels of education: 42% lacked a high school diploma. Over half of AIANs had family incomes at or below 133% FPL. Just over one-quarter of AIANs were privately insured, while 31% were publicly insured, and 41% were uninsured. AIANs were more likely to live in urban than rural communities and 52% lived in the Western U.S. Over half of AIANs were married or cohabiting, over three-quarters were sexually active, two-thirds were fecund, and over two-thirds had ever been pregnant. Most AIANs were in good health and about one-quarter reported a gynecological problem.

AIANs and NHWs had little in common demographically or among their sexual health characteristics. Compared to AIANs, NHWs were older (mean: 30 years), had higher levels of education, were less likely to have family incomes at or below 133% FPL, and were more likely to live in the Midwest or South. NHWs were also more likely to have private insurance and less likely to be uninsured or to have public insurance than AIANs. Additionally, NHWs were less likely to have ever been pregnant than AIANs. However, similar proportions of AIANs and NHWs were sexually active and fecund. Although NHWs were more likely to report being in good health than AIANs, they were also more likely to report a gynecological problem.

Bivariate Results- Service Use by Recession Period. The proportion of women who used SRHS, BC services, a BC method, and a medical BC method was not significantly different between the Recession periods for the full sample or for either racial group. However, AIANs were less likely than NHWs to use a BC method or medical BC method in nearly all recession periods. These findings were consistent regardless of the Recession measure used (Table 3.2).

Bivariate Results- Service Use by Unemployment Rates and Time. Regional unemployment was not associated with either service variable or either BC use variable for the full sample or for either racial group, regardless of the unemployment measure used (Table 3.3). Time was associated with SRHS use, but not BC service use or either BC use variable. SRHS use decreased over time.

Regression Results. In Tables 3.4-3.11, I present the results of the logistic regression analyses I ran on the un-weighted data. After controlling for covariates, AIANs did not significantly change their use of SRHS, BC services, BC methods, or medical BC methods during the Recession. Additionally, AIANs did not change their use of services or BC methods as regional unemployment levels changed. These findings were consistent with those from the bivariate analyses.

As indicated by the p-values for the interaction terms between race and the Recession measures, AIANs and NHWs use of services and BC methods were similarly affected by the Recession. However, unlike AIANs, NHWs reduced their use of SRHS from the pre-Recession to Recession/Post-Recession period. NHWs also were less likely to use BC services in the early Recession than in the pre-Recession.

Within each Recession period, numerous racial disparities in service and BC use existed (Table 3.9). Even after adjusting for covariates, AIANs were less likely to use SRHS, BC methods, and medical BC methods than NHWs. In the case of SRHS use, the disparity appeared during the Recession. AIANs were 30% less likely to use SRHS than NHWs during the Recession/post-Recession. However, in the case of BC method use, the disparity seemed to wane during the Recession. AIANs were 30-50% less likely to use a BC method than NHWs during the pre- and early-Recession, but were as likely as NHWs to use a BC method during the Recession/post-Recession. And, in the case of medical BC method use, the disparity persisted throughout the Recession. AIANs were consistently less likely to use medical BC methods than NHWs in all Recession periods.

Significant covariates in these analyses were generally the same as in the analyses of the 2006-10 data for Aim 1 (Tables 3.9-3.11). In particular, racial disparities continued to vary by rural or urban residency. Although there were no racial disparities in service

use or medical BC method use among rural women, urban AIANs were less likely than NHWs to use SRHS, BC services, and medical BC methods. Conversely, among rural women, but not urban women, AIANs were less likely than NHWs to use a BC method at interview.

Significant covariates of BC method use and medical BC method use were not previously explored in Aim 1, but were examined in Aim 3 (Table 3.10). Use of a medical BC method was associated with use of a SRHS in the past 12 months. Additionally, use of a medical BC method was associated with health insurance status. Specifically, AIAN women who were uninsured or who had public insurance were more likely to use a medical BC method than privately insured AIAN women.

Sensitivity Analyses

I ran a number of sensitivity analyses to assess the validity of my results, including testing different measures of insurance and running analyses on reduced models with only the significant interaction terms included. Results were generally consistent across all models, regardless of the insurance measure used. Additionally, results did not vary substantially when insignificant interaction terms were removed from the models.

For Aim 3, I also ran all analyses using both logistic regression and linear probability models. Although some models failed to converge due to an insufficient sample size for the large number of covariates, results were generally consistent for all analyses. There was one exception. According to the results from the linear probability model analysis (Table 3.8), which controlled for a linear time trend, AIANs were more likely than NHWs to reduce their use of medical BC methods during the early Recession from the pre-Recession. Because this finding was inconsistent with results from the logistic regression analyses controlling for state fixed effects, the finding may be an artifact of using a linear model to analyze a dichotomous outcome variable, rather than a true association. Thus, this finding should be interpreted with caution.

For Aims 1 and 2, I also ran analyses on both weighted and un-weighted data. The magnitude of the associations were usually the same for both weighted and un-weighted analyses. However, the magnitude of the standard errors increased when I used the

weighted data, which meant that a number of associations that were significant in un-weighted analyses were not significant in weighted analyses. I have chosen to present the results of the weighted analyses based on recommendations from the NSFG staff (Lepkowski et al., 2010).

Unlike with Aims 1 and 2, for Aim 3, I conducted all analyses using un-weighted data only. In the future, when I have access to the data again, I will re-run these analyses using weighted data. However, based on comparisons between results from weighted and un-weighted data analyses for Aims 1 and 2, I expect to find few differences in results. In particular, because AIANs service and BC use did not vary significantly between Recession periods, I do not anticipate these relationships will change in analyses with weighted data.

Using weighted data may eliminate the significant racial disparities in service and BC use identified in Aim 3. I do not expect these associations will become insignificant though because significant racial disparities in service use existed between AIANs and NHWs even when I used weighted data for the Aim 1 and 2 analyses. Nevertheless, the results for Aim 3 should be interpreted with caution and may change once weighted data are analyzed.

Summary of Results

- Racial disparities in SRHS use exist for AIAN men and women.
 - AIAN women were as likely or less likely to use SRHS and BC services than NHWs.
 - I found no significant differences in the rates of BC service use among AIAN and NHW men. Few men, regardless of race, used BC services.
 - AIAN women and men were as likely or more likely to use STI/HIV services than NHWs.
- Service use varied by rural and urban residency for both women and men.
 - Among urban women, AIANs were less likely than NHWs to use SRHS and BC services, but more likely to use STI/HIV services.
 - Among rural men, AIAN men were over three times as likely to use STI/HIV services than NHW men.

- Among AIANs, rural women were more likely than urban women to use SRHS.
- Racial disparities in service use were not found among urban men and rural women.
- Insurance status was associated with STI/HIV service and medical BC method use.
 - Privately insured AIAN women and men were more likely to use STI/HIV services than privately insured NHWs.
 - AIAN women with public insurance were more likely to use STI/HIV services and medical BC methods than AIAN women with private insurance.
 - AIAN women's use of SRHS and BC services and AIAN men's use of BC or STI/HIV services did not vary by insurance type.
- For AIAN men, engagement with the health care system was strongly associated with BC and STI/HIV service use.
- Not surprisingly, sexually active AIAN women and men were more likely to use STI/HIV services. AIAN women, but not men, who were sexually active were also more likely to use BC services.
- Among men and women aged 35-44, AIANs were more likely than NHWs to use STI/HIV services.
- Among men and women living in the Northeast region, AIANs were over two times as likely to use STI/HIV services than NHWs.
- Among men and women with incomes above 133% FPL, AIANs were more likely to use STI/HIV services than NHWs.
- Poverty status, education, marital/cohabitation status, general health status, and region were not associated with SRHS, BC, or STI/HIV service use for AIAN men or women.
- AIAN women did not change their use of SRHS, BC services, BC method, or medical BC method use during the Great Recession and these patterns generally mirrored those of NHW women.
- SRHS and BC method use disparities persisted throughout the Great Recession. AIAN women were less likely than NHW women to use SRHS, BC methods, and medical BC methods before and during the Great Recession.

Table 1.1. Descriptive Characteristics of American Indian and non-Hispanic White Female Sample, 2006-10 NSFG.

	Full Sample (n=7,015)	AIAN Sample (n=819)	NHW Sample (n=6,196)	Rao-Scott χ^2 or t-test statistic	p
	% or Mean (SE)				
Predisposing Characteristics					
Race					
AIAN	8.7 (1.5)				
NHW	91.2 (1.5)				
Age, mean	29.7 (0.22)	28.8 (0.46)	29.8 (0.23)	-2.07	p < 0.05
Age					
15-19	16.7 (0.7)	20.8 (1.9)	16.3 (0.7)	6.16	p = 0.10
20-24	16.4 (0.9)	15.1 (1.7)	16.5 (1.0)		
25-34	31.8 (0.9)	31.2 (1.9)	31.9 (1.0)		
35-44	35.1 (1.1)	32.9 (2.5)	35.3 (1.1)		
# Years of School, mean	13.5 (0.07)	11.7 (0.14)	13.6 (0.07)	-12.16	p < 0.001
Education					
< high school	20.1 (0.8)	41.9 (2.5)	18.0 (0.7)	164.48	p < 0.001
High school diploma or GED	23.5 (0.9)	25.5 (2.2)	23.3 (1.0)		
Some college/Associates Degree	28.6 (1.1)	25.2 (2.6)	28.9 (1.2)		
College degree	27.9 (1.2)	7.3 (1.2)	29.8 (1.3)		
Enabling Characteristics					
Region					
Northeast	16.9 (1.6)	7.0 (1.8)	17.8 (1.7)	33.39	p < 0.001
Midwest	31.0 (2.8)	17.9 (5.5)	32.3 (2.9)		
South	29.5 (2.7)	23.0 (6.4)	30.1 (2.7)		
West	22.6 (2.8)	52.1 (9.6)	19.8 (2.6)		
Rural/urban					
Rural	27.4 (2.3)	31.1 (10.7)	27.0 (2.3)	0.15	p = 0.70
Urban	72.6 (2.3)	68.9 (10.7)	73.0 (2.3)		
% Federal Poverty Level, mean	259.6 (4.1)	162.2 (7.7)	268.9 (4.0)	-11.54	p < 0.001
Poverty Status					
133%FPL or below	26.4 (1.1)	54.0 (2.5)	23.7 (1.0)	375.44	p < 0.001
Greater than 133%FPL	73.6 (1.1)	46.0 (2.5)	76.3 (1.0)		
Health Insurance Status, Past Year					
Uninsured < 3months	78.8 (1.0)	62.5 (5.3)	80.3 (1.0)	15.39	p < 0.001
Uninsured 3+ months	21.2 (1.0)	37.5 (5.3)	19.7 (1.0)		
Current Health Insurance Status					
Private	67.7 (1.6)	23.6 (4.0)	71.9 (1.4)	208.09	p < 0.001
Public	14.8 (0.9)	31.9 (2.9)	13.2 (0.9)		
Uninsured	17.5 (1.1)	44.5 (4.5)	14.9 (0.9)		
Ever Been Pregnant					
Yes	59.8 (1.4)	69.9 (2.1)	58.8 (1.5)	26.67	p < 0.001
No	40.2 (1.4)	30.1 (2.1)	41.2 (1.5)		
Need Characteristics					
Marital/cohabiting status					
Currently married/currently cohabiting	56.4 (1.0)	53.1 (2.1)	56.7 (1.1)	2.13	p = 0.14
Never married/not currently cohabiting	43.6 (1.0)	46.9 (2.1)	43.3 (1.1)		
# Male Partners Past Year					
Never had sex	13.3 (1.0)	12.7 (1.3)	13.3 (1.1)	9.33	p < 0.05
0	6.7 (0.5)	9.7 (1.8)	6.4 (0.4)		
1	69.9 (1.0)	70.4 (2.1)	69.9 (1.0)		
2 or more	10.1 (0.6)	7.2 (1.0)	10.4 (0.6)		
General Health Status (n=6,994)					
Excellent/Very good/Good	93.2 (0.5)	87.2 (1.8)	93.8 (0.5)	20.13	p < 0.001
Fair/Poor	6.8 (0.5)	12.8 (1.8)	6.2 (0.5)		
Gynecological Problem (n=7,005)					
Yes	33.5 (1.0)	21.5 (1.8)	34.6 (1.0)	46.96	p < 0.001
No	66.5 (1.0)	78.5 (1.8)	65.4 (1.0)		
Fecundity Status					
Surgically sterile	23.5 (1.1)	20.7 (2.5)	23.7 (1.2)	2.73	p = 0.26
Impaired fertility, including sterile, nonsurgical	10.9 (0.6)	9.6 (1.2)	11.0 (0.6)		
Fecund	65.7 (1.2)	69.8 (3.1)	65.3 (1.2)		

Notes: Frequencies are unweighted. Percentages are weighted and do not always add to 100 due to rounding. Unless noted, the sample size for the full sample and by race for each factor are noted at the top of columns. General health status n=6,994. History of a gynecological problem n=7,005.

Table 1.2. Percentage of Women, by Race, Who Used Sexual & Reproductive Health Services in Last 12 Months, 2006-10 NSFG.

	AIAN & NHW Sample (n=7,015)		AIAN Sample (n=819)		NHW Sample (n=6,196)		Rao-Scott χ^2 statistic	
	n	% (se)	n	% (se)	n	% (se)		p
SRHS Use	7,015	71.5 (1.1)	554	68.0 (1.9)	4490	71.9 (1.2)	3.48	p = 0.06
Pregnancy test	7,015	17.1 (0.6)	195	21.8 (2.0)	1080	16.6 (0.6)	7.15	p < 0.01
Abortion	7,014	0.7 (0.1)	9	2.0 (0.9)	41	0.5 (0.1)	8.00	p < 0.01
Pap smear	7,012	61.3 (1.1)	433	54.9 (2.4)	3818	61.9 (1.2)	6.89	p < 0.01
Pelvic exam	7,009	57.9 (1.1)	357	46.4 (2.6)	3621	59.0 (1.1)	22.1	p < 0.001
Prenatal care	7,015	6.5 (0.4)	80	10.7 (1.7)	408	6.2 (0.4)	9	p < 0.01
Post-partum care	7,015	5.4 (0.4)	66	7.9 (1.3)	338	5.1 (0.4)	4.78	p < 0.05
Birth Control Service Use	7,014	41.7 (1.0)	319	35.2 (2.5)	2727	42.3 (1.0)	7.49	p < 0.01
Birth control method or prescription	7,015	35.7 (0.9)	252	26.7 (2.0)	2332	36.6 (0.9)	19.75	p < 0.001
Birth control check-up or medical test	7,015	24.1 (0.8)	155	17.2 (1.9)	1573	24.7 (0.9)	10.76	p < 0.01
Birth control counseling or information	7,014	16.3 (0.7)	162	16.8 (2.0)	1114	16.3 (0.7)	0.08	p = 0.77
Sterilizing operation	7,015	1.6 (0.2)	12	1.4 (0.5)	84	1.7 (0.2)	0.19	p = 0.66
Sterilization counseling or information	7,015	3.04 (0.3)	41	4.7 (1.1)	170	2.9 (0.4)	3.48	p = 0.06
Emergency contraceptive provision or prescription	7,014	1.9 (0.3)	23	1.9 (0.7)	145	1.9 (0.3)	0.001	p = 0.97
Emergency contraceptive counseling or information	7,014	2.6 (0.3)	52	5.7 (1.3)	181	2.3 (0.3)	12.26	p < 0.001
STI/HIV Service Use	7,003	22.2 (0.9)	252	25.1 (2.3)	1488	21.9 (0.9)	1.93	p = 0.17
STI counseling, testing, treatment	7,012	14.5 (0.7)	128	13.0 (1.8)	1002	14.6 (0.8)	0.71	p = 0.40
HIV test outside of blood donation	7,004	15.2 (0.8)	193	19.0 (2.0)	1021	14.8 (0.8)	4.64	p < 0.05

Notes: Frequencies are unweighted, percentages are weighted. Sample sizes vary due to missing values for a small number of respondents. Data presented are for all AIAN and NHW in the study sample.

Table 1.3. Factors Associated With Use of Sexual and Reproductive Health Services Among AIAN Women, 2006-10 NSFG.

	Total No.	SRHS Use		BC Service Use			STI/HIV Service Use		
		% (se)	Rao-Scott χ^2 statistic p	% (se)	Rao-Scott χ^2 statistic p	% (se)	Rao-Scott χ^2 statistic p		
Predisposing Characteristics									
Age									
15-19	196	37.9 (6.3)	32.23 < 0.001	31.9 (5.5)	31.78 < 0.001	14.0 (2.4)	14.58	< 0.01	
20-24	118	84.1 (4.5)		58.6 (5.7)		31.2 (5.8)			
25-34	310	76.2 (3.7)		43.4 (3.3)		32.9 (3.4)			
35-44	195	71.8 (5.2)		18.8 (4.6)		22.1 (4.3)			
Education									
< high school	379	55.5 (3.2)	24.09 < 0.001	31.5 (2.9)	2.71 0.44	25.9 (3.3)	1.68	0.64	
High school diploma or GED	204	74.3 (3.9)		35.9 (5.3)		23.9 (3.1)			
Some college/Associates Degree	182	78.8 (3.6)		38.8 (4.2)		22.5 (4.3)			
College degree	54	80.2 (7.5)		41.5 (8.0)		34.0 (11.1)			
Enabling Characteristics									
Region									
Northeast	102	70.3 (5.9)	1.72 0.63	42.7 (8.5)	5.09 0.17	35.3 (5.3)	2.31	0.51	
Midwest	125	72.7 (5.1)		35.1 (6.1)		21.1 (5.7)			
South	186	65.0 (4.3)		25.5 (6.0)		23.6 (4.8)			
West	406	67.4 (2.5)		38.6 (2.7)		25.8 (3.2)			
Rural/urban									
Rural	144	73.8 (3.8)	2.59 0.11	33.8 (5.1)	0.14 0.71	19.0 (4.6)	2.02	0.16	
Urban	675	65.4 (2.6)		35.9 (2.7)		27.9 (2.9)			
Poverty Status									
133%FPL or below	452	66.4 (2.2)	0.66 0.42	36.2 (3.2)	0.36 0.55	25.6 (2.5)	0.10	0.75	
Greater than 133%FPL	367	69.9 (3.4)		34.1 (2.8)		24.5 (3.2)			
Health Insurance Status Past Year									
Uninsured < 3months	521	69.2 (2.2)	0.49 0.48	39.9 (2.6)	6.74 < 0.01	23.8 (2.3)	0.54	0.46	
Uninsured 3+ months	298	66.0 (3.9)		27.4 (4.2)		27.4 (4.5)			
Current Health Insurance Status									
Private	240	65.2 (4.2)	1.46 0.48	33.8 (4.6)	5.36 0.07	23.7 (3.5)	8.47	< 0.05	
Public	270	73.6 (5.8)		43.5 (4.9)		33.4 (3.4)			
Uninsured	309	65.4 (4.2)		30.1 (3.7)		20.0 (3.6)			
Ever Been Pregnant									
Yes	563	77.5 (2.6)	23.98 < 0.001	36.3 (3.0)	0.42 0.52	–	–	–	
No	256	46.0 (5.0)		32.7 (4.5)		–			
Need Characteristics									
Marital/cohabiting status									
Currently married/currently cohabiting	411	76.8 (2.5)	17.32 < 0.001	37.9 (3.1)	1.95 0.16	28.3 (2.7)	3.14	0.08	
Never married/not currently cohabiting	408	58.0 (3.3)		32.1 (3.4)		21.6 (3.0)			
# Male Partners Past Year									
Never had sex	124	20.3 (5.1)	70.11 < 0.001	15.8 (5.1)	18.23 < 0.001	R	90.24	< 0.001	
0	68	57.2 (7.1)		22.2 (4.7)		R			
1	562	77.5 (2.5)		39.9 (3.3)		29.4 (2.6)			
2 or more	65	74.5 (7.9)		40.7 (7.7)		53.9 (9.0)			
General Health Status									
Excellent/Very good/Good	711	67.4 (2.2)	0.22 0.64	35.5 (2.5)	0.61 0.44	24.4 (2.0)	1.39	0.24	
Fair/Poor	99	70.7 (6.2)		30.4 (6.2)		31.0 (6.5)			
Gynecological Problem									
Yes	177	76.8 (5.5)	2.05 0.15	40.5 (3.3)	2.6 0.11	30.7 (4.3)	3.00	0.09	
No	639	66.3 (2.5)		34.2 (2.9)		23.9 (2.3)			
Fecundity Status									
Surgically sterile	138	68.3 (8.1)	1.95 0.38	10.9 (3.4)	37.37 < 0.001	–	–	–	
Impaired fertility, including sterile, nonsurgical	74	81.6 (5.2)		35.3 (5.6)		–			
Fecund	607	66.1 (3.2)		42.4 (3.0)		–			

Notes: Frequencies are unweighted, percentages are weighted. Sample sizes vary due to missing values for a small number of respondents. Data presented are for all AIAN and NHW in the study sample.

Table 1.4. Factors Associated With Use of Sexual and Reproductive Health Services Among NHW Women, 2006-10 NSFG.

	Total No.	SRHS Use		BC Service Use			STI/HIV Service Use		
		% (se)	Rao-Scott χ^2 statistic p	% (se)	Rao-Scott χ^2 statistic p	% (se)	Rao-Scott χ^2 statistic p		
Predisposing Characteristics									
Age									
15-19	1140	45.3 (2.5)	189.16 < 0.001	38.7 (2.4)	156.15 < 0.001	16.4 (1.5)	108.97	< 0.001	
20-24	1038	78.6 (2.1)		62.0 (2.4)		37.0 (2.8)			
25-34	2139	81.5 (1.4)		50.2 (1.8)		26.7 (1.9)			
35-44	1879	72.3 (1.9)		27.7 (1.7)		12.9 (1.0)			
Education									
< high school	1278	49.9 (2.1)	185.23 < 0.001	31.8 (2.1)	54.93 < 0.001	21.3 (1.6)	6.45	0.09	
High school diploma or GED	1406	71.7 (1.8)		38.7 (1.7)		23.0 (1.6)			
Some college/Associates Degree	1818	74.5 (1.9)		45.1 (1.5)		24.0 (1.7)			
College degree	1694	82.7 (1.5)		48.9 (1.6)		19.2 (1.5)			
Enabling Characteristics									
Region									
Northeast	1245	73.6 (2.1)	1.12 0.77	44.8 (2.3)	2.16 0.54	21.3 (1.5)	9.15	< 0.05	
Midwest	1853	72.4 (1.7)		41.6 (1.4)		18.6 (1.4)			
South	1741	71.7 (1.7)		41.0 (2.1)		25.0 (1.6)			
West	1357	69.7 (3.9)		43.4 (2.0)		23.0 (2.6)			
Rural/urban									
Rural	1322	70.2 (2.0)	0.88 0.35	36.5 (1.9)	13.54 < 0.001	16.5 (1.4)	16.47	< 0.001	
Urban	4874	72.5 (1.4)		44.5 (1.1)		23.9 (1.1)			
Poverty Status									
133%FPL or below	1706	65.1 (1.9)	21.31 < 0.001	42.2 (1.6)	0.01 0.94	26.9 (1.7)	14.44	< 0.001	
Greater than 133%FPL	4490	74.0 (1.3)		42.4 (1.1)		20.3 (1.0)			
Health Insurance Status Past Year									
Uninsured < 3months	4930	73.5 (1.4)	11.86 < 0.001	42.9 (1.1)	1.31 0.25	21.0 (1.0)	5.16	< 0.05	
Uninsured 3+ months	1266	65.1 (2.0)		40.1 (2.2)		25.4 (1.7)			
Current Health Insurance Status									
Private	4208	73.9 (1.5)	33.17 < 0.001	43.0 (1.1)	5.50 0.06	19.2 (1.0)	65.61	< 0.001	
Public	1010	74.8 (2.2)		44.7 (2.5)		36.1 (2.4)			
Uninsured	978	59.7 (2.3)		37.0 (2.8)		22.1 (1.8)			
Ever Been Pregnant									
Yes	3452	77.7 (1.4)	41.45 < 0.001	37.7 (1.3)	27.42 < 0.001	–	–	–	
No	2744	63.6 (1.9)		49.0 (1.6)		–			
Need Characteristics									
Marital/cohabiting status									
Currently married/currently cohabiting	3016	80.4 (1.3)	86.02 < 0.001	41.7 (1.4)	0.44 0.51	20.5 (1.2)	4.07	< 0.05	
Never married/not currently cohabiting	3180	60.7 (1.8)		43.2 (1.7)		23.7 (1.3)			
# Male Partners Past Year									
Never had sex	869	25.9 (2.3)	696.53 < 0.001	19.0 (1.9)	169.61 < 0.001	1.9 (0.4)	438.23	< 0.001	
0	513	61.5 (3.1)		28.7 (3.1)		16.5 (2.2)			
1	4040	79.8 (1.1)		45.2 (1.2)		22.2 (1.0)			
2 or more	774	84.1 (1.8)		61.7 (2.7)		48.9 (2.6)			
General Health Status									
Excellent/Very good/Good	5764	72.3 (1.2)	4.71 < 0.05	43.1 (1.1)	13.30 < 0.001	21.4 (1.0)	7.43	< 0.01	
Fair/Poor	420	65.0 (3.7)		29.5 (3.3)		29.5 (3.1)			
Gynecological Problem									
Yes	2052	81.2 (1.5)	56.81 < 0.001	42.9 (1.7)	0.12 0.73	26.3 (1.5)	22.15	< 0.001	
No	4137	67.0 (1.4)		42.2 (1.2)		19.6 (0.9)			
Fecundity Status									
Surgically sterile	1226	66.4 (2.4)	15.74 < 0.001	14.7 (1.7)	204.32 < 0.001	–	–	–	
Impaired fertility, including sterile, nonsurgical	679	79.8 (2.7)		47.3 (3.2)		–			
Fecund	4291	72.5 (1.2)		51.5 (1.2)		–			

Notes: Frequencies are unweighted, percentages are weighted. Sample sizes vary due to missing values for a small number of respondents. Data presented are for all AIAN and NHW in the study sample.

Table 1.5. Logistic Regression Odds Ratios and 95% Confidence Interval Showing the Likelihood of Using Sexual and Reproductive Health Services Among Women, Full Sample, 2006-10 NSFG.

	Any SRHS	Any BC Service	Any STI/HIV Service
	OR (95% CI), p-value	OR (95% CI), p-value	OR (95% CI), p-value
Age (AIAN vs NHW)			
15-19	0.6 (0.4, 1.0)	0.7 (0.4, 1.1)	1.2 (0.7, 2.0)
20-24	1.3 (0.6, 2.8)	0.8 (0.5, 1.2)	1.4 (0.8, 2.3)
25-34	0.8 (0.5, 1.3)	0.8 (0.5, 1.1)	1.5** (1.1, 2.1)
35-44	1.0 (0.5, 2.3)	0.6 (0.3, 1.1)	2.1*** (1.4, 3.0)
Region (AIAN vs NHW)			
Northeast	1.0 (0.3, 3.1)	1.0 (0.4, 2.5)	2.3** (1.4, 3.8)
Midwest	1.0 (0.5, 2.1)	0.7 (0.4, 1.3)	1.5 (0.8, 2.6)
South	0.7 (0.4, 1.2)	0.4* (0.2, 0.9)	1.1 (0.8, 1.4)
West	0.8 (0.6, 1.3)	0.7 (0.5, 1.0)	1.5 (0.9, 2.5)
Rural/urban (AIAN vs NHW)			
Rural	1.4 (0.8, 2.5)	0.9 (0.6, 1.2)	1.6 (0.8, 3.4)
Urban	0.6** (0.5, 0.9)	0.6** (0.4, 0.9)	1.4* (1.1, 2.0)
Poverty Status (AIAN vs NHW)			
133%FPL or below	1.0 (0.7, 1.4)	0.7 (0.5, 1.0)	1.3 (0.8, 1.9)
Greater than 133%FPL	0.9 (0.5, 1.5)	0.7* (0.5, 1.0)	1.4* (1.0, 1.8)
Current Insurance Status (AIAN vs NHW)			
Private	0.7 (0.4, 1.1)	0.6 (0.4, 1.1)	1.7** (1.2, 2.4)
Public	1.0 (0.3, 3.0)	0.9 (0.6, 1.6)	1.0 (0.8, 1.3)
Uninsured	1.3 (0.8, 2.2)	0.7 (0.4, 1.0)	1.0 (0.6, 1.6)
Education			
< high school	0.5*** (0.4, 0.7)	0.6** (0.4, 0.8)	1.3 (0.9, 1.9)
High school diploma or GED	0.7* (0.5, 0.9)	0.7* (0.6, 0.9)	1.1 (0.8, 1.4)
Some college	0.7* (0.6, 0.9)	0.8 (0.7, 1.0)	1.0 (0.8, 1.3)
College degree (reference group)	1.0	1.0	1.0
Marital/cohabiting status			
Currently married/currently cohabiting (reference group)	1.0	1.0	1.0
Never married/not currently cohabiting	0.8 (0.7, 1.0)	1.1 (0.9, 1.4)	1.3* (1.0, 1.6)
# male partners past year			
Never had sex	0.1*** (0.1, 0.1)	0.1*** (0.1, 0.1)	0.04*** (0.02, 0.1)
0	0.5*** (0.3, 0.6)	0.4*** (0.3, 0.5)	0.5*** (0.4, 0.7)
1 (reference group)	1.0	1.0	1.0
2 or more	1.3 (1.0, 1.8)	1.1 (0.9, 1.4)	2.2*** (1.8, 2.8)
General Health status			
Excellent/Very good/Good (reference group)	1.0	1.0	1.0
Fair/Poor	0.8 (0.6, 1.1)	0.8 (0.6, 1.1)	1.4 (1.0, 1.9)
Gynecological Problem			
Yes (reference group)	1.0	1.0	1.0
No	0.5*** (0.4, 0.6)	0.7*** (0.6, 0.8)	0.7*** (0.5, 0.8)
Ever been pregnant			
Yes (reference group)	1.0	1.0	
No	0.7* (0.6, 1.0)	1.2 (1.0, 1.5)	
Fecundity			
Surgically sterile	0.3*** (0.3, 0.5)	0.2*** (0.1, 0.2)	
Impaired fertility	0.8 (0.6, 1.1)	0.7* (0.5, 1.0)	
Fecund (reference group)	1.0	1.0	

Notes: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Weighted data used in all analyses. p-values adjusted for multiple comparisons. Odds ratios for Age, Region, Rural/urban, poverty status, and current insurance status indicate differences in service use between AIANs and NHWs. Odds ratios greater than 1.0 indicate AIANs are more likely to use services than NHWs.

Table 1.6. Logistic Regression Odds Ratios and 95% Confidence Interval Showing the Likelihood of Using Sexual and Reproductive Health Services Among AIAN Women.

	SRHS Use	BC Service Use	STI/HIV Service Use
	OR (95% CI), p-value	OR (95% CI), p-value	OR (95% CI), p-value
Predisposing Characteristics			
Age			
15-19	1.0 (0.3, 2.9)	3.6** (1.4, 9.3)	1.1 (0.5, 2.4)
20-24	3.8** (1.8, 8.0)	4.9*** (2.1, 11.2)	1.8 (0.8, 4.1)
25-34	1.7 (0.9, 3.1)	2.7** (1.4, 5.4)	1.8* (1.0, 3.1)
35-44 (reference group)	1.0	1.0	1.0
Education			
< high school	0.6 (0.2, 2.0)	0.6 (0.2, 1.6)	0.7 (0.2, 2.2)
High school diploma or GED	0.8 (0.2, 2.5)	0.5 (0.2, 1.3)	0.4 (0.1, 1.3)
Some college	1.0 (0.3, 3.0)	0.7 (0.3, 1.7)	0.4 (0.1, 1.3)
College degree (reference group)	1.0	1.0	1.0
Enabling Characteristics			
Region			
Northeast	1.5 (0.5, 4.6)	1.2 (0.5, 3.1)	1.7 (0.8, 3.6)
Midwest	1.2 (0.6, 2.4)	0.8 (0.4, 1.5)	0.6 (0.3, 1.3)
South	1.1 (0.7, 1.8)	0.6 (0.3, 1.3)	1.0 (0.5, 1.9)
West (reference group)	1.0	1.0	1.0
Rural/urban			
Rural (reference group)	1.0	1.0	1.0
Urban	0.6* (0.4, 0.8)	0.8 (0.4, 1.6)	1.6 (0.7, 3.4)
Poverty Status			
133%FPL or below	0.8 (0.5, 1.5)	1.5 (1.0, 2.3)	1.1 (0.7, 1.9)
Greater than 133%FPL (reference group)	1.0	1.0	1.0
Current Insurance Status			
Private (reference group)	1.0	1.0	1.0
Public	1.5 (0.5, 4.6)	1.2 (0.6, 2.5)	1.9* (1.1, 3.4)
Uninsured	0.7 (0.3, 1.4)	0.8 (0.4, 1.3)	0.8 (0.4, 1.5)
Ever been pregnant			
Yes (reference group)	1.0	1.0	
No	0.3* (0.2, 0.7)	0.6 (0.3, 1.1)	
Need Characteristics			
Marital/cohabiting status			
Currently married/currently cohabiting (reference group)	1.0	1.0	1.0
Never married/not currently cohabiting	1.3 (0.8, 2.1)	1.2 (0.6, 2.1)	1.3 (0.8, 2.1)
# male partners past year			
Never had sex	0.2*** (0.1, 0.4)	0.2*** (0.1, 0.5)	0.01*** (0.002, 0.1)
0	0.3* (0.1, 0.8)	0.4* (0.2, 0.8)	0.1** (0.04, 0.2)
1 (reference group)	1.0	1.0	1.0
2 or more	0.7 (0.3, 1.6)	0.7 (0.3, 1.7)	2.4* (1.1, 5.2)
General Health status			
Excellent/Very good/Good (reference group)	1.0	1.0	1.0
Fair/Poor	1.3 (0.6, 2.5)	1.0 (0.6, 1.8)	1.5 (0.8, 2.9)
Gynecological Problem			
Yes (reference group)	1.0	1.0	
No	0.9 (0.5, 1.5)	0.6 (0.4, 0.9)	
Fecundity			
Surgically sterile	0.6 (0.3, 1.6)	0.2*** (0.1, 0.5)	
Impaired fertility, including sterile, nonsurgical	1.8 (0.8, 4.0)	0.7 (0.4, 1.3)	
Fecund (reference group)	1.0	1.0	

Notes: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Weighted data used for all analyses. p-values adjusted to account for multiple comparisons. Data from 2006-10 NSFG.

Table 1.7. Logistic Regression Odds Ratios and 95% Confidence Interval Showing the Likelihood of Using Sexual and Reproductive Health Services Among NHW Women.

	SRHS Use	BC Service Use	STI/HIV Service Use
	OR (95% CI), p-value	OR (95% CI), p-value	OR (95% CI), p-value
Predisposing Characteristics			
Age			
15-19	1.3 (0.9, 2.0)	2.7*** (1.8, 4.1)	2.2*** (1.4, 3.3)
20-24	2.2*** (1.5, 3.1)	2.8*** (2.1, 3.9)	4.1*** (3.0, 5.6)
25-34	1.5** (1.1, 2.0)	1.8*** (1.4, 2.3)	2.4*** (1.8, 3.1)
35-44 (reference group)	1.0	1.0	1.0
Education			
< high school	0.5*** (0.3, 0.7)	0.6** (0.4, 0.8)	1.3 (0.9, 1.9)
High school diploma or GED	0.7* (0.5, 0.9)	0.8* (0.6, 1.0)	1.1 (0.8, 1.4)
Some college	0.7* (0.6, 0.9)	0.9 (0.7, 1.0)	1.1 (0.8, 1.4)
College degree (reference group)	1.0	1.0	1.0
Enabling Characteristics			
Region			
Northeast	1.0 (0.7, 1.5)	0.9 (0.7, 1.2)	0.8 (0.6, 1.1)
Midwest	1.0 (0.7, 1.5)	0.9 (0.7, 1.1)	0.7* (0.5, 1.0)
South	1.0 (0.7, 1.4)	0.9 (0.7, 1.2)	1.1 (0.8, 1.5)
West (reference group)	1.0	1.0	1.0
Rural/urban			
Rural (reference group)	1.0	1.0	1.0
Urban	0.9 (0.7, 1.2)	1.0 (0.8, 1.2)	1.4** (1.1, 1.8)
Poverty Status			
133%FPL or below	0.9 (0.7, 1.1)	1.1 (0.9, 1.4)	1.0 (0.8, 1.2)
Greater than 133%FPL (reference group)	1.0	1.0	1.0
Current Insurance Status			
Private (reference group)	1.0	1.0	1.0
Public	1.4 (1.0, 1.9)	1.2 (0.9, 1.6)	2.0*** (1.5, 2.6)
Uninsured	0.4*** (0.3, 0.5)	0.7** (0.5, 0.9)	0.8 (0.6, 1.1)
Ever been pregnant			
Yes (reference group)	1.0	1.0	
No	0.8 (0.6, 1.0)	1.3 (1.0, 1.6)	
Need Characteristics			
Marital/cohabiting status			
Currently married/currently cohabiting (reference group)	1.0	1.0	1.0
Never married/not currently cohabiting	0.8* (0.6, 1.0)	1.1 (0.9, 1.4)	1.2 (1.0, 1.6)
# male partners past year			
Never had sex	0.1*** (0.1, 0.1)	0.1*** (0.1, 0.1)	0.04*** (0.02, 0.1)
0	0.5*** (0.3, 0.7)	0.4*** (0.3, 0.5)	0.6** (0.4, 0.8)
1 (reference group)	1.0	1.0	1.0
2 or more	1.4 (1.0, 1.9)	1.2 (0.9, 1.5)	2.3*** (1.8, 2.9)
General Health status			
Excellent/Very good/Good (reference group)	1.0	1.0	1.0
Fair/Poor	0.8 (0.5, 1.1)	0.8 (0.5, 1.1)	1.5 (1.1, 2.1)
Previous diagnosis w/gyn problem			
Yes (reference group)	1.0	1.0	
No	0.4*** (0.3, 0.5)	0.7*** (0.6, 0.8)	
Fecundity			
Surgically sterile	0.3*** (0.2, 0.4)	0.2*** (0.1, 0.2)	
Impaired fertility, including sterile, nonsurgical	0.8 (0.5, 1.1)	0.7* (0.5, 1.0)	
Fecund (reference group)	1.0	1.0	

Notes: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Weighted data used for all analyses. p-values adjusted to account for multiple comparisons. Data from 2006-10 NSFG.

Table 2.1. Descriptive Characteristics of AIAN and NHW Male Sample, 2006-10 NSFG.

	Full Sample (n=6,245)	AIAN Sample (n=923)	NHW Sample (n=5,322)	Rao-Scott χ^2 or t-test statistic	p
	% or Mean (SE)	% or Mean (SE)	% or Mean (SE)		
<i>Predisposing Characteristics</i>					
Race					
AIAN	10.9 (1.3)				
NHW	89.1 (1.3)				
Age, mean	29.5 (0.2)	29.1 (0.4)	29.6 (0.3)	-0.86	0.39
Age					
15-19	16.8 (0.7)	17.4 (1.6)	16.8 (0.8)	5.15	0.16
20-24	17.2 (1.3)	15.8 (1.9)	17.3 (1.4)		
25-34	31.3 (1.0)	36.2 (2.6)	30.7 (1.1)		
35-44	34.7 (1.2)	30.5 (2.5)	35.2 (1.4)		
# years of school, mean	13.1 (0.1)	11.2 (0.1)	13.4 (0.1)	-16.31	<0.001
Education					
< high school	25.2 (1.2)	50.6 (2.7)	22.1 (1.1)	221.33	< 0.001
High school diploma or GED	23.7 (1.0)	29.2 (2.5)	23.0 (1.1)		
Some college/Associates Degree	28.0 (1.3)	15.4 (1.6)	29.5 (1.4)		
College degree	23.2 (1.1)	4.8 (1.0)	25.4 (1.2)		
<i>Enabling Characteristics</i>					
Region					
Northeast	16.6 (1.7)	6.5 (1.1)	17.8 (1.9)	66.64	< 0.001
Midwest	30.0 (2.8)	13.6 (3.4)	32.0 (3.0)		
South	30.5 (2.7)	27.6 (4.7)	30.8 (2.7)		
West	23.0 (2.8)	52.4 (6.1)	19.4 (2.9)		
Rural/Urban					
Urban	73.7 (2.3)	80.5 (7.1)	72.8 (2.4)	0.87	0.35
Rural	26.3 (2.3)	19.5 (7.1)	27.2 (2.4)		
%FPL, mean	288.1 (3.6)	186.0 (6.4)	300.6 (3.8)	-14.85	<0.001
Poverty Status					
133%FPL or below	20.3 (0.9)	42.3 (2.4)	17.6 (1.0)	104.60	< 0.001
Greater than 133%FPL	79.7 (0.9)	57.7 (2.4)	82.4 (1.0)		
Health Insurance Status Past Year					
Uninsured 3+ months	23.1 (1.2)	46.4 (4.8)	20.2 (1.2)	39.96	< 0.001
Uninsured < 3months	76.9 (1.2)	53.6 (4.8)	79.8 (1.2)		
Current Insurance Status					
Private	69.4 (1.4)	34.3 (4.0)	73.7 (1.3)	203.40	< 0.001
Public	10.6 (0.7)	14.4 (1.8)	10.1 (0.8)		
Uninsured	20.0 (1.3)	51.3 (4.4)	16.2 (1.0)		
Has Usual Source of Care					
Yes	75.5 (0.9)	59.3 (3.5)	77.5 (1.0)	31.34	< 0.001
No	24.5 (0.9)	40.7 (3.5)	22.5 (1.0)		
Received physical exam in last 12 months					
Yes	47.1 (1.1)	41.9 (3.2)	47.8 (1.1)	3.22	0.07
No	52.9 (1.1)	58.1 (3.2)	52.2 (1.1)		
Received testicular exam in last 12 months					
Yes	36.9 (1.0)	31.3 (3.0)	37.5 (1.1)	3.44	0.06
No	63.1 (1.0)	68.7 (3.0)	62.5 (1.1)		
<i>Need Characteristics</i>					
Marital/cohabiting status					
Never married/not currently cohabiting	48.9 (1.1)	43.8 (2.5)	49.5 (1.2)	3.74	0.05
Currently married/currently cohabiting	51.1 (1.1)	56.2 (2.5)	50.5 (1.2)		
# female partners past year					
Never had sex	14.9 (1.0)	11.1 (1.3)	15.4 (1.2)	5.67	0.13
0	7.1 (0.5)	7.8 (1.5)	7.0 (0.5)		
1	63.9 (1.0)	65.5 (2.4)	63.8 (1.0)		
2 or more	14.1 (0.8)	15.6 (1.7)	13.9 (0.8)		
General Health status					
Fair/Poor	4.9 (0.5)	8.4 (1.6)	4.5 (0.5)	8.93	< 0.01
Excellent/Very good/Good	95.1 (0.5)	91.6 (1.6)	95.5 (0.5)		

Note: Percentages are weighted and do not always add to 100 due to rounding.

Table 2.2. Percentage of Men, by Race, Who Used Sexual & Reproductive Health Services in Last 12 Months, 2006-10 NSFG.

	Full Sample (n=6,245)		AIAN Sample (n=923)		NHW Sample (n=5,322)		Rao-Scott χ^2 statistic	p
	n	% (SE)	n	% (SE)	n	% (SE)		
Birth Control Service Use	699	9.9 (0.7)	129	10.2 (1.1)	570	9.8 (0.7)	0.0947	0.76
Birth control counseling or method, including condoms and sterilization	699	9.9 (0.7)	129	10.2 (1.1)	570	9.8 (0.7)	0.0947	0.76
Abortion advice or counseling	13	0.2 (0.1)	5	0.1 (0.1)	8	0.2 (0.1)	0.4406	0.51
STI/HIV Service Use	1384	19.6 (0.8)	259	23.7 (2.3)	1125	19.1 (0.8)	3.6926	0.05
STI advice or counseling	581	7.7 (0.5)	124	10.3 (1.1)	457	7.4 (0.5)	7.1525	< 0.01
STI testing or treatment	915	13.1 (0.7)	160	13.5 (1.5)	755	13.1 (0.7)	0.0803	0.78
HIV advice or counseling	551	7.1 (0.5)	125	10.1 (1.1)	426	6.8 (0.6)	8.4854	< 0.01
HIV testing	714	10.5 (0.5)	121	11.5 (1.6)	593	10.4 (0.6)	0.3945	0.53

Notes: Frequencies are unweighted, percentages are weighted. Sample sizes vary due to missing values for a small number of respondents. Data presented are for all AIAN and NHW in the study sample.

Table 2.3. Factors Associated With Use of Sexual and Reproductive Health Service Use Among AIAN Men, 2006-10 NSFG.

	Used Any BC Service			Used Any STI/HIV Service		
	% (se)	Rao-Scott χ^2 statistic	p	% (se)	Rao-Scott χ^2 statistic	p
Predisposing Characteristics						
Age						
15-19	15.1 (2.7)	12.58	< 0.01	29.0 (5.0)	2.04	0.56
20-24	16.4 (4.0)			21.2 (4.1)		
25-34	9.3 (2.0)			22.1 (2.9)		
35-44	5.3 (1.5)			23.7 (4.3)		
Education						
< high school	r (r)	0.85	0.84	19.9 (3.7)	5.30	0.15
High school diploma or GED	11.7 (2.5)			23.3 (3.4)		
Some college/Associates Degree	10.4 (3.4)			35.2 (6.5)		
College degree	r (r)			28.5 (11.4)		
Enabling Characteristics						
Region						
Northeast	8.2 (2.6)	1.03	0.79	30.3 (6.8)	1.41	0.70
Midwest	11.9 (3.0)			26.4 (4.8)		
South	9.1 (2.2)			21.1 (4.4)		
West	10.6 (1.5)			23.5 (3.5)		
Rural/Urban						
Urban	10.3 (1.3)	0.02	0.88	22.1 (2.1)	3.01	0.08
Rural	9.9 (2.2)			30.1 (5.6)		
Poverty Status						
133%FPL or below	12.6 (2.2)	2.44	0.12	24.1 (3.8)	0.04	0.84
Greater than 133%FPL	8.5 (1.3)			23.3 (2.5)		
Health Insurance Status Past Year						
Uninsured 3+ months	8.0 (1.5)	2.50	0.11	15.8 (1.8)	23.40	<0.001
Uninsured < 3months	12.1 (1.9)			30.6 (3.6)		
Current Insurance Status						
Private	10.2 (2.3)	5.46	0.07	25.3 (3.5)	9.96	< 0.01
Public	16.6 (3.1)			37.1 (4.8)		
Uninsured	8.4 (1.4)			18.8 (3.3)		
Has Usual Source of Care						
Yes	14.4 (1.7)	30.02	< 0.001	30.2 (2.9)	25.09	< 0.001
No	4.2 (0.9)			14.1 (2.5)		
Received physical exam in last 12 months						
Yes	18.4 (2.1)	46.73	< 0.001	37.5 (3.4)	69.03	< 0.001
No	4.4 (0.9)			13.8 (2.1)		
Received testicular exam in last 12 months						
Yes	21.2 (2.8)	43.68	< 0.001	43.8 (4.0)	91.48	< 0.001
No	5.2 (0.9)			14.5 (1.9)		
Need Characteristics						
Marital/cohabiting status						
Never married/not currently cohabiting	12.3 (1.7)	1.91	0.17	25.4 (3.5)	0.70	0.40
Currently married/currently cohabiting	8.6 (1.6)			22.3 (2.5)		
# female partners past year						
Never had sex	10.0 (3.2)	2.79	0.43	15.4 (4.2)	5.85	0.12
0	7.7 (5.0)			19.0 (6.0)		
1	9.4 (1.3)			24.1 (2.6)		
2 or more	15.2 (3.9)			29.7 (4.7)		
General Health status						
Fair/Poor	6.8 (2.6)	1.29	0.26	17.7 (5.7)	1.17	0.28
Excellent/Very good/Good	10.6 (1.1)			24.2 (2.3)		

Notes: Frequencies are unweighted, percentages are weighted.

Table 2.4. Factors Associated With Use of Sexual and Reproductive Health Service Use Among NHW Men, 2006-10 NSFG.

	NHW					
	Used Any BC Service			Used Any STI/HIV Service		
	% (se)	Rao-Scott χ^2 statistic	p	% (se)	Rao-Scott χ^2 statistic	p
<i>Predisposing Characteristics</i>						
Age						
15-19	15.2 (1.7)	21.41	< 0.001	18.2 (1.7)	13.69	< 0.01
20-24	12.7 (2.3)			22.8 (2.8)		
25-34	8.8 (1.0)			21.9 (1.5)		
35-44	6.7 (1.0)			15.1 (1.3)		
Education						
< high school	11.2 (1.2)	2.58	0.46	18.9 (2.0)	1.59	0.66
High school diploma or GED	9.5 (1.4)			20.8 (1.7)		
Some college/Associates Degree	10.3 (1.5)			19.1 (1.8)		
College degree	8.4 (1.1)			17.6 (1.5)		
<i>Enabling Characteristics</i>						
Region						
Northeast	10.9 (1.6)	0.65	0.88	18.9 (1.7)	0.98	0.81
Midwest	9.3 (0.8)			18.0 (1.7)		
South	10.0 (1.9)			20.0 (1.6)		
West	9.5 (1.2)			19.4 (1.7)		
Rural/Urban						
Urban	10.4 (0.8)	2.18	0.14	20.8 (1.0)	9.35	< 0.01
Rural	8.4 (1.2)			14.3 (1.7)		
Poverty Status						
133%FPL or below	12.8 (1.8)	4.26	< 0.05	20.4 (2.2)	0.42	0.51
Greater than 133%FPL	9.2 (0.7)			18.8 (0.9)		
Health Insurance Status Past Year						
Uninsured 3+ months	8.2 (1.4)	1.42	0.23	22.1 (2.2)	2.38	0.12
Uninsured < 3months	10.2 (0.8)			18.3 (1.0)		
Current Insurance Status						
Private	8.9 (0.8)	18.11	< 0.001	15.8 (0.9)	55.82	< 0.001
Public	18.1 (2.7)			37.8 (3.6)		
Uninsured	9.0 (1.6)			22.3 (2.4)		
Has Usual Source of Care						
Yes	10.6 (0.9)	5.26	< 0.05	20.1 (1.0)	5.41	< 0.05
No	7.2 (1.1)			15.6 (1.6)		
Received physical exam in last 12 months						
Yes	16.5 (1.4)	102.62	< 0.001	28.5 (1.4)	99.73	< 0.001
No	3.8 (0.5)			10.5 (1.0)		
Received testicular exam in last 12 months						
Yes	19.9 (1.5)	210.84	< 0.001	31.8 (1.4)	145.05	< 0.001
No	3.8 (0.5)			11.4 (0.9)		
<i>Need Characteristics</i>						
Marital/cohabiting status						
Never married/not currently cohabiting	11.3 (1.0)	5.44	< 0.05	22.3 (1.1)	14.35	< 0.001
Currently married/currently cohabiting	8.4 (0.9)			16.0 (1.2)		
# female partners past year						
Never had sex	7.4 (1.0)	49.45	< 0.001	9.1 (1.0)	140.86	< 0.001
0	4.4 (1.2)			23.4 (3.1)		
1	9.1 (0.9)			16.9 (1.0)		
2 or more	18.6 (2.4)			37.7 (2.5)		
General Health status						
Fair/Poor	7.2 (2.3)	1.11	0.29	25.1 (3.9)	2.91	0.09
Excellent/Very good/Good	10.0 (0.7)			18.8 (0.9)		

Notes: Frequencies are unweighted, percentages are weighted.

Table 2.5. Logistic Regression Odds Ratios and 95% Confidence Interval Showing the Likelihood of Using Sexual and Reproductive Health Services Among Men, Full Sample.

	Any BC Service	Any STI/HIV Service
	OR (95% CI), p-value	OR (95% CI), p-value
Age (AIAN vs NHW)		
15-19	1.0 (0.6, 1.7)	2.2** (1.3, 3.6)
20-24	1.5 (0.8, 2.9)	1.0 (0.6, 1.5)
25-34	1.1 (0.7, 1.9)	1.1 (0.8, 1.6)
35-44 (reference group)	0.7 (0.3, 1.6)	2.0* (1.2, 3.3)
Poverty Status (AIAN vs NHW)		
133%FPL or below	1.0 (0.6, 1.7)	1.5 (0.9, 2.3)
Greater than 133%FPL (reference group)	0.9 (0.5, 1.4)	1.5* (1.0, 2.0)
Current Insurance Status (AIAN vs NHW)		
Private (reference group)	1.2 (0.7, 2.0)	2.0*** (1.5, 2.6)
Public	1.0 (0.5, 1.9)	1.0 (0.7, 1.6)
Uninsured	0.8 (0.5, 1.4)	1.3 (1.0, 1.7)
Rural/urban (AIAN vs NHW)		
Rural (reference group)	1.1 (0.5, 2.5)	3.2** (1.7, 5.8)
Urban	1.0 (0.7, 1.4)	1.2 (0.9, 1.5)
Region (AIAN vs NHW)		
Northeast	0.8 (0.3, 1.8)	2.2** (1.2, 4.0)
Midwest	1.5 (0.7, 3.4)	1.9 (0.9, 4.1)
South	0.9 (0.4, 1.9)	1.2 (0.7, 2.0)
West (reference group)	1.1 (0.7, 1.6)	1.4 (1.0, 2.0)
Education		
< high school	0.8 (0.5, 1.2)	1.0 (0.6, 1.6)
High school diploma or GED	1.0 (0.6, 1.5)	1.1 (0.8, 1.5)
Some college	1.0 (0.6, 1.5)	1.0 (0.7, 1.7)
College degree (reference group)	1.0	1.0
Usual Source of Care		
Yes	1.0	1.3* (1.0, 1.7)
No	0.8 (0.5, 1.1)	1.0
Physical Exam		
Yes (reference group)	1.0	1.0
No	0.5* (0.3, 0.9)	0.5*** (0.3, 0.7)
Testicular Exam		
Yes (reference group)	1.0	1.0
No	0.3*** (0.2, 0.4)	0.4*** (0.3, 0.5)
Marital/cohabiting status		
Currently married/currently cohabiting (reference group)	1.0	1.0
Never married/not currently cohabiting	1.0 (0.6, 1.5)	1.4* (1.0, 1.9)
# male partners past year		
Never had sex	0.4*** (0.2, 0.6)	0.3*** (0.2, 0.4)
0	0.5 (0.3, 1.0)	1.2 (0.8, 1.9)
1 (reference group)	1.0	1.0
2 or more	1.6* (1.0, 2.5)	2.0*** (1.5, 2.7)
General Health status		
Fair/Poor	0.9 (0.5, 1.6)	1.3 (0.8, 2.0)
Excellent/Very good/Good (reference group)	1.0	1.0

Notes: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Weighted data used in all analyses. p-values adjusted for multiple comparisons. Odds ratios for Age, Region, Rural/urban, poverty status, and current insurance status indicate differences in service use between AIANs and NHWs. Odds ratios greater than 1.0 indicate AIANs are more likely to use services than NHWs. Data from 2006-10 NSFG.

Table 2.6. Logistic Regression Odds Ratios and 95% Confidence Interval Showing the Likelihood of Using Sexual & Reproductive Health Services Among AIAN Men.

	BC Service Use	STI/HIV Service Use
	OR (95% CI), p-value	OR (95% CI), p-value
<i>Predisposing Characteristics</i>		
Age		
15-19	2.6 (0.9, 8.0)	1.3 (0.5, 3.5)
20-24	4.3** (1.6, 11.3)	0.9 (0.5, 1.7)
25-34	2.2 (1.1, 4.7)	1.1 (0.5, 2.1)
35-44 (reference group)	1.0	1.0
Education		
< high school	1.9 (0.2, 14.5)	0.7 (0.1, 3.7)
High school diploma or GED	1.8 (0.3, 11.6)	0.7 (0.2, 3.0)
Some college	1.4 (0.2, 9.6)	1.3 (0.3, 5.0)
College degree (reference group)	1.0	1.0
<i>Enabling Characteristics</i>		
Region		
Northeast	0.6 (0.3, 1.6)	1.5 (0.8, 2.7)
Midwest	1.2 (0.5, 2.7)	1.2 (0.6, 2.5)
South	1.0 (0.5, 1.9)	1.0 (0.6, 1.8)
West (reference group)	1.0	1.0
Rural/urban		
Rural (reference group)	1.0	1.0
Urban	1.5 (0.8, 3.0)	1.0 (0.5, 1.9)
Poverty Status		
133%FPL or below	1.0 (0.6, 1.6)	1.4 (0.9, 2.2)
Greater than 133%FPL (reference group)	1.0	1.0
Current Insurance Status		
Private (reference group)	1.0	1.0
Public	1.5 (0.7, 3.4)	1.8 (0.9, 3.8)
Uninsured	1.7 (0.8, 3.3)	1.3 (0.7, 2.3)
Usual Source of Care		
Yes	3.4*** (1.7, 6.6)	1.9* (1.1, 3.1)
No (reference group)	1.0	1.0
Physical Exam		
Yes (reference group)	1.0	1.0
No	0.4* (0.1, 0.9)	0.7 (0.4, 1.1)
Testicular Exam		
Yes (reference group)	1.0	1.0
No	0.4** (0.1, 0.9)	0.3*** (0.2, 0.5)
<i>Need Characteristics</i>		
Marital/cohabiting status		
Currently married/currently cohabiting (reference group)	1.0	1.0
Never married/not currently cohabiting	1.1 (0.5, 2.1)	1.5 (0.8, 2.9)
# female partners past year		
Never had sex	0.4 (0.1, 1.2)	0.2*** (0.1, 0.4)
0	1.1 (0.3, 4.2)	1.0 (0.4, 2.6)
1 (reference group)	1.0	1.0
2 or more	1.6 (0.8, 3.4)	1.1 (0.6, 2.0)
General Health status		
Fair/Poor	0.8 (0.2, 2.5)	0.9 (0.3, 2.8)
Excellent/Very good/Good (reference group)	1.0	1.0

Notes: * p < 0.05, ** p < 0.01, *** p < 0.001. Weighted data used for all analyses. p-values adjusted to account for multiple comparisons. Data from 2006-10 NSFG.

Table 2.7. Logistic Regression Odds Ratios and 95% Confidence Interval Showing the Likelihood of Using Sexual & Reproductive Health Services Among NHW Men.

	BC Service Use	STI/HIV Service Use
	OR (95% CI), p-value	OR (95% CI), p-value
<i>Predisposing Characteristics</i>		
Age		
15-19	3.3*** (1.9, 5.9)	1.1 (0.7, 1.8)
20-24	2.0* (1.2, 3.5)	1.5 (1.0, 2.3)
25-34	1.5* (1.0, 2.2)	1.8*** (1.3, 2.4)
35-44 (reference group)	1.0	1.0
Education		
< high school	0.7 (0.4, 1.1)	1.1 (0.6, 1.8)
High school diploma or GED	0.9 (0.6, 1.4)	1.2 (0.9, 1.6)
Some college	1.0 (0.6, 1.5)	0.9 (0.7, 1.2)
College degree (reference group)	1.0	1.0
<i>Enabling Characteristics</i>		
Region		
Northeast	0.9 (0.6, 1.5)	0.8 (0.5, 1.1)
Midwest	0.9 (0.6, 1.3)	0.9 (0.6, 1.2)
South	1.0 (0.6, 1.7)	1.0 (0.7, 1.3)
West (reference group)	1.0	1.0
Rural/urban		
Rural (reference group)	1.0	1.0
Urban	1.1 (0.7, 1.7)	1.5** (1.1, 2.0)
Poverty Status		
133%FPL or below	1.4 (1.0, 2.0)	0.9 (0.6, 1.2)
Greater than 133%FPL (reference group)	1.0	1.0
Current Insurance Status		
Private (reference group)	1.0	1.0
Public	1.9** (1.3, 2.8)	3.2*** (2.2, 4.7)
Uninsured	1.7* (1.1, 2.7)	2.1*** (1.5, 3.0)
Usual Source of Care		
Yes	1.2 (0.8, 1.7)	1.2 (0.9, 1.6)
No (reference group)	1.0	1.0
Physical Exam		
Yes (reference group)	1.0	1.0
No	0.5* (0.3, 1.0)	0.5*** (0.3, 0.7)
Testicular Exam		
Yes (reference group)	1.0	1.0
No	0.2*** (0.1, 0.4)	0.4*** (0.3, 0.5)
<i>Need Characteristics</i>		
Marital/cohabiting status		
Currently married/currently cohabiting (reference group)	1.0	1.0
Never married/not currently cohabiting	1.0 (0.6, 1.5)	1.3 (1.0, 1.8)
# female partners past year		
Never had sex	0.4*** (0.2, 0.6)	0.3*** (0.3, 0.5)
0	0.5* (0.2, 0.9)	1.3 (0.8, 2.1)
1 (reference group)	1.0	1.0
2 or more	1.6 (1.0, 2.6)	2.2*** (1.6, 3.0)
General Health status		
Fair/Poor	0.9 (0.5, 1.8)	1.2 (0.9, 1.7)
Excellent/Very good/Good (reference group)	1.0	1.0

Notes: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Weighted data used for all analyses. p-values adjusted to account for multiple comparisons. Data from 2006-10 NSFG.

Table 3.1 Descriptive Characteristics, Female AIAN & NHWs, 2002 & 2006-10 NSFG.

	Full Sample (n=11,427)	AIAN Sample (n=1,176)	NHW Sample (n=10,251)	Rao-Scott χ^2 or F-test statistic (AIAN vs NHW)	p
	% or Mean (SE)	% or Mean (SE)	% or Mean (SE)		
Predisposing Characteristics					
Race					
AIAN	7.17%				
NHW	92.83				
Age, mean	30.0	28.3 (0.4)	30.1 (0.2)	20.76	< 0.001
Age					
15-19	16.2 (0.5)	20.7 (1.8)	15.9 (0.5)	15.28	< 0.01
20-24	15.9 (0.7)	17.6 (1.6)	15.7 (0.7)		
25-34	31.2 (0.7)	31.7 (1.7)	31.2 (0.7)		
35-44	36.7 (0.8)	30.0 (2.1)	37.2 (0.8)		
# Years of School, mean	13.4	11.7 (0.1)	13.5 (0.05)	230.32	< 0.001
Education					
< high school	18.9 (0.5)	42.0 (2.0)	17.1 (0.5)	289.15	< 0.001
High school diploma or GED	25.5 (0.6)	26.8 (1.7)	25.4 (0.7)		
Some college	29.3 (0.8)	23.9 (1.9)	29.7 (0.8)		
College degree	26.3 (0.8)	7.3 (1.0)	27.8 (0.9)		
Enabling Characteristics					
Region					
Northeast	16.2 (1.0)	8.3 (1.4)	16.8 (1.0)	81.59	< 0.001
Midwest	29.0 (1.5)	15.6 (3.4)	30.0 (1.6)		
South	31.9 (1.7)	22.0 (4.0)	32.7 (1.7)		
West	22.9 (1.5)	54.0 (5.9)	20.5 (1.4)		
Rural/urban					
Urban	75.7 (1.4)	73.7 (7.0)	75.9 (1.4)	0.10	0.75
Rural	24.3 (1.4)	26.3 (7.0)	24.1 (1.4)		
%Federal Poverty Level, mean	274	163.8 (6.4)	282.5 (2.9)	259.15	< 0.001
Poverty Status					
133%FPL or below	24.5 (0.8)	54.7 (2.1)	22.2 (0.7)	352.57	< 0.001
Greater than 133%FPL	75.5 (0.8)	45.3 (2.1)	77.8 (0.7)		
Current Health Insurance Status					
Private	71.8 (0.9)	28.0 (3.0)	75.2 (0.8)	326.73	< 0.001
Public	12.9 (0.6)	31.1 (2.4)	11.5 (0.6)		
Uninsured	15.3 (0.7)	41.0 (3.4)	13.3 (0.6)		
Need Characteristics					
Marital/cohabiting status					
Never married/not currently cohabiting	42.7 (0.8)	48.0 (2.0)	42.3 (0.9)	6.30	< 0.05
Currently married/currently cohabiting	57.3 (0.8)	52.0 (2.0)	57.7 (0.9)		
# MalePartners Past Year					
Never had sex	12.4 (0.6)	13.7 (1.3)	12.4 (0.6)	4.45	0.22
0	7.3 (0.4)	8.8 (1.3)	7.2 (0.4)		
1	70.1 (0.7)	69.2 (1.7)	70.2 (0.8)		
2 or more	10.1 (0.5)	8.4 (1.0)	10.2 (0.5)		
General Health Status					
Fair/Poor	6.3 (0.3)	12.5 (1.4)	5.8 (0.3)	40.31	< 0.001
Excellent/Very good/Good	93.7 (0.3)	87.5 (1.4)	94.2 (0.3)		
Gynecological problem					
No	66.2 (0.7)	76.0 (1.6)	65.5 (0.7)	34.92	< 0.001
Yes	33.8 (0.7)	24.0 (1.6)	34.5 (0.7)		
Ever Been Pregnant					
No	38.4 (0.9)	30.9 (1.8)	39.0 (0.9)	19.09	< 0.001
Yes	61.6 (0.9)	69.1 (1.8)	61.0 (0.9)		
Fecundity Status					
Surgically sterile	23.7 (0.7)	22.0 (1.8)	23.8 (0.7)	2.07	0.36
Impaired fertility, including sterile, nonsurgical	11.6 (0.4)	10.7 (1.0)	11.7 (0.5)		
Fecund	64.6 (0.8)	67.3 (2.2)	64.4 (0.8)		

Note: Frequencies are unweighted. Percentages are weighted and do not always add to 100 due to rounding.

Table 3.2. Results from Bivariate Analyses of AIAN and NHW Women's SRHS Use by Recession Period, 2002 & 2006-10 NSFG.

	Recession1					Recession_B							
	Pre-Recession		Recession/Post-Recession			Pre-Recession		Early Recession		Post-Recession			Difference by Period
	%	Group Difference within Period, p	%	Group Difference within Period, p	Difference from Pre-Recession	%	Group Difference within Period, p	%	Group Difference within Period, p	%	Group Difference within Period, p		
Full Sample													
SRHS	73%	n/a	71%	n/a		73%	n/a	71%	n/a	72%	n/a	p = 0.29	
BC Services	42%	n/a	41%	n/a		42%	n/a	41%	n/a	43%	n/a	p= 0.51	
BC Method at Interview	63%	n/a	63%	n/a		63%	n/a	63%	n/a	68%	n/a	p= 0.39	
Medical BC Method at Interview	26%	n/a	26%	n/a		26%	n/a	26%	n/a	29%	n/a	p= 0.07	
SRHS													
AIAN	72%	0.38	69%	0.29	0.42	72%	0.53	69%	0.76	67%	0.15	p= 0.38	
NHW	74%		72%		0.31	73%		71%		73%		p= 0.36	
BC Service													
AIAN	39%	0.14	35%	0.06	0.39	40%	0.15	29%	0.05	39%	0.33	p= 0.23	
NHW	43%		43%		0.7	43%		42%		44%		p= 0.66	
BC Method at Interview													
AIAN	55%	< 0.001	58%	< 0.001	0.75	55%	< 0.001	51%	< 0.05	59%	< 0.01	p= 0.55	
NHW	64%		68%		0.09	64%		64%		69%		p= 0.37	
Medical BC Method at Interview													
AIAN	19%	< 0.01	21%	0.07	0.84	19%	< 0.01	14%	< 0.05	25%	0.45	p= 0.48	
NHW	27%		29%		0.07	27%		27%		30%		p= 0.07	

Note: Recession1: Pre-Recession=Respondent interviewed in 2002, 2003, 2006, 2007. Recession=Respondent interviewed in 2008-2010. Recession_B: Pre-Recession=Respondent interviewed in 2002, 2003, 2006, Jan-Nov07. Early Recession=Respondent interviewed in Dec07-Nov08. Recession=Respondent interviewed in Dec08-Jun2010. Percentages are weighted and do not always add to 100 due to rounding.

Table 3.3. Results from Bivariate Analyses of AIAN and NHW Women's SRHS Use by Unemployment and Time.

Variable	County Unemployment		Male Unemployment, State		Time (categorical)	
	Unadjusted ORs	P-values	Unadjusted ORs	P-values	Chi-square test for difference in use by Year	P-values
Full Sample						
SRHS	1.0	0.55	1.00	0.62	17.5	<0.01
BC Services	1.0	0.62	1.00	0.46	6.2	0.40
BC at Interview	1.1	0.25	1.10	0.13	9.9	0.13
RxBCatInterview	0.9	0.23	1.00	1.00	7.1	0.31
SRHS						
AIAN	1.0	0.89	1.00	0.57		
NHW	1.0	0.60	1.00	0.55		
BC Service						
AIAN	1.0	0.18	1.10	0.08		
NHW	1.0	0.60	1.00	0.66		
BC Method at Interview						
AIAN	1.2	0.35	1.30	0.05		
NHW	1.1	0.21	1.10	0.23		
Medical BC Method at Interview						
AIAN	1.0	0.84	1.00	0.79		
NHW	0.9	0.37	1.00	0.95		

Note: Results for unemployment analyses are from weighted, unadjusted logistic regression models. Results for time analyses are from weighted chi-square tests. Full sample indicates all AIAN and NHW women in study. Data from 2002 & 2006-10 NSFG.

Table 3.4. AIAN and NHW Women's SRHS Use and the Recession Measured by Regional Unemployment, ORs from Logistic Regression Models, 2002 & 2006-10 NSFG.

	Equation 1- Unemployment											
	Full Sample				AIAN Sample				NHW Sample			
	SRHS Use	BC Service Use	BC Method at Interview	Medical BC Method at Interview	SRHS Use	BC Service Use	BC Method at Interview	Medical BC Method at Interview	SRHS Use	BC Service Use	BC Method at Interview	Medical BC Method at Interview
<i>Recession Variables</i>	OR, p-value	OR, p-value	OR, p-value	OR, p-value	OR, p-value	OR, p-value	OR, p-value	OR, p-value	OR, p-value	OR, p-value	OR, p-value	OR, p-value
County Unemployment Rate	0.9	1.0	1.1	0.9	0.9	1.0	1.2	0.9	0.9	1.0	1.1	0.9
County Unemployment Rate x AIAN	1.0	1.1	1.0	1.0								
Male Unemployment Rate, State	1.0	1.0	1.0	1.0	0.9	1.0	1.1	1.0	1.0	1.0	1.1	1.0
Male Unemployment Rate, State x AIAN	0.9	1.0	1.0	1.0								

Note: p-values adjusted for multiple comparisons. *p<0.05, **p<0.01, ***p<0.001. Controlling for covariates: age, education, region, rural/urban residence, poverty status, current health insurance status, marital status, number of male partners last year (SRHS & BC service analyses), general health status, gynecological problem, ever pregnant, fecundity status (SRHS & BC service analyses), and SRHS use last 12 months (BC at Interview & Medical BC Method Use).

Table 3.5. AIAN and NHW Women's SRHS Use and the Recession Measured by Regional Unemployment, Controlling for Time, ORs from Logistic Regression Models, 2002 & 2006-10 NSFG.

	Equation 2- Unemployment + Linear Time Trend							
	Full Sample				AIAN Sample			
	SRHS Use	BC Service Use	BC Method at Interview	Medical BC Method at Interview	SRHS Use	BC Service Use	BC Method at Interview	Medical BC Method at Interview
<i>Recession Variables</i>	OR, p-value	OR, p-value	OR, p-value	OR, p-value	OR, p-value	OR, p-value	OR, p-value	OR, p-value
County Unemployment Rate	1.0	1.0	1.1	0.9	Failed to Converge			
County Unemployment Rate x AIAN	1.0	1.1	1.0	1.0				
Time, Linear	1.0	1.0	1.0	1.0				
State Unemployment Rate among Males	1.0	1.0	1.1	1.0	Failed to Converge			
State Unemployment Rate among Males x AIAN	0.9	1.0	1.0	1.0				
Time, Linear	1.0	1.0	1.0	1.0				

Note: p-values adjusted for multiple comparisons. *p<0.05, **p<0.01, ***p<0.001. Controlling for covariates: age, education, region, rural/urban residence, poverty status, current health insurance status, marital status, number of male partners last year (SRHS & BC service analyses), general health status, gynecological problem, ever pregnant, fecundity status (SRHS & BC service analyses), and SRHS use last 12 months (BC at Interview & Medical BC Method Use).

Table 3.6. AIAN and NHW Women's SRHS Use and the Recession Measured by Time Point, ORs from Logistic Regression Models, 2002 & 2006-10 NSFG.

	Equation 3- Recession Time Periods											
	Full Sample				AIAN Sample				NHW Sample			
	SRHS Use	BC Service Use	BC Method at Interview	Medical BC Method at Interview	SRHS Use	BC Service Use	BC Method at Interview	Medical BC Method at Interview	SRHS Use	BC Service Use	BC Method at Interview	Medical BC Method at Interview
<i>Recession Variables</i>	OR, p-value	OR, p-value	OR, p-value	OR, p-value	OR, p-value	OR, p-value	OR, p-value	OR, p-value	OR, p-value	OR, p-value	OR, p-value	OR, p-value
Recession vs Pre-Recession					0.9	1.0	1.1	0.9	0.9	0.9	1.2*	1.1
Recession x AIAN	1.0	1.1	0.9	0.8								
AIAN: Recession vs Pre-Recession	0.7	0.9	1.1	0.9								
NHW: Recession vs Pre-Recession	0.8***	0.9	1.1	1.0								
Early Recession vs Pre-Recession					1.1	1.0	0.8	0.7	0.9	0.9	1.1	1.0
Early Recession x AIAN	0.9	1.2	0.7	0.6								
AIAN: Early vs Pre-Recession	0.9	0.8	0.8	0.8								
NHW: Early vs Pre-Recession	0.8*	0.9	1.1	1.0								
Recession vs Pre-Recession					0.8	1.0	1.2	1.0	0.9	0.9	1.2	1.1
Recession/Post Recession x AIAN	0.9	1.1	1.0	0.9								
AIAN: Recession vs Pre-Recession	0.6**	0.9	1.2	0.9								
NHW: Recession vs. Pre-Recession	0.8**	0.9	1.1	1.0								

Note: p-values adjusted for multiple comparisons. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Controlling for covariates: age, education, region, rural/urban residence, poverty status, current health insurance status, marital status, number of male partners last year (SRHS & BC service analyses), general health status, gynecological problem, ever pregnant, fecundity status (SRHS & BC service analyses), and SRHS use last 12 months (BC at Interview & Medical BC Method Use).

Table 3.7. AIAN and NHW Women's SRHS Use and the Recession Measured by Time Point, Controlling for State Fixed Effects, ORs from Logistic Regression Models, 2002 & 2006-10 NSFG.

<i>Recession Variables</i>	Equation 4- Recession Time Periods + State Fixed Effects											
	Full Sample				AIAN Sample				NHW Sample			
	SRHS Use	BC Service Use	BC Method at Interview	Medical BC Method at Interview	SRHS Use	BC Service Use	BC Method at Interview	Medical BC Method at Interview	SRHS Use	BC Service Use	BC Method at Interview	Medical BC Method at Interview
	OR, p-value	OR, p-value	OR, p-value	OR, p-value	OR, p-value	OR, p-value	OR, p-value	OR, p-value	OR, p-value	OR, p-value	OR, p-value	OR, p-value
Recession vs Pre-Recession					0.8	1.0	Failed to Converge	1.1	0.9	0.9	1.2	1.1
Recession x AIAN	1.0	1.1	0.9	0.7								
AIAN: Recession vs Pre-Recession	0.7	0.9	1.1	0.9								
NHW: Recession vs Pre-Recession	0.8*	0.9	1.1	1.0								
Early Recession vs Pre-Recession					1.0	0.9	Failed to Converge	0.9	0.9	0.8*	1.1	1.0
Early Recession x AIAN	1.2	1.1	0.6	0.6								
AIAN: Early vs Pre-Recession	0.8	0.8	0.8	0.8								
NHW: Early vs Pre-Recession	0.8	0.9	1.0	1.0								
Recession vs Pre-Recession					0.8	1.1	Failed to Converge	1.2	0.9	0.9	1.2	1.2
Recession/Post Recession x AIAN	0.9	1.0	1.0	0.7								
AIAN: Recession vs Pre-Recession	0.6	0.9	1.2	1.0								
NHW: Recession vs. Pre-Recession	0.8*	0.9	1.2	1.0								

Note: p-values adjusted for multiple comparisons. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Controlling for covariates: age, education, region, rural/urban residence, poverty status, current health insurance status, marital status, number of male partners last year (SRHS & BC service analyses), general health status, gynecological problem, ever pregnant, fecundity status (SRHS & BC service analyses), and SRHS use last 12 months (BC at Interview & Medical BC Method Use).

Table 3.8. AIAN and NHW Women's SRHS Use and the Recession Measured by Time Point, Controlling for State Fixed Effects and Linear Time Trend, Estimates from Linear Probability Models, 2002 & 2006-10 NSFG.

Equation 5- Recession Time Periods + State Fixed Effects + Linear Time Trend								
<i>Recession Variables</i>	Full Sample				AIAN Sample			
	SRHS Use	BC Service Use	BC Method at Interview	Medical BC Method at Interview	SRHS Use	BC Service Use	BC Method at Interview	Medical BC Method at Interview
	OR, p-value	OR, p-value	OR, p-value	OR, p-value	OR, p-value	OR, p-value	OR, p-value	OR, p-value
Recession vs Pre-Recession	-0.002	-0.008	0.03	0.02**	Failed to Converge			
AIAN (NHW reference)	0.1	-0.03	-0.07	-0.17*				
Recession x AIAN	-0.002	0.02	-0.02	-0.05				
Time	-0.006	-0.01	0.003	-0.009				
Early Recession vs Pre-Recession	-0.002	-0.02	0.02	0.004	Failed to Converge			
Recession vs Pre-Recession	0.002	0.004	0.03	0.03***				
AIAN (NHW reference)	0.09	-0.03	-0.07	-0.17*				
Early Recession x AIAN	0.03	0.03	-0.06	-0.07*				
Recession/Post Recession x AIAN	-0.02	0.02	-0.003	-0.03	Failed to Converge			
Time	-0.006	-0.01	0.003	-0.01				

Note: p-values adjusted for multiple comparisons. *p<0.05, **p<0.01, ***p<0.001. Controlling for covariates: age, education, region, rural/urban residence, poverty status, current health insurance status, marital status, number of male partners last year (SRHS & BC service analyses), general health status, gynecological problem, ever pregnant, fecundity status (SRHS & BC service analyses), and SRHS use last 12 months (BC at Interview & Medical BC Method Use).

Table 3.9. Logistic Regression Odds Ratios and 95% Confidence Interval Showing the Likelihood of Using Sexual and Reproductive Health Services Among AIAN and NHW Women, Controlling for Recession Time Period, 2002 & 2006-10 NSFG.

	SRHS Use (n=11,339)	BC Service Use (n=11,340)	BC at Interview (n=7,891)	Medical BC at Interview (n=4,802)
	OR (95% CI), p-value	OR (95% CI), p-value	OR (95% CI), p-value	OR (95% CI), p-value
Recession_B (AIAN vs NHW)				
Pre-Recession	0.9 (0.7, 1.2)	0.8 (0.7, 1.0)	0.7* (0.5, 0.9)	0.7** (0.5, 0.9)
Early Recession	1.0 (0.6, 1.5)	0.8 (0.5, 1.1)	0.5* (0.3, 0.8)	0.5* (0.3, 0.9)
Recession/Post-Recession	0.7** (0.6, 0.9)	0.8 (0.6, 1.0)	0.7 (0.5, 1.1)	0.6* (0.4, 0.9)
Age (AIAN vs NHW)				
15-19	0.7 (0.5, 1.0)	0.6** (0.5, 0.8)	0.4*** (0.2, 0.6)	0.7 (0.4, 1.3)
20-24	1.2 (0.8, 1.8)	0.9 (0.6, 1.2)	0.5* (0.3, 0.8)	0.5* (0.3, 0.8)
25-34	0.9 (0.7, 1.2)	0.8 (0.7, 1.0)	0.6* (0.4, 0.9)	0.6* (0.4, 0.9)
35-44	0.9 (0.7, 1.3)	0.7* (0.5, 0.9)	1.1 (0.7, 1.7)	0.5* (0.3, 0.9)
Region (AIAN vs NHW)				
Northeast	1.6 (0.8, 2.9)	0.8 (0.6, 1.2)	0.5* (0.3, 0.9)	0.7 (0.4, 1.1)
Midwest	1.0 (0.7, 1.6)	0.7 (0.5, 1.0)	0.5*** (0.3, 0.7)	1.0 (0.5, 1.8)
South	0.6* (0.4, 0.8)	0.6* (0.4, 0.9)	0.6 (0.4, 1.0)	0.7 (0.4, 1.2)
West	0.8 (0.7, 1.0)	0.8 (0.7, 1.0)	0.8 (0.6, 1.1)	0.5*** (0.4, 0.7)
Rural/urban (AIAN vs NHW)				
Rural	1.3 (1.0, 1.7)	1.2 (0.9, 1.6)	0.4*** (0.3, 0.6)	1.2 (0.6, 2.3)
Urban	0.8* (0.6, 0.9)	0.7*** (0.6, 0.9)	0.8 (0.6, 1.0)	0.6*** (0.4, 0.7)
Poverty Status (AIAN vs NHW)				
133%FPL or below	1.0 (0.8, 1.2)	0.8 (0.7, 1.0)	0.7 (0.5, 1.0)	0.8 (0.5, 1.1)
Greater than 133%FPL	1.0 (0.8, 1.3)	0.8 (0.7, 1.0)	0.7 (0.5, 1.0)	0.5*** (0.4, 0.7)
Current Insurance Status (AIAN vs NHW)				
Private	1.0 (0.7, 1.3)	0.7* (0.6, 0.9)	0.6** (0.4, 0.8)	0.3*** (0.2, 0.5)
Public	1.1 (0.8, 1.5)	1.0 (0.7, 1.3)	0.8 (0.5, 1.2)	1.1 (0.7, 1.7)
Uninsured	1.0 (0.8, 1.4)	1.0 (0.8, 1.3)	1.0 (0.7, 1.5)	1.3 (1.0, 2.0)
Education				
< high school	0.5*** (0.4, 0.6)	0.5*** (0.4, 0.6)	0.9 (0.7, 1.2)	0.8 (0.6, 1.1)
High school diploma or GED	0.6*** (0.5, 0.7)	0.6*** (0.6, 0.7)	1.1 (0.8, 1.3)	1.0 (0.8, 1.2)
Some college	0.8*** (0.7, 0.9)	0.9* (0.8, 1.0)	1.3 (1.0, 1.6)	1.0 (0.8, 1.2)
College degree (reference group)	1.0	1.0	1.0	1.0
Marital/cohabiting status				
Currently married/currently cohabiting (reference group)	1.0	1.0	1.0	1.0
Never married/not currently cohabiting	1.0 (0.8, 1.1)	1.2* (1.0, 1.3)	0.7*** (0.6, 0.8)	1.4*** (1.2, 1.6)
# male partners past year				
Never had sex	0.1*** (0.1, 0.1)	0.1*** (0.1, 0.1)		
0	0.5*** (0.4, 0.6)	0.4*** (0.3, 0.5)		
1 (reference group)	1.0	1.0		
2 or more	1.1 (1.0, 1.3)	1.1 (0.9, 1.2)		
General Health status				
Excellent/Very good/Good (reference group)	1.0	1.0	1.0	1.0
Fair/Poor	1.0 (0.8, 1.2)	0.8 (0.7, 1.0)	1.0 (0.8, 1.4)	0.9 (0.6, 1.3)
Gynecological Problem				
Yes (reference group)	1.0	1.0	1.0	1.0
No	0.4*** (0.4, 0.5)	0.6*** (0.6, 0.7)	1.1 (0.9, 1.3)	1.1 (0.9, 1.2)
Ever been pregnant				
Yes (reference group)	1.0	1.0	1.0	1.0
No	0.7*** (0.6, 0.8)	1.0 (0.9, 1.1)	0.9 (0.7, 1.1)	1.6*** (1.3, 1.9)
Fecundity				
Surgically sterile	0.5*** (0.4, 0.5)	0.2*** (0.1, 0.2)		
Impaired fertility	0.9 (0.7, 1.0)	0.6*** (0.6, 0.7)		
Fecund (reference group)	1.0	1.0		
Used SRHS last 12 months				
Yes (reference group)			1.0	1.0
No			0.5*** (0.4, 0.6)	0.1*** (0.05, 0.1)

Notes: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Un-weighted data used in all analyses. p-values adjusted for multiple comparisons. Odds ratios for Recession_B, Age, Region, Rural/urban, poverty status, and current insurance status indicate differences in service use between AIANs and NHWs. Odds ratios greater than 1.0 indicate AIANs are more likely to use services than NHWs. BC Method at Interview analyses restricted to women who were at risk for an unintended pregnancy. Medical BC Method at Interview analyses restricted to women using a BC method at time of interview. Data presented are from analyses on the AIAN and NHW sample conducted using Equation 4 presented in the Methods section. Data are from the 2002 and 2006-10 NSFG.

Table 3.10. Logistic Regression Odds Ratios and 95% Confidence Interval Showing the Likelihood of Using Sexual and Reproductive Health Services Among AIAN Women, Controlling for Recession Time Period, 2002 & 2006-10 NSFG.

	SRHS Use (n=1,160)	BC Service Use (n=1,160)	BC at Interview (n=742)	Medical BC at Interview (n=420)
	OR (95% CI), p-value	OR (95% CI), p-value	OR (95% CI), p-value	OR (95% CI), p-value
Predisposing Characteristics				
Age				
15-19	1.1 (0.5, 2.0)	4.0*** (2.3, 6.9)	0.5 (0.2, 1.2)	2.6 (1.0, 6.9)
20-24	2.4** (1.4, 4.2)	5.4*** (3.2, 9.0)	0.4* (0.2, 0.9)	1.9 (0.9, 4.0)
25-34	1.5 (1.0, 2.2)	2.7*** (1.9, 3.9)	0.6 (0.3, 1.0)	1.9 (1.0, 3.4)
35-44 (reference group)	1.0	1.0	1.0	1.0
Education				
< high school	0.8 (0.4, 1.5)	0.7 (0.4, 1.2)	0.7 (0.3, 2.0)	0.7 (0.3, 1.8)
High school diploma or GED	1.1 (0.6, 2.0)	0.7 (0.4, 1.1)	0.7 (0.3, 1.9)	0.6 (0.2, 1.5)
Some college	1.2 (0.7, 2.6)	0.9 (0.5, 1.7)	1.5 (0.5, 4.3)	0.7 (0.3, 1.7)
College degree (reference group)	1.0	1.0	1.0	1.0
Enabling Characteristics				
Recession_B				
Pre-Recession (reference group)	1.0	1.0	1.0	1.0
Early Recession	1.1 (0.7, 1.9)	1.0 (0.7, 1.5)	0.8 (0.4, 1.4)	0.7 (0.4, 1.2)
Recession/Post-Recession	0.8 (0.5, 1.1)	1.0 (0.7, 1.4)	1.2 (0.8, 1.9)	1.0 (0.6, 1.6)
Region				
Northeast	1.9 (1.0, 3.4)	1.1 (0.7, 1.7)	0.5 (0.3, 1.0)	1.3 (0.8, 2.3)
Midwest	1.1 (0.6, 1.9)	0.8 (0.5, 1.1)	0.6 (0.4, 1.0)	1.4 (0.8, 2.6)
South	1.0 (0.6, 1.5)	0.8 (0.5, 1.2)	0.8 (0.5, 1.4)	1.9 (1.0, 3.4)
West (reference group)	1.0	1.0	1.0	1.0
Rural/urban				
Rural (reference group)	1.0	1.0	1.0	1.0
Urban	0.6 (0.4, 1.0)	0.7 (0.5, 1.0)	1.5 (0.9, 2.3)	0.7 (0.3, 1.3)
Poverty Status				
133%FPL or below	0.8 (0.5, 1.1)	0.9 (0.7, 1.2)	0.9 (0.6, 1.4)	1.1 (0.6, 2.2)
Greater than 133%FPL (reference group)	1.0	1.0	1.0	1.0
Current Insurance Status				
Private (reference group)	1.0	1.0	1.0	1.0
Public	1.2 (0.7, 2.1)	1.1 (0.7, 1.6)	1.6 (1.0, 2.5)	2.4** (1.4, 4.2)
Uninsured	0.4*** (0.3, 0.7)	0.8 (0.5, 1.1)	1.6 (0.9, 2.8)	2.0* (1.1, 3.5)
Ever been pregnant				
Yes (reference group)	1.0	1.0	1.0	1.0
No	0.5* (0.3, 0.8)	0.6* (0.4, 0.9)	0.8 (0.4, 1.6)	0.6 (0.3, 1.1)
Need Characteristics				
Marital/cohabiting status				
Currently married/currently cohabiting (reference group)	1.0	1.0	1.0	1.0
Never married/not currently cohabiting	1.3 (0.9, 1.9)	0.9 (0.6, 1.4)	0.4*** (0.2, 0.6)	1.5 (0.9, 2.6)
# male partners past year				
Never had sex	0.1*** (0.05, 0.1)	0.2*** (0.1, 0.3)		
0	0.3*** (0.2, 0.6)	0.4** (0.2, 0.7)		
1 (reference group)	1.0	1.0		
2 or more	0.8 (0.5, 1.4)	0.9 (0.6, 1.5)		
General Health status				
Excellent/Very good/Good (reference group)	1.0	1.0	1.0	1.0
Fair/Poor	1.1 (0.7, 1.8)	0.8 (0.5, 1.2)	0.6 (0.3, 1.4)	1.4 (0.6, 3.2)
Gynecological Problem				
Yes (reference group)	1.0	1.0	1.0	1.0
No	0.7 (0.5, 1.0)	0.6* (0.4, 0.9)	1.0 (0.6, 1.6)	1.0 (0.6, 1.8)
Fecundity				
Surgically sterile	0.5* (0.3, 0.8)	0.2*** (0.1, 0.3)		
Impaired fertility, including sterile, nonsurgical	1.2 (0.7, 2.1)	0.8 (0.5, 1.1)		
Fecund (reference group)	1.0	1.0		
Used SRHS Last 12 months				
Yes (reference group)			1.0	1.0
No			0.6 (0.3, 0.9)	0.1*** (0.05, 0.2)

Notes: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Un-weighted data used for all analyses. p-values adjusted to account for multiple comparisons. Data presented are from analyses on the AIAN sample conducted using Equation 4 presented in the Methods section. Data are from the 2002 and 2006-10 NSFG.

Table 3.11. Logistic Regression Odds Ratios and 95% Confidence Interval Showing the Likelihood of Using Sexual and Reproductive Health Services Among NHW Women, Controlling for Recession Time Period, 2002 & 2006-10 NSFG.

	SRHS Use (n=10,179)	BC Service Use (n=10,180)	BC at Interview (n=7,149)	Medical BC at Interview (n=4,382)
	OR (95% CI), p-value	OR (95% CI), p-value	OR (95% CI), p-value	OR (95% CI), p-value
Predisposing Characteristics				
Age				
15-19	1.5** (1.2, 1.8)	3.4*** (2.8, 4.2)	0.8 (0.6, 1.1)	1.6** (1.2, 2.2)
20-24	2.5*** (2.1, 3.0)	3.5*** (3.0, 4.2)	0.9 (0.7, 1.2)	1.4* (1.1, 1.7)
25-34	1.4*** (1.2, 1.6)	2.0*** (1.8, 2.3)	1.1 (0.9, 1.3)	1.4*** (1.2, 1.7)
35-44 (reference group)	1.0	1.0	1.0	1.0
Education				
< high school	0.5*** (0.4, 0.6)	0.5*** (0.4, 0.6)	0.9 (0.7, 1.2)	0.8 (0.5, 1.0)
High school diploma or GED	0.6*** (0.5, 0.7)	0.6*** (0.6, 0.7)	1.1 (0.9, 1.4)	1.0 (0.8, 1.3)
Some college	0.8*** (0.7, 0.9)	0.9* (0.8, 1.0)	1.2 (1.0, 1.5)	1.0 (0.8, 1.3)
College degree (reference group)	1.0	1.0	1.0	1.0
Enabling Characteristics				
Recession_B				
Pre-Recession (reference group)	1.0	1.0	1.0	1.0
Early Recession	0.9 (0.8, 1.1)	0.9 (0.7, 1.0)	1.1 (0.9, 1.5)	1.0 (0.8, 1.2)
Recession/Post-Recession	0.9 (0.8, 1.0)	0.9 (0.8, 1.0)	1.2 (1.0, 1.5)	1.1 (0.9, 1.3)
Region				
Northeast	1.0 (0.9, 1.2)	0.9 (0.8, 1.0)	0.9 (0.7, 1.1)	1.0 (0.8, 1.3)
Midwest	0.9 (0.8, 1.1)	0.9 (0.8, 1.0)	0.9 (0.7, 1.1)	1.0 (0.8, 1.3)
South	1.0 (0.9, 1.2)	0.9 (0.8, 1.0)	1.1 (0.8, 1.3)	1.1 (0.9, 1.4)
West (reference group)	1.0	1.0	1.0	1.0
Rural/urban				
Rural (reference group)	1.0	1.0	1.0	1.0
Urban	1.1 (1.0, 1.3)	0.9 (0.8, 1.1)	0.7*** (0.5, 0.8)	0.8 (0.7, 1.0)
Poverty Status				
133%FPL or below	0.9 (0.8, 1.0)	1.0 (0.9, 1.1)	1.0 (0.8, 1.3)	1.1 (0.9, 1.4)
Greater than 133%FPL (reference group)	1.0	1.0	1.0	1.0
Current Insurance Status				
Private (reference group)	1.0	1.0	1.0	1.0
Public	1.3** (1.1, 1.6)	1.1 (1.0, 1.3)	0.8 (0.6, 1.0)	1.0 (0.8, 1.2)
Uninsured	0.4*** (0.3, 0.5)	0.6*** (0.5, 0.7)	0.7** (0.6, 0.9)	0.5*** (0.4, 0.7)
Ever been pregnant				
Yes (reference group)	1.0	1.0	1.0	1.0
No	0.7*** (0.6, 0.8)	1.1 (1.0, 1.2)	0.9 (0.7, 1.2)	1.7*** (1.4, 2.0)
Need Characteristics				
Marital/cohabiting status				
Currently married/currently cohabiting (reference group)	1.0	1.0	1.0	1.0
Never married/not currently cohabiting	0.9 (0.8, 1.0)	1.2 (1.1, 1.3)	0.7** (0.6, 0.9)	1.4*** (1.2, 1.6)
# male partners past year				
Never had sex	0.1*** (0.1, 0.1)	0.1*** (0.1, 0.1)		
0	0.5*** (0.4, 0.6)	0.4*** (0.3, 0.5)		
1 (reference group)	1.0	1.0		
2 or more	1.2 (1.0, 1.4)	1.1 (0.9, 1.3)		
General Health status				
Excellent/Very good/Good (reference group)	1.0	1.0	1.0	1.0
Fair/Poor	0.9 (0.7, 1.2)	0.9 (0.7, 1.1)	1.2 (0.8, 1.6)	0.8 (0.6, 1.2)
Gynecological Problem				
Yes (reference group)	1.0	1.0	1.0	1.0
No	0.4*** (0.4, 0.5)	0.6*** (0.6, 0.7)	1.1 (0.9, 1.3)	1.1 (0.9, 1.2)
Fecundity				
Surgically sterile	0.5*** (0.4, 0.5)	0.2*** (0.1, 0.2)		
Impaired fertility, including sterile, nonsurgical	0.8 (0.7, 1.0)	0.6*** (0.5, 0.7)		
Fecund (reference group)	1.0	1.0		
Used SRHS Last 12 months				
Yes (reference group)			1.0	1.0
No			0.5*** (0.4, 0.6)	0.1*** (0.04, 0.1)

Notes: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Un-weighted data used for all analyses. p-values adjusted to account for multiple comparisons. Data presented are from analyses on the NHW sample conducted using Equation 4 presented in the Methods section. Data are from the 2002 and 2006-10 NSFG.

Chapter 5: Discussion and Conclusions

The purpose of this dissertation was three-fold: 1) to provide baseline data on sexual and reproductive health service use prior to the implementation of the Affordable Care Act for a nationally representative sample of AIAN men and women, 2) to explore factors potentially associated with sexual and reproductive health service use for AIANs, and 3) to examine the impact of the Great Recession on AIAN sexual and reproductive health service use. In this study, AIAN women, but not men, were less likely to use sexual and reproductive health services and birth control services than NHWs. Conversely, AIAN women and men were more likely than NHWs to use STI/HIV services. These findings mirror those of previous researchers who examined sexual and reproductive health service use disparities among non-Hispanic Blacks and NHWs (Chabot et al., 2011; Frost, 2013; Hall et al., 2012; Kalmuss & Tatum, 2007). Additionally, these findings complement and add to the existing literature on AIANs and sexual and reproductive health services.

Most previous researchers studying AIANs and sexual and reproductive health services focused on the availability of services, but not the utilization of services (Gattozzi & Asetoyer, January 2008; Hart, 2010; Kingfisher et al., February 2012; Kost, Finer, & Singh, 2012; Leston et al., 2012; Urban Indian Health Institute, December 2009; S. I. H. B. Urban Indian Health Institute, December 2009). In these previous studies, researchers identified substantial gaps in service provision and noted numerous barriers to care for AIAN women. This dissertation adds to the previous research by showing that AIANs not only have limited access to sexual and reproductive health services, but are also less likely than NHWs to use sexual and reproductive health services and birth control services.

Sexual and Reproductive Health Service and Birth Control Service Use

Findings from this dissertation also complement the limited number of studies on AIAN sexual and reproductive health service use, including Pap smear and birth control use. Similar to AIAN women interviewed in the 2000-2010 Behavioral Risk Factor Surveillance System (Cobb, Espey, & King, 2014), AIAN women in my study were less likely to use preventive sexual and reproductive health services, including Pap smears,

compared to NHW women. AIAN women's low rates of Pap smear use are concerning because AIAN women have higher rates of invasive cervical cancer and are more likely to die from this cancer than NHW women (Watson et al., 2014). Insufficient cancer screening and follow-up treatment programs could potentially be a root cause of these disparities. Although cancer screening programs for AIANs have improved over the last several decades (Watson et al., 2014), findings from this dissertation suggest the need for continued efforts to provide preventive sexual and reproductive health services for AIAN women.

Similar to my study, previous researchers also found lower rates of birth control method use among AIANs compared to NHWs (The National Campaign to Prevent Teen and Unplanned Pregnancy, August 2009; Urban Indian Health Institute, May 2010). Although women do not need a medical visit to obtain all birth control methods, they do to obtain the most effective methods. In my study, AIAN women were significantly less likely to use birth control services than NHW women, which might partly explain why AIANs are less likely than NWHs to use birth control. Interestingly, although women of both racial groups were equally likely to use birth control counseling, AIAN women were less likely to actually receive a birth control method. My research does not explore reasons for the lower rates of birth control service use. However, AIAN women may have been less likely to receive birth control methods because they were unable to access birth control methods, did not wish to use a method, or chose to use methods that did not require a medical visit, such as condoms.

In a study by Gattozzi et al. (2008), sexual assault responders identified two barriers to birth control method access in Indian Health Service (IHS) clinics. First, the responders reported that IHS providers, who were protected by conscience clauses, refused to offer birth control methods to AIAN women. Second, although birth control methods are included in the IHS formulary, the responders noted that IHS pharmacies sometimes did not stock certain medications (Gattozzi & Asetoyer, January 2008). Even though the IHS does not serve all AIANs and is not the only source of care for AIANs seeking birth control methods, such access barriers may be contributing to fewer AIANs receiving birth control methods.

Conversely, AIAN women may not be interested in using birth control methods, especially those which require a medical visit. This disinterest may be due to the fact that AIAN women were the object of mass forced sterilization policies implemented by the U.S. government during the 1970s and 1980s (Hart, 2010). During this time an estimated 42% of AIAN women of reproductive age were forced, coerced, or unknowingly sterilized by IHS physicians (Hart, 2010). This prior abuse of patient's rights may have led AIANs to mistrust providers and, therefore, they may be less likely to seek out birth control services and to use birth control methods requiring a medical visit.

Regardless of why AIAN women were less likely to receive a birth control method, AIANs have an unmet need for birth control services. In additional analyses not presented, AIAN women had significantly higher rates of unintended pregnancy and teen pregnancy than NHWs (see Appendix 1). These trends were also identified by researchers analyzing data from the 2002 National Survey of Family Growth, suggesting an ongoing need for birth control services for AIAN women (Urban Indian Health Institute, May 2010).

Unlike AIAN women, AIAN men were as likely as NHW men to use birth control services. However, rates of birth control service use were low; only 10% of AIAN men used birth control services. Unfortunately, this finding was not surprising given that low rates of sexual and reproductive health service use among men in other populations are well documented (e.g. Chabot et al., 2011). These findings are troubling, however, given men's role in unintended and teen pregnancy and the spread of STIs and HIV. *Healthy People 2020* has called for increased provision of sexual and reproductive health services to men and this study suggests that AIAN men also need to be targeted with initiatives to increase service use (U.S. Department of Health and Human Services, 2015).

STI/HIV Service Use

Similar to non-Hispanic Blacks in previous studies, AIANs in this study were generally more likely to use STI/HIV services than NHWs (Chabot et al., 2011; Frost, 2013; Hall et al., 2012; Kalmuss & Tatum, 2007). Given the higher rates of STIs/HIV among the AIAN community, it is encouraging to also see higher rates of STI/HIV service use among AIANs. AIANs may be more likely than NHWs to use STI/HIV

services for a number of reasons. For example, AIANs may be aware of their increased risk of STIs/HIV and thus are more likely to seek services.

In contrast, STI/HIV service use might be related to where AIANs access services. Frost (2013) found that women who received sexual and reproductive health services at public clinics received a wider array of services than women who accessed sexual and reproductive health services in a private doctor's office (Frost, 2013). A larger percentage of AIAN women and men in this study had public insurance or were uninsured compared to NHWs. These populations are generally more likely to receive health services from public clinics. Thus, it is possible that the higher rates of STI/HIV service use among AIANs in this study may be attributed to their source of care.

Additionally, AIANs may have been more likely to use STI/HIV services because their providers were aware of the higher rates of STIs/HIV in this population. The CDC recommends that providers counsel high risk groups on STI prevention strategies (CDC., 2010). Indeed, although AIANs in this study were no more likely to use STI/HIV testing or treatment compared to NHWs, they were more likely to use counseling. Thus, higher rates of STI/HIV service use may be indicative of informed providers following CDC recommendations.

Interestingly, racial disparities in STI/HIV service use existed among privately insured, but not uninsured or publicly insured populations. Based on Frost's (2013) research it seems likely that uninsured and publicly insured women, regardless of race, receive a wider variety of services, including STI/HIV services. Conversely, providers seeing patients with private insurance may be more likely to rely on a person's membership in a racial group at high risk for STIs/HIV to determine when they should provide STI/HIV services. These findings further suggest the important role of the source of care in understanding racial disparities in SRHS use.

Importantly, higher rates of STI/HIV service use compared to NHWs do not guarantee that AIANs are adequately utilizing STI/HIV services. In this study, only one-quarter of AIAN men and women reported STI/HIV service use even though more than three-quarters of AIAN men and women reported having sex in the past year. Low rates of STI/HIV service use may be fueled by inadequate STI/HIV service provision. In a

recent needs assessment study of IHS, tribal, and Urban Indian healthcare facilities, providers were aware of STI/HIV screening recommendations. However, rates of STI/HIV screening in their clinics were low and about one-third of providers did not feel HIV was a serious health issue for their communities. Providers reported specific barriers to service provision including a lack of clinic resources, difficulty getting at-risk patients to the clinic, patient concerns about privacy, and financial barriers. (Northwest Portland Area Indian Health Board & Northwest AIDS Education Training Center, 2015). These barriers to service provision may help explain why rates of STI/HIV service use among AIANs are relatively low considering the great need.

Rural and Urban Disparities

Although AIANs experienced a number of sexual and reproductive health service use disparities, not all sub-groups of AIANs faced these disparities. In particular, sexual and reproductive health service use among AIANs varied by rural and urban residency. For AIAN women, living in a rural area was positively associated with sexual and reproductive health service and birth control service use. Specifically, among AIANs, rural women were more likely than urban women to use a sexual and reproductive health service. Additionally, whereas urban AIANs were significantly less likely than urban NHWs to use a sexual and reproductive health service or birth control service, rural AIANs were as likely as rural NHWs to use a sexual and reproductive health service and a birth control service. For AIAN men, rural residency was positively associated with STI/HIV service use.

The protective effect of rural residency on sexual and reproductive health service use was not altogether unexpected. Although rural populations in the U.S. generally have more difficulty accessing needed health care services than urban populations (Meit et al., 2014), the reverse is generally true for AIANs. Health facilities, health care offerings, and funding for AIAN health tend to be more limited in urban than rural communities, even though most AIANs now live in urban areas (Moss, 2010). For example, Urban Indian Health Organizations (UIHOs), which are private, non-profit entities funded by the Indian Health Care Improvement Act, only have 33 health centers located in 19 states. Additionally, UIHOs receive only 1% of the IHS budget, an estimated 22% of the actual

needed funding (Moss, 2010). The inadequate number of service centers and funding limit the number of AIANs UIHOs can serve and the types of services they can provide (Urban Indian Health Institute, 2015). The lack of services aimed at AIANs in urban areas may be fueling the disparities in sexual and reproductive health service use among urban AIANs and deserves attention.

The Great Recession and Sexual and Reproductive Health Service Use

In this study I also investigated the impact of the Recession on AIANs use of sexual and reproductive health services, including birth control methods. In contrast to previous studies on sexual and reproductive health service use and the Recession among other populations (Alan Guttmacher Institute, September 2009; American Congress of Obstetricians and Gynecologists, May 5, 2009), AIANs use of sexual and reproductive health services did not vary significantly during the Recession. This dissertation employed numerous empirical techniques, tested several Recession measures, and relied on a self-reported measure of service use collected at one time point. The previous Recession related research also relied on self-reported information collected at one point in time. However, the respondents in the previous studies were asked about *changes* they made to their sexual and reproductive health service use related to the Recession. Thus, the results of prior work should be used with caution as a comparator to this dissertation.

In contrast to my study, prior researchers also found that preventive health service use declined during the Recession (Burgard & Hawkins, 2014; Mortensen & Chen, 2013). Previous studies, however, did not control for unobserved factors that were changing over time. When employing the same methods as prior researchers, my results for the NHW sample were similar. However, when a time trend was introduced, sexual and reproductive health service use was no longer associated with the Recession for either AIANs or NHWs. Thus, sexual and reproductive health service use appears to be changing over time, but this change does not appear to be due to the Recession. In fact, the association between time and sexual and reproductive health service use indicates this study may have incorrectly omitted an important variable that explains changes in service use over time. A number of factors may account for the change in service use over time, including an increasingly socially conservative environment that restricted access to

sexual and reproductive health service (Boonstra, 2009; Dailard, 2006; Jones & Boonstra, 2004). Future work, which includes a system wide approach to the problem, may allow researchers to untangle the factors associated with changes in service use over time.

Similar to Burgard and Hawkins (2014), I found persistent racial disparities in health service use during the Great Recession. In particular, AIANs were less likely to use birth control methods than NHWs before and during the Recession. Sexual and reproductive health service use disparities did not increase during the Great Recession. Therefore, policymakers and health care providers likely do not need to increase service provision to AIANs during a future recession to prevent growing disparities. However, these persistent sexual and reproductive health service use disparities need to be addressed in order to improve the sexual and reproductive health of AIANs.

Policy Implications and Recommendations

As noted in the literature review, AIANs are more likely to have an unintended pregnancy or teen pregnancy and are more likely to be diagnosed with an STI/HIV than NHWs. Low rates of sexual and reproductive health service use among AIANs are likely contributing to AIANs ongoing sexual and reproductive health disparities. Thus, sexual and reproductive health service use among AIANs needs to increase.

Increasing sexual and reproductive health service use among AIANs has several public health implications. First, increasing sexual and reproductive health service use has the potential to reduce rates of teen and unintended pregnancy and new STI/HIV infections. By preventing these negative sexual and reproductive health outcomes, AIANs will be spared the accompanying unnecessary health and socioeconomic consequences.

Second, reducing the rates of teen and unintended pregnancy and STIs/HIV will save the federal government money. For example, for each unintended pregnancy prevented, the government would save approximately \$4,500. Fifty-four percent of AIAN women in the study sample reported ever having an unintended pregnancy. The cost savings to the government of averting these pregnancies alone would have been nearly \$2 million. This money could be used to fund preventive sexual and reproductive health services and programs for AIANs, which in turn could improve AIAN sexual and

reproductive health. Given these public health implications, policies and programs are needed to increase AIANs sexual and reproductive health service use.

Based on the results from this dissertation and my experience working in tribal health, I propose several recommendations to increase sexual and reproductive health service use among AIANs.

- **Increase IHS funding overall and the proportion of funding allocated to UIHOs.**

Although not all AIANs are eligible for IHS services, the IHS remains an important source of care for many AIANs. However, the IHS is chronically underfunded, which limits the services that AIANs can receive even when eligible, especially for urban AIANs (Moss, 2010). With evidence from previous studies of inadequate sexual and reproductive health service availability in IHS and UIHO clinics (e.g. Gattozzi & Asetoyer, January 2008; Urban Indian Health Institute, December 2009), additional funding is needed to increase sexual and reproductive health service provision to AIANs.

- **Provide continued support for programs working to increase the capacity of tribes and tribal organizations to deliver sexual and reproductive health services.**

As noted in the assessment of IHS, tribal, and UIHO clinics, providers do not feel well prepared to address STIs/HIV with their clients (Northwest Portland Area Indian Health Board & Northwest AIDS Education Training Center, 2015). Thus, even with increased IHS funding, rates of sexual and reproductive health service use may not increase without improvements to the current service delivery model. Programs like Project Red Talon (Northwest Portland Area Indian Health Board), which provides training and technical assistance to tribes and tribal organizations to administer sexual and reproductive health programs, need continued support to increase sexual and reproductive health service use among AIANs.

- **Encourage eligible AIANs to enroll in Medicaid to increase their access to sexual and reproductive health services.**

Publicly insured AIAN women in this study were more likely to use STI/HIV services and birth control methods than privately insured and uninsured women. Thus, increasing Medicaid enrollment among AIANs could increase sexual and reproductive health service use. Although not all uninsured AIANs will be eligible for Medicaid

coverage, about half of AIANs in this study had family incomes at or below 133% FPL, and thus would be eligible for Medicaid in many states. Enrollment in Medicaid would provide two specific benefits to AIANs. First, Medicaid would remove financial barriers to sexual and reproductive health services for AIANs, including birth control methods and STI/HIV services.

Second, for men, Medicaid's patient-centered medical home model may facilitate sexual and reproductive health service use. In this study, I found that AIAN men who reported having a usual source of care were significantly more likely to report using birth control and STI/HIV services than AIAN men without a usual source of care. Furthermore, AIAN men who reported receiving other health services, including a physical exam or a testicular exam, were also significantly more likely to have used birth control and STI/HIV services. Medical care homes may facilitate sexual and reproductive health service use for AIAN men by serving as their usual source of care. Additionally, providers in medical care homes who incorporate sexual and reproductive health services into routine medical visits could increase AIAN men's use of birth control and STI/HIV services.

- **Add birth control services for men to the list of mandated preventive services to be covered by insurers under the Affordable Care Act.**

Birth control services are currently not covered for men under the preventive service mandate (HealthCare.gov). However, men have an important role in the prevention of unintended and teen pregnancies. Vasectomy and male condoms are important birth control methods that should be available to men and women to protect against pregnancy and STI/HIV transmission. Without reimbursement from insurers, providers will likely not offer birth control services to men. In order to see reductions in unintended and teen pregnancies in general and among the AIAN community specifically, policymakers need to mandate coverage of birth control services for men, just like they have for women.

- **Engage AIAN communities to determine the needs and wants of AIAN men and women around sexual and reproductive health and birth control service use.**

Insured AIANs were no more likely to use sexual and reproductive health and birth control services than uninsured AIANs. Thus, simply increasing the number of insured AIANs may not lead to increased sexual and reproductive health and birth control service use. Other efforts are needed to increase service use. Through community engagement efforts policymakers can obtain a better understanding of community needs, and better assist tribal organizations in the creation and dissemination of programs to improve sexual and reproductive health service and birth control service use among AIANs.

• Utilize State Plan Amendments to increase birth control service coverage for AIAN women and men.

In the past, the federal government allocated Medicaid Family Planning waivers to a number of states (Adams, Galactionova, & Kenney, 2015). These waivers allowed states to provide family planning services to women and men who otherwise would not qualify for Medicaid services. Under the Affordable Care Act, states may use the State Plan Amendment to alter their Medicaid rules in a fashion similar to the Family Planning waivers to provide family planning coverage to groups currently ineligible for Medicaid. Researchers have determined that Family Planning waivers lead to reductions in the number of unintended births and thus provide a cost-savings to states (Adams et al., 2015). Therefore, states, especially those not expanding Medicaid eligibility overall, should consider modifying their Medicaid programs to increase access to family planning services in order to improve sexual and reproductive health service use among AIANs.

• Increase accessibility to sexual and reproductive health research data on AIANs, while continuing to protect research participants' confidentiality.

Importantly, many of the potential improvements in sexual and reproductive health service use associated with provisions of the Affordable Care Act will need to be measured through rigorous policy research. Currently, the number of AIANs interviewed in the National Survey of Family Growth and other national surveys is small, which prevents researchers from using more rigorous methods to measure the impact of policy changes. Other minority groups, including non-Hispanic Blacks and Hispanics, are oversampled by the National Survey of Family Growth to ensure there is an adequate

sample size to conduct research. The National Survey of Family Growth staff should consider also oversampling AIANs to allow for more in depth research, especially to evaluate the impact of the Affordable Care Act.

Additionally, access to data on AIAN health needs to be improved. Restrictions on access to National Survey of Family Growth data have been implemented to rightfully protect for potential identification of survey respondents. However, for a researcher to conduct similar studies to the research presented here, would require around six months for the application process and a minimum of \$1,500 to analyze the data for a one month period. These time and cost barriers prevent organizations and researchers interested in improving AIAN health from accessing important data. The CDC should consider how it might better facilitate access to the AIAN sample in the National Survey of Family Growth, so that important research questions can be answered, while still protecting the rights of research participants.

Limitations

This dissertation has a number of strengths, which include the measurement of sexual and reproductive health service use from the perspective of AIANs, the use of a nationally representative dataset, and the inclusion of AIAN men. Despite these strengths, my study also has a number of limitations.

First, National Survey of Family Growth data were self-reported and thus subject to recall bias and potential dishonesty in respondents' reporting. Additionally, this study relied on secondary data, which constrained the variables available for analysis. For example, to capture the impact of the Recession on service use, I relied on a categorical measure of time demarking time before and after the start of the Recession. Questions on sexual and reproductive health services in the National Survey of Family Growth asked respondents about service use in the past 12 months. Thus, it was possible that respondents interviewed in 2008 used services during the time period before the Recession, but were categorized as receiving services during the Recession. To address this potential bias, I also employed a recession measure similar to one used by Burgard and Hawkins (2014), which captured respondents in the pre-Recession, early Recession, and late/post Recession periods. However, imprecise measurement of the Recession time

period may have led to insignificant findings. A more precise measure of service use, such as a monthly question that is asked of patients and providers, may be needed to capture the impact of recessions in the future.

Another limitation of the study is the National Survey of Family Growth sampling design. The National Survey of Family Growth sampling design allowed for comparisons of AIANs by Census region and rural and urban residency. However, state and county level estimates of sexual and reproductive health service use could not be made. AIANs are a highly diverse population, consisting of members of 566 federally recognized and 400 unrecognized tribes, with varied economic, social, and community resources. Thus, care should still be taken in applying findings from the nationally representative data to specific tribal populations.

Furthermore, although the National Survey of Family Growth dataset included a relatively large number of AIANs compared to other studies, the sample size of AIANs remained small. The small sample size restricted the types of questions that could be answered and the analyses that could be performed. For some analyses, the failure to find a difference in sexual and reproductive health service use among AIANs and NHWs or among AIANs during different Recession periods may be due to insufficient sample size. Because of concerns about adequate statistical power, especially when numerous interaction terms were included in the models, I also ran the analyses with only the significant interaction terms. The results of the analyses were generally consistent. However, insignificant findings should be interpreted with caution.

The final limitation of the research was the inclusion of a health insurance variable as a covariate. Endogeneity is a potential concern when health insurance is used as a covariate in analyses. Although researchers consistently find connections between health service use and health insurance, less is known about the direction of causality. Specifically, researchers suggest that having health insurance may drive health service use, but that health service use may also lead people to procure health insurance (e.g. Meer & Rosen, 2004). In an attempt to rule out potential bias introduced by including health insurance as a covariate, I also estimated models without health insurance variables. Generally, I found few differences in estimates from models with and without

health insurance variables. Future researchers, however, should model health insurance as an endogenous variable to more appropriately assess for the effect of insurance on AIAN sexual and reproductive health service use.

Future Research

This study is one of only a few examining the sexual and reproductive health of AIANs and is the first to examine AIANs use of a wide variety of sexual and reproductive health services. This study is also the first to evaluate AIAN men's use of sexual and reproductive health services. Due to the small number of existing studies and the potential changes to sexual and reproductive health service use among AIANs because of policy changes introduced by the Affordable Care Act, other studies on AIAN sexual and reproductive health are warranted.

One of the objectives of this dissertation was to provide baseline data that can be used to compare sexual and reproductive health service use among AIANs before and after the implementation of the Affordable Care Act. It is too early to measure many of the impacts of the Affordable Care Act, but changes to sexual and reproductive health service use among AIANs associated with Affordable Care Act policies are needed. Results from studies on other marginalized populations may not be applicable to AIANs who are not required to obtain health insurance under the Affordable Care Act. Future researchers should examine the impacts of the preventive service mandate, Medicaid expansion, and the medical home model to determine if AIANs use of sexual and reproductive health services changed.

In addition to the recommended research associated with the Affordable Care Act, researchers should further utilize the National Survey of Family Growth to examine AIAN sexual and reproductive health. My study was only the second ever to analyze AIAN health using National Survey of Family Growth data. We still do not know where AIANs access sexual and reproductive health services, how far they have to travel to use these services, or how they pay for these services. Additionally, we know little about AIAN men's sexual risk behaviors, which are highly related to men's need for sexual and reproductive health services. National Survey of Family Growth data are available to researchers to address these questions.

AIANs use of birth control is one area that deserves particular attention in future research. With the National Survey of Family Growth data, researchers could examine factors associated with AIAN women's birth control use, including the use of long-acting reversible contraceptive methods. AIANs in a previous study were more likely than NHWs to use long-acting reversible contraceptive methods (Urban Indian Health Institute, May 2010). However, rates of unintended pregnancy remain higher among AIANs than NHWs. These findings present an interesting dichotomy given that one of the reasons long-acting reversible contraceptive methods are touted is to decrease rates of unintended pregnancy.

Furthermore, very little is known about the needs and desires for birth control among AIAN women and men. Policymakers need better information to inform the development of culturally sensitive programs and policies to address low rates of birth control use among AIANs. Researchers should conduct qualitative studies examining AIAN women's and men's birth control preferences and experiences seeking services.

Conclusion

Compared to NHWs, AIAN women, but not men, are less likely to use sexual and reproductive health and birth control services. Although these disparities did not increase during the Recession, they persisted. Additionally, the rate of birth control and STI/HIV service use among AIAN men was generally low. In order to reduce the high rates of unintended pregnancy, teen pregnancy, and STIs/HIV among American Indians and Alaska Natives, sexual and reproductive health service use for American Indians and Alaska Natives must be increased.

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Appendix 1. NSFG Sample Size by Race and Survey Cycle.

Appendix 1. NSFG sample size and percentage of U.S. population interviewed for each NSFG cycle, by race.

	2002		2006 - 2010	
	Sample Size	% Population	Sample Size	% Population
<i>AIAN</i>			1,742	0.03%
Women	357	0.009%	819	
Men	n/a		923	
<i>NHW</i>			11,514	0.006%
Women	4,055	0.002%	6,196	
Men	n/a		5,322	

Notes: Percentage of population interviewed in 2002 Cycle calculated from 2000 Census estimates of AIAN and NHW populations. Percentage of population interviewed in 2006-10 Cycle calculated from 2010 Census estimates of AIAN and NHW populations.

**Appendix 2. Additional Fertility Characteristics of AIAN and NHW Women in the
2006-2010 NSFG.**

Appendix 2. Additional Fertility Characteristics of AIAN and NHW Women in 2006-10 NSFG.

	AIAN & NHW Sample (n=7,015)	AIAN Sample (n=819)	NHW Sample (n=6,196)		
	% or Mean (SE)			Rao-Scott χ^2 or t-test statistic	p-value
Age at Menarche, categorical					
<11 years	6.8 (0.4)	8.3 (1.3)	6.6 (0.5)	4.00	p = 0.26
11-12 years	43.1 (0.9)	43.8 (3.0)	43.0 (0.9)		
13-14 years	40.2 (0.9)	35.9 (2.6)	40.6 (0.9)		
>14 years	10.0 (0.6)	12.0 (2.3)	9.8 (0.6)		
# Pregnancies, mean	1.6 (0.05)	2.3 (0.15)	1.5 (0.05)	4.78	p < 0.001
# Pregnancies					
0	40.2 (1.4)	30.1 (2.1)	41.2 (1.5)	28.66	p < 0.001
1	14.1 (0.7)	12.2 (1.1)	14.3 (0.7)		
2	18.1 (0.8)	17.1 (3.1)	18.2 (0.8)		
3+	27.5 (0.9)	40.6 (3.3)	26.2 (1.0)		
# births, mean	1.2 (0.04)	1.8 (0.2)	1.1 (0.03)	4.21	p < 0.001
# births					
0	46.6 (1.4)	34.9 (2.1)	47.7 (1.4)	51.92	p < 0.001
1	15.6 (0.7)	15.0 (1.7)	15.7 (0.7)		
2	21.4 (1.0)	17.5 (3.0)	21.8 (1.0)		
3+	16.3 (0.9)	32.6 (4.4)	14.8 (0.7)		
Ever had unintended pregnancy					
Yes	38.5 (1.3)	54.4 (3.0)	37.0 (1.4)	35.57	p < 0.001
No	61.5 (1.3)	45.6 (3.0)	63.0 (1.4)		
Ever had mistimed pregnancy					
Yes	31.8 (1.2)	44.5 (2.8)	30.6 (1.3)	26.22	p < 0.001
No	68.2 (1.2)	55.5 (2.8)	69.4 (1.3)		
Ever had unwanted pregnancy					
Yes	13.9 (0.8)	26.9 (4.2)	12.6 (0.6)	23.46	p < 0.001
No	86.1 (0.8)	73.1 (4.2)	87.4 (0.6)		
% Teens- Ever Given Birth	0.8 (0.1)	2.6 (0.8)	0.6 (0.1)	26.81	p < 0.001
% Teens- Ever Been Pregnant	1.4 (0.2)	3.8 (0.8)	1.2 (0.2)	39.2	p < 0.001

Percentages are weighted. Fertility characteristics are for total sample of women, including women who have never had sex.

