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Relationships between Penile-Vaginal Intercourse Frequency and Condom/Contraceptive Use from 2009 to 2018: Findings from the National Survey of Sexual Health and Behavior

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Abstract

Objectives: To examine changes over time in event-level condom/contraceptive use and the association between past year penile-vaginal intercourse frequency and event-level condom/contraceptive use.

Methods: Data were from the 2009 and 2018 National Survey of Sexual Health and Behavior, an online probability survey of U.S. adolescents and adults.

Results: Use of condoms and highly effective hormonal contraceptives decreased while long-acting reversible contraceptive use increased from 2009 to 2018 among adults. Increased penile-vaginal intercourse frequency was associated with decreased use of most contraceptive methods but an increase in condom use for adolescents.

Conclusions: Sexual frequency should be considered when assessing condom/contraceptive use.

Keywords

penile-vaginal intercourse frequency; condom use; contraceptive use; United States

Introduction

In the United States (U.S.), condoms are widely available, inexpensive, and a highly effective means of preventing both pregnancy and sexually transmitted infections (STI) (Beksinska, Wong, & Smit, 2020; Davis & Weller, 1999; Holmes, Levine, & Weaver, 2004).

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Declaration of Interest

The authors report there are no competing interests to declare.

Ethics Review

The Institutional Review Board at Indiana University reviewed and approved study protocols and questionnaires used in the 2009 and 2018 National Surveys of Sexual Health and Behavior (Protocols 081200042, 1408833205, and 1906506253).

Even so, in 2018 there were an estimated 26 million new STIs in the U.S. and the lifetime direct medical cost for these infections have been estimated at \$16 billion USD (Centers for Disease Control and Prevention, 2021b). As of 2019, U.S. STI rates had increased for six consecutive years, with a nearly 30% increase in chlamydia, gonorrhea, and syphilis reported between 2015 and 2019 (Centers for Disease Control and Prevention, 2021a). Yet, since the COVID-19 pandemic, access to STI testing has been strained in countries around the world (Beima-Sofie et al., 2020; Hill, Anderson, & Lock, 2021; Tao et al., 2021). Compounding these challenges, condom non-use remains prevalent; only 33.7% of U.S. men and 23.8% of U.S. women ages 15–44 used a condom at last penile-vaginal intercourse (PVI) (Copen, 2017). Promotion of condom use among at-risk individuals remains a priority for STI prevention in the U.S, as well as globally (Burazin et al., 2014; Foss, Hossain, Vickerman, & Watts, 2007; Sadler et al., 2017; Wulff & Lalos, 2004).

Correct and consistent use of condoms and other contraceptives is highly effective at reducing pregnancy risk among people who are sexually active. Yet, despite the wide availability of condoms and other contraceptives in the U.S., data from the National Survey of Family Growth (NSFG) show that 38% of all pregnancies are unintended (MacCallum-Bridges & Margerison, 2020). In recent years, U.S. adolescents and adults have had greater access to more highly effective contraceptive options, including long-acting reversible contraceptive (LARC) methods (e.g., IUDs, implants); this access has been attributed both to the implementation of the Affordable Care Act as well as to dedicated contraceptive programs and healthcare provider training (Comfort et al., 2021; El Ayadi et al., 2017; MacCallum-Bridges & Margerison, 2020). Accordingly, U.S. women report increased use of LARCs (Daniels, Daugherty, & Mosher, 2015; Finer, Jerman, & Kavanaugh, 2012; Kavanaugh, Jerman, & Finer, 2015; Mosher, Moreau, & Lantos, 2016), similar to patterns observed in some other countries such as Australia, the Netherlands, Sweden, and some parts of rural Ethiopia (Grzeskowiak, Calabretto, Amos, Mazza, & Ilomaki, 2021; Hellström, Gemzell Danielsson, & Kopp Kallner, 2019; Marra, Meijer, & de Graaf, 2020; Zerfu, Ayele, & Bogale, 2018). Also according to NSFG data, the 12-month probability of contraceptive failure has declined from 14.9 in 1995 to 10.3 in 2010 (Sundaram et al., 2017). Nevertheless, 95% of unintended pregnancies occur among women who report contraceptive non-use or inconsistent/incorrect use, indicating that a better understanding of how and/or when contraceptives are used is warranted (Kavanaugh & Jerman, 2018).

Condom and Contraceptive Use in Relation to Sexual Frequency

Prior research has demonstrated the importance of considering condom and contraceptive use within the broader context of people's sexual lives, including the frequency with which they engage in sex. After all, condom/contraceptive use does not occur in a vacuum. Although some people use contraceptives for medical reasons unrelated to pregnancy prevention (e.g., management of acne or menstruation), decisions about condom/contraceptive use are usually made with respect to a person's actual or anticipated sexual behaviors. For example, some people report not using condoms/contraceptives if they do not expect to have sex (Frederiksen & Ahrens, 2020) or only rarely have sex (Bornstein, Gipson, Bleck, Sridhar, & Berger, 2019). Some sexual minority women may not use (or may stop

using) highly effective contraceptives once they enter an exclusive sexual relationship with another woman or if they don't anticipate having sex with males (Higgins et al., 2019).

Indeed, in some studies, the frequency of sexual activity appears related to condom/contraceptive use, though the directionality of the association has been inconsistently observed in prior studies and may differ by contraceptive type as well as various partner characteristics. For example, in U.S. national cross-sectional surveys, increased sexual frequency has been linked to increased contraceptive use among women (Frost, Singh, & Finer, 2007; Wu, Meldrum, Dozier, Stanwood, & Fiscella, 2008). Research also suggests that more frequent partnered sex is associated not just with increased contraceptive use, but with increased use of highly effective contraceptive methods (Frost & Darroch, 2008; Gibbs, Kusunoki, Colantuoni, & Moreau, 2019; Kusunoki & Upchurch, 2011). There are several reasons for why this association might exist; for example, it may be that when people are having more frequent partnered sex, and penile-vaginal intercourse in particular, they become aware of potential pregnancy and/or STI risk and this awareness prompts behavioral change in the form of ensuring that they are using condoms and/or other contraceptives. More frequent partnered sex may also be a reflection of a more established relationship, in which it is well established that condom use tends to decline and male-female couples tend to opt for hormonal contraception (He, Hensel, Harezlak, & Fortenberry, 2016; Kusunoki & Barber, 2020). Relationship status is also related to sexual esteem, sexual depression, and the perception of shared responsibility for contraception among couples, all of which have been found to predict contraception choices (Chinopfukutwa & Blodgett Salafia, 2021).

However, another longitudinal study of 839 low-income women visiting family planning, maternity, and postpartum clinics in two U.S. Southeastern cities found no significant associations between frequency of sex and condom/contraceptive use (Wilson & Koo, 2008). Further, some studies have observed a negative relationship between sexual frequency and condom/contraceptive use, which may raise potential concerns for the prevention of unintended pregnancies and STIs. For example, a study using data from the 2001–2002 National Longitudinal Study of Adolescent Health found that, for cohabitating couples, a greater sexual frequency was related to a lower likelihood of both condom and hormonal contraceptive use (Wildsmith, Manlove, & Steward-Streng, 2015). Another study found that while both relationship quality and coital frequency were related to condom non-use, coital frequency was associated with the rate of change of condom non-use over time, implying that characteristics present early in a relationship, instead of the duration of the relationship, has a significant impact on condom non-use (Sayegh, Fortenberry, Shew, & Orr, 2006). These findings may be further explained by studies that found one's own attitudes as well as the perception of sexual partners' attitudes towards condoms/contraception may predict intentions to actually use condoms/contraceptives (Hood & Shook, 2014). The lack of detailed assessments of partnership characteristics and attitudes may account for the inconsistencies of prior studies in examining the relationship between sexual frequency and condom/contraceptive use.

Many of these studies were conducted among adolescents/young adults, clinic-based samples, or other convenience samples; few studies have examined condom and contraceptive use in relation to sexual frequency among the U.S. general population and for

a broader age group. However, recent research in the U.S. and internationally suggests that sexual frequency, and penile-vaginal intercourse frequency specifically, has declined, and especially among younger adults (Ghaznavi et al., 2019; Herbenick, Rosenberg, Golzarri-Arroyo, Fortenberry, & Fu, 2022; Twenge, Sherman, & Wells, 2017a, 2017b; Ueda, Mercer, Ghaznavi, & Herbenick, 2020; Wellings, Palmer, Machiyama, & Slaymaker, 2019), which may potentially lead to changes in patterns of condom/contraceptive use and then ultimately affect rates of unintended pregnancies and STIs. These recent declines in penile vaginal intercourse, combined with the fact that prior research shows inconsistent findings regarding the relationship between sexual frequency and condom/contraceptive use, suggest the need for an updated assessment among the U.S. general population.

Study Aims

The present study uses data from the 2009 and 2018 waves of the National Survey of Sexual Health and Behavior (NSSHB) to (1) examine changes over time in event-level condom/contraceptive use and (2) to evaluate how past year PVI frequency is related to event-level condom/contraceptive use among U.S. adolescents (14–17 years old) and adults (18–49 years old), also over time. The NSSHB is comprised of a series of U.S. nationally representative surveys that assesses sexual behaviors as well as condom/contraceptive use, using comparable items over time; thus, it provides a unique opportunity to compare sexual behavior and contraceptive use across nearly a decade.

Materials and Methods

Study Design and Participants

Data for the present study are from the 2009 (Wave 1) and 2018 (Wave 7) data collection waves of the NSSHB, a series of confidential U.S. nationally representative probability surveys of adolescents and adults. Each NSSHB wave was cross-sectional in design. Individuals were recruited from the Ipsos KnowledgePanel®, which is a panel of about 60,000 individuals established by Ipsos (formerly GfK) using address-based sampling methodologies via the U.S. Postal Service's Delivery Sequence File. People cannot volunteer to join the KnowledgePanel (i.e., it is not an "opt-in" panel). Individuals were initially invited by Ipsos into the KnowledgePanel® through an initial invitation letter, a reminder postcard, a follow-up letter, and telephone calls if a matched landline telephone number was available. Households without internet connection were provided with a web-enabled device and free internet service upon enrollment in the KnowledgePanel®.

All sampled adults received an invitation message from Ipsos that let them know a new survey was available and included a link to the study information sheet. Adults who consented to participate could then proceed to the online survey. Because KnowledgePanel® members are adults, in order to recruit adolescents, adult panel members with children ages 14–17 were identified by Ipsos. The adult member then received an email or online notification from Ipsos, letting them know that their 14–17 year old was eligible to participate in a new survey. Parents who consented to let our research team invite their adolescent child into the survey could either immediately let their adolescent come to the computer to complete the survey or else the adolescent could return to a computer at a time

of their own choosing to complete the survey. Parents were asked to give their adolescent privacy while taking the survey.

Panel members could earn points to accumulate toward cash rewards or merchandise as incentives to participate in surveys; adolescent participants earned a \$5 cash equivalent. Once data collection was complete, Ipsos developed further weighting adjustments, using the latest Current Population Survey (CPS) distribution as a benchmark, in order to account for minor differential attrition rates among study participants. Variables used for weighting the sample included: gender, age, race/ethnicity, Census region, household income, home ownership status, metropolitan area, and internet access. Using the above weights as the measure of size for each panel member, a probability proportional to size procedure was used to select our study sample.

Measures

Demographic variables: Demographic variables such as age, gender, race/ethnicity, education, annual household income, employment status, number of children in household, and Census region were collected as part of the research panel's recruitment and retention efforts.

Partner type at last sexual event: Participants who reported a prior sexual event were asked a series of questions about their most recent sexual event. Specifically, they were asked about partner type with the item "Which best describes who this person was?" Response options were: my spouse or domestic partner; boyfriend, girlfriend, or significant other; someone I was dating/hanging out with; a friend; someone I just met; someone who paid me or gave me something for sex; someone who I paid or gave something to for sex; other, please specify.

Contraceptive use at last sexual event: Study participants could select all methods that apply from the following contraceptive inventory list: male condom, female condom, birth control pill, Nuva ring (vaginal ring), birth control patch, birth control shot, implant, IUD, cervical cap or diaphragm, spermicidal gel, jelly, or foam, rhythm or natural family planning method, withdrawal, unsure, other, or none of these.

PVI frequency during the past year: Participants were asked, "Thinking about the past year, about how often have you engaged in penile-vaginal intercourse?" Response options included: not at all, a few times in the past year, once a month, a few times per month, once a week, 2–3 times per week, and almost every day.

Statistical Analysis

All statistical analyses were performed separately by adults (ages 18–49) and adolescents (ages 14–17) and use the statistical weights developed by Ipsos (described above). Participants were included in the analysis if they reported having had PVI at least once in the prior year and if they reported PVI, oral, or anal sex at the last sexual event. Composite variables were created for the following contraceptive groups: any contraceptive use, condom use (male or female condom), long-acting reversible contraception or LARC

(birth control shot, implant, IUD), highly effective hormonal methods (birth control pill, patch, or vaginal ring), and other contraceptives (cervical cap or diaphragm; spermicidal gel, jelly, or foam; rhythm or natural family planning methods; withdrawal). Birth control shots were categorized as LARC methods because the 2009 survey grouped birth control shot and implant together as one response item. At the time of the survey, the period of effectiveness that birth control shots provide was considered “long” (Tolaymat & Kaunitz, 2007; Wellings, Zhihong, Krentel, Barrett, & Glasier, 2007). Chi-squared tests were used to identify differences in contraceptive use between 2009 and 2018. To evaluate the association between past year PVI frequency on contraceptive use at the last sexual event (condoms, LARC, highly effective hormonal methods, other, or none), logistic regression with survey weights was performed to calculate odds ratios and 95% confidence intervals. The models included year and the interaction of PVI and year to account for the effect modification that calendar year had. PVI frequency was included in the model as a linear term by coding the ordinal categories ranging from 0 (not at all) to 6 (almost every day). We also specified adjusted models, separately for adults and adolescents. For adults, the models were adjusted for gender, age category, race, income, education, and event-level partner type. For adolescents, the models were adjusted for gender, age, race, and event-level partner type. All analyses were done using SAS for Windows 9.4 (SAS Institute, Cary, NC, USA)

Results

A total of 181 adolescents (ages 14 to 17) and 3566 adults (ages 18 to 49) who reported any PVI in the past year and who reported PVI, oral, or anal sex at the most recent sexual event were included from the 2009 and 2018 waves of the NSSHB. Of these, 114 adolescents (114 weighted) and 1314 adults (1390 weighted) were from the 2009 NSSHB, while 67 adolescents (61 weighted) and 2252 adults (2199 weighted) were from the 2018 NSSHB. Weighted demographic and behavioral characteristics are shown in Table 1.

Overall condom/contraceptive use in 2009 and 2018

Among adults, there was a significant decrease over time in condom use during their most recent sexual event (27.6% in 2009 vs. 21.4% in 2018, $p < .001$) (Table 1). The same overall trend was observed for highly effective hormonal methods (25.8% in 2009 vs 20.8% in 2018, $p < .001$). However, there was a significant increase in average use of LARC methods (5.5% in 2009 vs 14.0% in 2018, $p < .001$) and other contraceptives (20.0% in 2009 vs 26.9% in 2018, $p < .001$).

Among adolescents, there was no significant changes over time on the use of condoms or contraceptives. There was a similar decrease seen in the use of highly effective hormonal contraceptives (44% to 35%), however the precision was limited by small sample size.

Past year PVI frequency and condom/contraceptive use at last sexual event

Past year PVI frequency decreased from 2009 to 2018 among both adults and adolescents (Table 1). Those who reported past year PVI frequency a few times per month or less increased from 2009 to 2018 (45.1% to 53.8% among adults; 53.6% to 76.9% among adolescents).

In the 2009 NSSHB, among adults, we found significant differences in condom use at the most recent sexual event in relation to past year penile-vaginal frequency (Table 2); that is, those who reported lower PVI frequency were more likely to report condom use. We also observed statistically significant differences between PVI frequency and the use of highly effective hormonal methods and no contraceptives. Those who reported higher past-year PVI frequency were more likely to report contraceptive non-use at last sexual event.

In the 2018 NSSHB, also among adults, PVI frequency was significantly associated with the use of condoms, highly effective hormonal methods, LARC methods, other contraceptives, and no contraceptives. People in the highest PVI frequency group (reporting intercourse almost every day) were least likely to report condom use and most likely to report the use of no contraceptives.

For adolescents, there was a significant difference in percentages of reported use of highly effective hormonal methods by prior year PVI frequency in 2009, but not in 2018 (Table 3). Participants' reports of other contraceptive use was associated with decreased prior year PVI frequency in 2018 but not in 2009.

In the adjusted models (Table 4), we observed an inverse relationship between past-year PVI frequency and use of all contraceptives, except for adolescent condom use (which was positively related to PVI frequency). That is, for both adults and adolescents, greater PVI frequency was associated with a lower likelihood of using highly effective hormonal methods, LARC, other contraceptives, as well as reporting that no contraceptives were used. For adolescents, however, greater PVI frequency was associated with a greater likelihood of reporting condom use.

Specifically, among adults we observed that greater PVI frequency was associated with lower odds of condom use in the 2009 NSSHB (0.53 AOR, 95%CI [0.45, 0.63]) as well as in the 2018 NSSHB (0.41 AOR, 95%CI [0.35, 0.47]), when adjusted for gender, age, race, income, education, event-level partner type. We observed the same trend for adults with the use of highly effective hormonal methods, LARC, other contraceptives, as well as with the use of no contraceptives.

Among adolescents, in both 2009 and 2018, greater PVI frequency was associated with greater use of condoms at the most recent sexual event (2009 – 7.05 AOR, 95%CI [3.17, 15.70]; 2018 – 5.34 AOR, 95%CI [2.18, 13.07]), when adjusted for gender, age, race, and event-level partner type.

Discussion

This study uses data from two U.S. nationally representative surveys, the 2009 and 2018 NSSHB, to examine changes over time in event-level condom/contraceptive use as well as associations between past-year sexual frequency and condom/contraceptive use at the last sexual experience. Prior research has demonstrated that, during this time frame, U.S. STI rates have increased (Centers for Disease Control and Prevention, 2021a) while partnered sexual activity has decreased (Herbenick et al., 2022), underscoring the importance of understanding how condom/contraceptive use fits in relation to sexual behavior.

We found that among adults, event-level use of condoms and highly effective hormonal methods decreased from 2009 to 2018. Yet, event-level use of LARC methods and “other” contraceptives (e.g., cervical cap or diaphragm, spermicidal gel, jelly, or foam, rhythm or natural family planning methods, withdrawal) increased from 2009 to 2018 among adults. Our findings of increased utilization of LARC methods over time, as well as decreased use of highly effective hormonal methods over time, are consistent with data from other U.S. surveillance studies, including NSFG and the National Health and Nutritional Examination Survey (Branum & Jones, 2015; Kavanaugh et al., 2015; Mosher et al., 2016). Also, NSFG data indicate increases in use of withdrawal and natural family planning methods from 2008 to 2014, which aligns with our findings of increased use of “other” contraceptive methods (Kavanaugh & Jerman, 2018). However, NSFG data did not show significant changes in condom use between 2008 and 2014. The perception that the use of condoms decreases sexual pleasure may play a key role in the decreased use of condoms and thereby the increased use of other contraceptive methods (Philpott, Larsson, Singh, Zaneva, & Gonsalves, 2021). Strategies and interventions to eroticize safe sex may be effective in promoting condom use and should be a priority for future STI prevention efforts.

Regarding the relationship between PVI frequency and condom/contraceptive use, we found that increased PVI frequency in the past year was statistically significantly associated with decreased condom/contraceptive use at the last sexual event except for condom use among adolescents; these associations were observed even after controlling for gender, age, race, income, education, and event-level partner type. Despite controlling for partner type (e.g., regular partners versus casual partners), our results still show that U.S. adults are less likely to use condom/contraceptives as their PVI frequency increases. Also, even though we statistically adjusted for partner type, the categorization of one’s sexual partner is limited in its measurement, and does not account for characteristics such as trust, love, relational commitment, or emotional satisfaction. Moreover, adolescents often have less temporally stable relationships than adults (even when in a committed relationship) and may be more worried about unintended pregnancy or STIs and thus more likely than adults to use a condom with greater PVI frequency.

Our study findings are consistent with prior studies showing decreased use of condom/contraceptives among young adults (Sayegh et al., 2006; Wildsmith et al., 2015) and individuals using drugs (Williams et al., 2001). While prior U.S. national studies have shown the opposite trend (e.g., that increased PVI frequency was associated with increase condom/contraceptive use; (Frost et al., 2007; Wu et al., 2008), those studies relied on data from years earlier than 2009. As various forms of partnered sex, including vaginal intercourse, has declined among both adolescents and adults since 2009, it may be that the ways in which condom/contraceptive use intersects with sexual behavior, including sexual frequency, has shifted as well. This finding that, for adults (but not adolescents), increased PVI frequency was associated with decreased condom/contraceptive use raises potential concern for both prevention of unintended pregnancy as well as STIs and has important implications on how clinicians and sexual health educators counsel individuals on using condom and contraceptive, especially among those who are engaging in PVI more frequently.

A strength of our study is that we used data from the NSSHB, which a nationally representative survey spanning over a decade. The NSSHB collects rich data on both sexual behaviors and condom/contraceptive use for thousands of American in each wave of data collection. The survey was also administered online, which facilitates the reporting of sensitive behaviors such as sexual behaviors. However, our study was also limited in the items that were consistently collected throughout the NSSHB waves. For example, we used data on condom and contraceptive use at the most recent sexual event, which does not differentiate between the selection of condom/contraceptive use versus the continuation of these methods. We also were not able to control for pregnancy intentions and account for multiple sexual partners and/or concurrent partners. More detailed assessments of partner characteristics, sexual esteem, sexual depression, or attitudes and norms towards condoms/contraceptives were not possible due to the limited survey items. The NSSHB was cross-sectional in design, therefore we were unable to determine if the changes in sexual frequency influenced condom/contraceptive use or vice versa. Although we attempted to account for temporality by examining sexual frequency in the past year versus condom/contraceptive use at the last sexual event, we do acknowledge that the relationship between sexual frequency and condom/contraceptive use may be bi-directional and the reverse causal relationship may have been captured in our analysis.

In conclusion, we found an overall decrease in the use of condoms and highly effective hormonal contraceptives as well as an overall increase in use of LARC methods and other contraceptives from 2009 to 2018 in adults. Increased frequency of penile-vaginal intercourse was associated with decreased use of most contraceptive methods but an increase in condom use for adolescents. Our findings suggests that sexual frequency should be considered in the context of counseling and educating sexually active individuals regarding contraceptive choice and continued use.

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Table 1. Weighted Characteristics of Adults and Adolescents, National Survey of Sexual Health and Behaviors (NSSHB) 2009 and 2018

Characteristics	Adults (ages 18–49)				Adolescents (ages 14–17)			
	Total (N=3589)	2009 (N=1390)	2018 (N=2199)	p-value	Total (N=175)	2009 (N=114)	2018 (N=61)	p-value
Gender				.216				.934
Male	48.1 (1727)	49.4 (687)	47.3 (1040)		52.7 (92)	52.4 (60)	53.1 (32)	
Female	51.9 (1862)	50.6 (703)	52.7 (1159)		47.3 (83)	47.6 (54)	46.9 (29)	
Age Group				<.001				-
14–17	-	-	-		100.0 (175)	100.0 (114)	100.0 (61)	
18–24	12.1 (435)	15.7 (218)	9.9 (217)		-	-	-	
25–29	23.9 (857)	27.1 (377)	21.8 (480)		-	-	-	
30–39	32.6 (1171)	27.5 (382)	35.9 (789)		-	-	-	
40–49	31.4 (1125)	29.7 (413)	32.4 (713)		-	-	-	
Race/Ethnicity				<.001				.585
White, non-Hispanic	63.7 (2288)	69.1 (961)	60.4 (1327)		52.6 (92)	49.1 (56)	59.1 (36)	
Black, non-Hispanic	11.0 (395)	8.9 (124)	12.3 (271)		15.9 (28)	17.9 (21)	12.2 (7)	
Other or 2+ races, non-Hispanic	7.7 (276)	7.1 (99)	8.1 (177)		12.5 (22)	12.5 (14)	12.5 (8)	
Hispanic	17.6 (630)	14.8 (206)	19.3 (424)		18.9 (33)	20.4 (23)	16.1 (10)	
Annual Household Income				<.001				.435
<\$25k	11.7 (420)	15.2 (211)	9.5 (209)		15.7 (27)	18.3 (21)	10.7 (7)	
\$25–49k	21.0 (755)	28.9 (402)	16.0 (353)		23.5 (41)	22.8 (26)	24.8 (15)	
\$50–74k	19.3 (692)	22.1 (307)	17.5 (385)		13.8 (24)	13.4 (15)	14.5 (9)	
\$75–124k	28.1 (1009)	25.6 (355)	29.8 (654)		28.7 (50)	25.1 (29)	35.4 (22)	
\$125k+	19.9 (713)	8.3 (115)	27.2 (599)		18.3 (32)	20.4 (23)	14.5 (9)	
Education				.117				-
Less than high school	9.0 (323)	9.3 (130)	8.8 (194)		-	-	-	
High school	24.6 (883)	25.9 (360)	23.8 (523)		-	-	-	
Some college	31.0 (1112)	31.8 (441)	30.5 (671)		-	-	-	
Bachelor's degree or higher	35.4 (1270)	33.0 (459)	36.9 (811)		-	-	-	
Partner Type (Last Sexual Event)				<.001				.127

Characteristics	Adults (ages 18–49)				Adolescents (ages 14–17)			
	2009 (N=3589)		2018 (N=2199)		Total (N=175)		2009 (N=114)	
	% (n)	% (n)	% (n)	% (n)	% (n)	% (n)	% (n)	p-value
Spouse	61.7 (2207)	52.9 (734)	67.3 (1473)		-	-	-	
Boyfriend/Girlfriend	21.4 (767)	22.9 (317)	20.5 (450)		-	-	-	
Spouse, Boyfriend/Girlfriend	-	-	-		63.7 (112)	67.8 (78)	56.1 (34)	
Other	16.9 (603)	24.2 (335)	12.2 (268)		36.3 (64)	32.2 (37)	43.9 (27)	
Contraceptive Use (Last Sexual Event)								
Condoms								.791
Yes	23.7 (825)	27.6 (358)	21.4 (467)		76.3 (127)	75.6 (80)	77.4 (47)	
No	76.3 (2650)	72.4 (937)	78.6 (1714)		23.7 (40)	24.4 (26)	22.6 (14)	
Highly effective hormonal methods								.247
Yes	22.6 (787)	25.8 (331)	20.8 (456)		40.6 (68)	43.9 (47)	34.8 (21)	
No	77.4 (2694)	74.2 (951)	79.3 (1743)		59.4 (99)	56.1 (60)	65.2 (40)	
Long-acting reversible contraceptives								.906
Yes	10.9 (379)	5.5 (71)	14.0 (308)		12.4 (21)	12.2 (13)	12.8 (8)	
No	89.1 (3103)	94.5 (1212)	86.0 (1891)		87.6 (146)	87.8 (93)	87.2 (53)	
Other contraceptives								.441
Yes	24.4 (848)	20.0 (256)	26.9 (592)		18.3 (31)	16.5 (18)	21.3 (13)	
No	75.6 (2634)	80.0 (1026)	73.1 (1608)		81.7 (137)	83.5 (89)	78.7 (48)	
None	33.3 (1159)	33.4 (432)	33.2 (728)		5.7 (10)	5.1 (5)	6.8 (4)	.647
Past Year Penile- Vaginal Intercourse Frequency								.039
A few times in the past year	15.4 (548)	12.6 (173)	17.1 (375)		28.6 (46)	21.1 (22)	42.9 (24)	
Once a month	9.1 (323)	9.2 (126)	9.0 (197)		10.9 (18)	10.2 (11)	12.2 (7)	
A few times per month	26.0 (929)	23.3 (320)	27.7 (609)		22.1 (36)	22.3 (24)	21.8 (12)	
Once a week	19.4 (694)	22.4 (308)	17.6 (386)		10.7 (17)	12.3 (13)	7.6 (4)	
2–3 times per week	25.1 (898)	25.8 (354)	24.7 (543)		16.4 (27)	20.6 (22)	8.3 (5)	
Almost every day	5.0 (179)	6.7 (92)	4.0 (87)		11.4 (18)	13.6 (14)	7.2 (4)	

Table 2.
Adults: Past-Year Penile-Vaginal Intercourse Frequency and Contraceptive Use at Last Sexual Event

	Contraceptive Use at Last Sexual Event	Past Year Penile-Vaginal Intercourse Frequency					<i>p-value</i>
		A few times in the past year	Once a month	A few times per month	Once a week	2–3 times per week	Almost every day
		% (n)	% (n)	% (n)	% (n)	% (n)	% (n)
2009							
	Condoms	40.0 (64)	28.4 (32)	33.7 (98)	23.6 (66)	19.4 (67)	27.2 (25)
	Highly effective hormonal methods	27.7 (43)	24.7 (28)	19.6 (56)	24.7 (69)	32.2 (110)	24.3 (22)
	Long-acting reversible contraceptives	5.63 (9)	11.6 (13)	5.2 (15)	4.5 (12)	4.8 (16)	5.4 (5)
	Other contraceptives	17.4 (27)	15.7 (18)	16.9 (49)	23.1 (64)	22.8 (78)	17.9 (16)
	None	26.1 (41)	29.9 (34)	38.5 (112)	35.3 (99)	30.2 (103)	40.8 (37)
2018							
	Condoms	33.6 (126)	27.1 (54)	19.7 (120)	20.5 (79)	15.3 (82)	7.2 (6)
	Highly effective hormonal methods	15.9 (59)	12.2 (24)	24.6 (150)	24.7 (96)	21.7 (118)	11.4 (10)
	Long-acting reversible contraceptives	9.9 (37)	13.3 (26)	12.0 (73)	12.2 (47)	20.2 (110)	17.5 (15)
	Other contraceptives	27.9 (105)	31.1 (61)	28.4 (173)	29.6 (114)	21.4 (116)	25.1 (22)
	None	34.1 (128)	37.5 (74)	30.7 (187)	30.0 (116)	33.6 (181)	48.0 (42)

Table 3.
Adolescents: Past-Year Penile-Vaginal Intercourse Frequency and Contraceptive Use at Last Sexual Event

Contraceptive Use at Last Sexual Event	Past Year Penile-Vaginal Intercourse Frequency						<i>p-value</i>
	A few times in the past year	Once a month	A few times per month	Once a week	2–3 times per week	Almost every day	
	% (n)	% (n)	% (n)	% (n)	% (n)	% (n)	
2009							
Condoms	82.0 (18)	85.8 (7)	85.9 (18)	83.9 (10)	57.2 (12)	51.0 (7)	0.067
Highly effective hormonal methods	26.3 (6)	54.4 (4)	27.4 (6)	34.7 (4)	63.8 (13)	63.1 (9)	0.044
Long-acting reversible contraceptives	3.2 (1)	5.7 (0)	29.0 (6)	0.0 (0)	22.8 (5)	6.8 (1)	0.053
Other contraceptives	16.6 (4)	9.9 (1)	19.0 (4)	15.6 (2)	22.4 (5)	10.9 (2)	0.949
None	5.1 (1)	0.0 (0)	2.6 (1)	0.0 (0)	9.0 (2)	13.0 (2)	0.623
2018							
Condoms	82.6 (20)	100.0 (7)	65.3 (8)	65.6 (3)	27.7 (1)	88.2 (4)	0.078
Highly effective hormonal methods	33.0 (8)	30.6 (2)	51.1 (6)	42.7 (2)	57.6 (3)	9.9 (0)	0.631
Long-acting reversible contraceptives	3.8 (1)	7.7 (1)	8.2 (1)	11.8 (1)	26.3 (1)	0.0 (0)	0.651
Other contraceptives	23.7 (6)	2.5 (0)	22.7 (3)	88.2 (4)	3.4 (0)	9.9 (0)	0.021
None	8.6 (2)	0.0 (0)	13.1 (2)	0.0 (0)	0.0 (0)	11.8 (0)	0.849

Table 4.

Associations between Past-Year Penile-Vaginal Intercourse Frequency and Contraceptive Use at Last Sexual Event

	2009		2018					
	OR (95% CI)	p-value	AOR (95% CI)	p-value	OR (95% CI)	p-value	AOR (95% CI)	p-value
Adults								
Condoms	0.39 (0.35, 0.44)	<.001	0.53 (0.45, 0.63)	<.001	0.26 (0.23, 0.29)	<.001	0.41 (0.35, 0.47)	<.001
Highly effective hormonal methods	0.34 (0.30, 0.39)	<.001	0.29 (0.24, 0.34)	<.001	0.26 (0.24, 0.29)	<.001	0.23 (0.20, 0.27)	<.001
Long-acting reversible contraceptives	0.06 (0.05, 0.08)	<.001	0.05 (0.04, 0.07)	<.001	0.16 (0.14, 0.18)	<.001	0.16 (0.13, 0.20)	<.001
Other contraceptives	0.24 (0.21, 0.28)	<.001	0.22 (0.18, 0.26)	<.001	0.37 (0.33, 0.40)	<.001	0.34 (0.29, 0.39)	<.001
None	0.50 (0.44, 0.56)	<.001	0.40 (0.34, 0.47)	<.001	0.50 (0.45, 0.54)	<.001	0.34 (0.30, 0.39)	<.001
Adolescents								
Condoms	3.65 (2.12, 6.29)	<.001	7.05 (3.17, 15.70)	<.001	2.80 (1.50, 5.24)	.001	5.34 (2.18, 13.07)	<.001
Highly effective hormonal methods	0.63 (0.41, 0.99)	.043	0.35 (0.19, 0.64)	<.001	0.62 (0.35, 1.09)	.096	0.37 (0.17, 0.80)	.011
Long-acting reversible contraceptives	0.14 (0.07, 0.27)	<.001	0.12 (0.05, 0.28)	<.001	0.08 (0.03, 0.23)	<.001	0.08 (0.02, 0.28)	<.001
Other contraceptives	0.20 (0.12, 0.35)	<.001	0.20 (0.10, 0.39)	<.001	0.30 (0.16, 0.58)	<.001	0.37 (0.17, 0.83)	.016
None	0.04 (0.01, 0.14)	<.001	0.00 (0.00, Inf)	.999	0.08 (0.03, 0.23)	<.001	0.00 (0.00, Inf)	.999

Note: Adult models are adjusted for gender, age category, race, income, education, and event-level partner type. Adolescent models are adjusted for gender, age, race, and event-level partner type.