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Annual physical examination reports vary by gender once teenagers become sexually active

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Abstract

Introduction—Few sexually active male adolescents receive sexual/reproductive health (SRH) services. We examine whether the association between adolescents' sexual behavior status and physical examination over time can help us understand why.

Methods—We conducted longitudinal cohort analysis of the National Longitudinal Study of Adolescent Health with 9239 adolescents who completed the baseline school (1994/95) and Wave 2 (1996) follow-up surveys approximately 1.5 years later (retention rate=71%). We fit logistic regression models with random effects to estimate individual odds of reporting a physical examination in the past 12 months at follow-up, as compared to baseline, stratified by sexual behavior status and gender, and adjusting for sociodemographic and healthcare access factors.

Results—34.5% males and 38.2% females reported experiencing vaginal intercourse by follow-up, and 22.4% males and 24.7% females reported first experiencing intercourse during the study. Among sexually active adolescents, about half reported annual exams and one-fifth no exams. Among females, baseline to follow-up exam reports significantly increased in: sex initiators (adjusted Odds Ratio [95% confidence interval]=2.09 [1.66–2.64]); those reporting sex at both times (2.16 [1.51–3.09]); and those reporting no sex either time (2.47 [2.00–3.04]). Among males, baseline to follow-up exam reports significantly increased in those reporting no sex either time (1.57 [1.26–1.96]) and showed increasing trends in sex initiators (1.27 [0.92–1.76]).

Discussion—A majority of sexually active adolescents report annual physical exams over time. Providers should not miss opportunities to deliver evidence-based SRH to sexually active adolescents. Future efforts are needed to increase all adolescents' access to SRH services.

MeSH Terms

Health Services Accessibility; Male; Female

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Introduction

In the U.S., the majority of adolescents initiate sexual behavior prior to age 19 placing themselves and their partners at risk for sexually transmitted infections (STIs), human immunodeficiency virus (HIV) and unintended pregnancy [1,2]. The importance of healthcare to reduce risk of these preventable health outcomes among all adolescents is becoming increasingly clear, as evidenced by recent recommendation updates from the U.S. Preventive Services Task Force (USPSTF) and Centers for Disease Control (CDC) [3–5] and professional organizations [6,7]. In order for healthcare providers to effectively deliver evidence-based sexual/reproductive health (SRH) services to adolescents, this population needs to be engaged in healthcare – especially as they initiate sex and transition to ongoing sexual behavior.

Data from outpatient ambulatory visits suggest that providers' reports of SRH services delivered to young people represent services delivered primarily to females than males [8]. For example, a review of outpatient ambulatory medical record data by gender shows that providers were three times more likely to take sexual health histories and twice as likely to counsel on condoms among their female than male adolescent patients (45% vs. 15% and 18% vs. 7%, respectively) [8]. However, young men's care use patterns may contribute to some of the low levels of services received by this population.

Past studies show that adolescents' annual healthcare visits vary by gender [9,10]. Whereas increases in adolescent care use are observed for older females, declines in care use are observed for older males. However, few past studies have examined the relationship between adolescents' sexual behavior and care use, especially among males [11–13]. If sexually active young men are not interfacing with healthcare, then they may have limited opportunities to receive SRH services. Alternately, sexually active young men may be engaged in healthcare but their regular providers are not delivering SRH services to them. Burstein and colleagues, examining a national sample of sexually experienced teenaged students, found that males were less likely to report a preventive healthcare visit in the last year compared to females [11]. The major limitation of this study is its cross-sectional design that limits our ability to disentangle the longitudinal relationship between sexual behavior and healthcare use.

Given recent evidence that services addressing key components of adolescents' SRH effectively reduce risk of negative sexual health outcomes, we wanted to examine the extent to which young men transitioning into sexual behavior are also reporting routine care use over time. Thus, the goal of our study was to examine by gender the association of healthcare use over time once adolescents initiate sex after controlling for demographic and healthcare access factors. We used the National Longitudinal Study of Adolescent Health (Add Health) dataset since it is the only and most recent study to follow a nationally representative sample of the same adolescents over time and assess data on both report of an annual physical examination and sexual behavior.

Methods

Survey Design and Analytic Sample

Add Health is a nationally representative cohort study of youth followed into adulthood that used a multistage, stratified, school-based, clustered sampling design [14].

For this study, we used data from the baseline in-school survey completed October 1994 to April 1995, the Wave 1 in-home survey including the parent survey completed April to

December 1995 and the Wave 2 in-home survey completed May to August 1996 (N=14,738; and retention rate=71% including school dropouts and excluding graduating seniors).

Since our main outcome of interest (physical examination) asked study participants to respond to a 12-month recall time frame, for our main analysis we used data from the baseline in-school and the Wave 2 in-home survey. These two surveys were administered, on average, 16-months apart and, thus, we eliminated any potential overlap in the recall time frame for responses to our main outcome. For the purposes of analyses presented here, the baseline in-school survey is designated as “baseline” data and the Wave 2 in-home as “follow-up” data.

Our final analytic sample consisted of participants who had data available for the baseline and follow-up surveys with an assigned grand weight (n=10,234), known age (n=9844), age between 12 and 18 years old (n=9692), responses to our key outcome variable at baseline and follow-up (n=9675), and responses to our main predictor variable – sexual behavior – at baseline and follow-up (n=9239).

Institutional Review Board approval was provided by the University of North Carolina, Chapel Hill for original survey procedures [14] and by the Johns Hopkins University for secondary data analysis.

Measures

Main Outcome Variable

The main outcome variable was measured at baseline and follow-up by “When did you last have a physical examination?” Responses were coded as more or less than 12 months ago. At baseline, participants had the response choice “I don’t remember.” For analyses presented here, this response was coded as “more than 12 months”; 723 male and 1146 female respondents chose this response. Report of a physical examination at baseline and follow-up was treated as a time varying outcome.

Main Predictor Variable

In the Wave 1 and 2 in-home surveys, participants were asked if they ever had sex (defined as “when a male inserts his penis into a female’s vagina”) in general and in the context of romantic and non-romantic relationships. In both waves, follow-up questions were asked about the months and years of first and last sex, respectively. Since questions about sexual behavior in the last year were not asked in the baseline in-school survey we used the date of the in-school baseline survey and the dates that adolescents stated they initiated sex in the Wave 1 in-home survey to dummy code whether adolescents engaged in sexual behavior or not in the last year at the time of the baseline in-school survey. For the follow-up Wave 2 in-home survey, adolescents’ responses to whether they engaged in sexual behavior within the context of romantic or non-romantic relationships within the last year were dummy coded as engaged in sexual behavior or not in the last year. Change in sexual behavior from baseline to follow-up was categorized as one of the following: sexual behavior at both times; no sexual behavior at baseline but sexual behavior at follow-up (sex initiator); sexual behavior at baseline but not at follow-up (decline in sexual behavior); or no sexual behavior at either time.

Baseline Sociodemographic and Healthcare Access Factors

Demographics included teen self-report of gender, age, and race/ethnicity coded as non-Hispanic white, non-Hispanic black, Hispanic, or other race.

Parent responses to questions on parent education, family welfare status and adolescent health insurance status were obtained from the Wave 1 in-home parent survey. Parental education was measured by asking parents “How far did you go in school?” and coded as having completed less than high school vs. receipt of a high school diploma/GED or higher. Family welfare assistance was measured by parent responses to whether they were currently receiving public assistance and/or welfare and dummy coded as receipt of welfare or not.

Adolescent health insurance status was measured based on parent report and coded as continuously insured (any type), insured with interruptions, or uninsured during the past 12 months. Adolescents’ self-report of participation in team sports during the school year was coded as no or yes.

Data Analysis

All reported frequencies and analyses are weighted according to previously described procedures [14]. For presentation of descriptive findings, report of a physical examination at baseline and follow-up was categorized as having an examination at both times, no exam at baseline but an exam at follow-up (increase in report), an exam at baseline but no exam at follow-up (decrease in report), or no exam at either time. We performed crosstabs to summarize patterns of change in sexual behavior and report of a physical examination from baseline to follow-up.

We modeled change over time using a random intercept logistic regression model that accounted for three-levels (repeated measures, individuals, and schools) and estimated individual odds of reporting a physical examination at follow-up as compared to baseline [15]. For these analyses, physical examination report was treated as a time varying outcome. Analyses were run unadjusted and adjusted for factors known to be associated with adolescents’ physical examination reports (age, race/ethnicity, parent education, family welfare status, health insurance status and sports participation) [16–18]. All analyses were stratified by sexual behavior categories and gender.

Results

The analytic sample consisted of 9239 adolescents. At baseline, study participants’ mean (95% CI) age was 14.8 (14.6–15.1) years old. The majority were White non-Hispanic (70.1%) with 9.9% Hispanic, 14.2% Black non-Hispanic, and 5.7% Asian/other race (Table 1). One-quarter of families reported being on welfare and the majority of parents reported a 12th grade or higher education level (85.3%). The majority of parents reported their adolescent had continuous health insurance coverage during the past year (74%). At baseline, the majority of participants reported sports participation (61.1%) and a physical examination in the past year (55.8%) and 12.8% reported sexual behavior.

Change in sexual behavior from baseline to follow-up

Among male adolescents, 22.4% reported initiating sex, 9.2% reported sexual behavior at both times, 2.9% reported declines in sexual behavior, and 65.5% reported no sexual behavior at either time (Table 2). Among female adolescents, 24.7% reported initiating sex, 11.1% reported sexual behavior at both times, 2.4% reported declines in sexual behavior, and 61.8% reported no sexual behavior at either time.

Changes in report of physical examination from baseline to follow-up

Among male adolescents, 19.2% reported increasing exam report, 45.5% reported an exam at both times, 13.3% reported declines in exam, and 22.1% reported no exam at either time (Table 2). Among female adolescents, 24.0% reported increasing exam report, 42.6%

reported an exam at both times, 10.5% reported declines in exam, and 22.9% reported no exam at either time (Table 2).

Report of a physical examination at baseline and follow-up by sexual behavior status

Among female sex initiators, 54.6% reported a baseline exam and 67.9% a follow-up exam. Among females reporting sexual behavior at both times, 57.9% reported a baseline exam and 70.6% a follow-up exam. Among females reporting declines in sexual behavior, 46.5% reported a baseline exam and 54.0% a follow-up exam. Among females reporting no sexual behavior, 51.8% reported a baseline exam and 65.9% a follow-up exam.

Among male sexual initiators, 59.6% reported a baseline exam and 63.5% a follow-up exam. Among males reporting sexual behavior at both times, 63.7% reported a baseline exam and 63.0% a follow-up exam. Among males reporting declines in sexual behavior, 52.1% reported a baseline exam and 63.0% a follow-up exam. Among males reporting no sexual behavior, 58.1% reported a baseline exam and 65.3% a follow-up exam. Since these observations were not independent, individual trends over time are analyzed below.

Changes in report of a physical examination from baseline to follow-up by sexual behavior status

Logistic regression with random effects used in analyses here estimate individual odds in physical examination report at follow-up as compared to baseline (Table 3). Among female adolescents in all sexual behavior categories, physical examination reports at follow-up as compared to baseline significantly increased except among female adolescents who reported declines in sex. A female who reported no sexual behavior at baseline but sexual behavior at follow-up was 109% more likely to report a physical exam at follow-up as compared to baseline after controlling for sociodemographic and healthcare access factors (adjusted Odds Ratio [95% confidence interval]=2.09 [1.66–2.64]). A female who reported sexual behavior at baseline and follow-up was 116% significantly more likely to report a physical exam at follow-up as compared to baseline (2.16 [1.51–3.09]). A female who reported no sexual behavior at either baseline or follow-up was 147% significantly more likely to report a physical exam at follow-up as compared to baseline (2.47 [2.00–3.04]).

Among male adolescents, physical examination reports at follow-up as compared to baseline varied by sexual behavior category after controlling for sociodemographic and healthcare access factors. A male who reported no sexual behavior at baseline but sexual behavior at follow-up as well as a male who reported sexual behavior at baseline and follow-up was neither more nor less likely to report a physical examination at follow-up as compared to baseline (1.27 [0.92–1.76] and 0.96 [0.52–1.77]), respectively. This is in contrast to a male adolescent who reported no sexual behavior at either baseline or follow-up being 57% significantly more likely to report a physical exam at follow-up as compared to baseline (1.57 [1.26–1.96]). A male who reported sexual behavior at baseline but not at follow-up had increasing trends in physical examination reports at follow-up as compared to baseline (2.69 [0.96–7.49]).

Discussion

In this study we found that the majority of sexually active male and female adolescents reported annual physical examinations during the study period. Annual health visits represent an opportunity for all adolescents to receive evidence-based SRH clinical preventive services as recommended by the AAP, AMA, CDC and USPSTF [3–7]. These services include performing sexual health assessments, STI and HIV testing, provision of STI behavioral counseling and pregnancy prevention.

We also found gender differences in the relationship between sexual behavior and physical examination reports. Among female adolescents, physical examination reports increased over time regardless of sexual behavior. For male adolescents who were sexually active throughout the study, and males who became sexually active during the study period, we did not observe similar increases in exam reports. To our knowledge, this is the first report to examine associations in annual physical examination reports over time once adolescents initiate sex using a nationally representative longitudinal cohort of adolescents by gender.

In some respects, our finding that adolescents' physical examination reports over time vary by gender and sexual behavior status is not surprising [9,10,17]. Female adolescents receive clearer messages about the importance of addressing emerging SRH needs including menses, birth control, pregnancy and cervical cancer. In contrast, similar messages do not target young men, the recognition of the importance and value of male adolescents getting SRH care is relatively new [19], men do not require healthcare to obtain a condom and men lack a specialty comparable to gynecology dedicated to promoting SRH care [20,21]. Privacy is a concern for many adolescents' regarding SRH services, but is generally less of a concern among male adolescents [22]. Other known barriers to young men's access to care, such as fear, stigma, traditional masculine beliefs, and lack of perceived need [16,23–25], were not assessed in the Add Health survey. Our findings highlight the need for future work to investigate influences on male adolescents' SRH care, and methods to successfully engage and retain this population in care as they transition into sexual behavior.

Contextual factors also contribute to differences in relationships between sexual behavior and care use by gender including have women's increased resource availability (e.g., Planned Parenthood) and access to publically funded insurance options (e.g. Medicaid family planning). Although child health insurance expansions since 1997 have improved overall insurance access to young people, having insurance does not necessarily translate into increased care use, particularly among young men [26]. Given that young men's SRH was not an emphasized S-CHIP component, it is unlikely there have been resultant improvements in young men's access to SRH care. One recent analysis supporting no improvements in young men's SRH care delivery examined trends in STI/HIV counseling receipt among two cross-sectional national samples of male adolescents aged 15–19 years conducted in 1995 (National Survey of Adolescent Males) and 2002 (National Survey of Family Growth) [27]. This study found that regardless of young men's sexual risk category, the proportions of young men who reported STI/HIV counseling service receipt were the same in 1995 and 2002. Other studies also find low levels of SRH care delivery to adolescents in general and to male adolescents in particular [8,28,29]. Thus, strategies are needed to improve adolescents' access and quality of adolescent SRH care provided by primary care providers once they enter clinical settings.

Although we cannot determine reasons our respondents' received a physical examination, or whether SRH-specific services were received as part of these visits, it is important to highlight that about half of sexually active young men and women reported annual physical examinations indicating that they are accessing some type of health care. To the extent that these visits represent routine preventive care, past work shows providers' level of SRH care delivery has substantial room for improvement across settings in which adolescents are seen [11,30]. Current recommendations for routine adolescent preventive healthcare visits includes taking a developmentally-appropriate sexual health history, assessing for sexual risk, providing STI behavioral counseling and providing counseling on pregnancy prevention and family planning as needed [3,4]. All adolescents aged 13 and older should be tested for HIV according to the CDC or tested based on individual and/or clinic setting risk factors according to the USPSTF [3,31]. All at-risk sexually active adolescents should be screened for syphilis [32]. All sexually active female adolescents should be screened for

Chlamydia and gonorrhea [33,34]. All sexually active male adolescents in high prevalence clinic settings (e.g. STI, Job Corps, jail clinics) should be screened for Chlamydia [5]. Any adolescent infected with Chlamydia should be rescreened three months later [35]. Reproductive-health related vaccinations, including Hepatitis B and HPV [36], should also be administered to adolescents as recommended by the Advisory Committee on Immunization Practices along with other routine immunizations. To the extent that respondents' annual physical examination reports were obtained during other types of visits, it is important to note that these visits represent opportunities to provide SRH care, or discuss need for SRH services which can be delivered at a return appointment or by referral.

Our findings also provide a greater understanding about the degree to which sexually active adolescents have potential health needs that are not being met. Among sexually active adolescents in this national sample, 22% of males and 20% of females reported being sexually active at one or both times and no annual physical examinations. Mechanisms are thus needed to improve access to SRH for all adolescents including the use of successful alternative strategies including parent, school, and community outreach [37–39].

Male adolescents who reported sexual behavior at baseline but not at follow-up demonstrated increasing trends in physical exam reports but similar findings were not observed among females. Although a potentially interesting finding, this group's sample size was quite small. Among adolescents who reported no sexual behavior at either time, both females and males reported significant increases in physical examinations over the study period with females reporting the greatest odds of having a physical exam. This finding may be driven by other health needs, including school physical exam requirements. Regardless of sexual behavior, any annual visit represents an opportunity to promote age-appropriate healthy sexual development with adolescents and their parents as recommended [7].

A major strength of this study is that it examines whether changes in physical examination reports are associated with sexual behavior onset over time and how this relationship varies by gender among a nationally representative longitudinal cohort of adolescents after controlling for sociodemographic and healthcare access factors. However, this study has several important potential limitations. First, we focused on examining the relationship between sexual behavior and physical examination, our study does not seek to explain broader influences on adolescent healthcare seeking or healthcare use. Second, we were limited to measures used in Add Health. Differences in the wording of the main outcome's response categories in the baseline and follow-up surveys may underestimate baseline physical examination reports. We ran sensitivity analyses excluding participants at baseline who did not remember the timing of their last physical examination and results showed a similar pattern. Furthermore, our measure for physical exam report is not specific to type of visit, services received at visit [30], or site of care. Measurement limitations also precluded our ability to define sexual behavior broadly including oral, anal and/or same-sex behaviors. Thus, our results should be interpreted as the association between changes in heterosexual vaginal sexual behavior and physical examination reports. Since Add Health assessed health insurance status only once, we were unable to examine how person-based changes in health insurance status influenced the relationship between changes in sexual behavior and physical examination. Future work should include improved measures for SRH care-related questions asked of adolescents in large national cohort studies, and include assessment of a broader array of sexual behavior, reasons for care visits, services received, visit location, and repeated assessments of factors that may influence care. Finally, Add Health represents a dataset collected from 1994–96. It is, however, the most recent cohort study of its kind that examined both sexual behavior and physical examination over time. Future work should determine whether study findings hold among a more contemporary longitudinal cohort of adolescents.

Conclusions

Among a national sample of adolescents, the majority of sexually active adolescents reported annual physical examinations over the study period. Physical examination reports significantly increased over the study period regardless of females' sexual behavior status, but not for males who initiated sex or reported ongoing sexual behavior. In addition, one-fifth of sexually active adolescents never reported having an examination. Providers should not miss opportunities to deliver SRH care to adolescents who are initiating or engaging in ongoing sexual behavior. Future efforts should employ methods to increase all adolescents' access to SRH care and awareness of healthcare to address SRH needs.

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References

1. Eaton DK, Kann L, Kinchen S, Shanklin S, Ross J, Hawkins J, et al. Youth risk behavior surveillance--United States, 2007. *MMWR Surveill Summ.* 2008; 57(4):1–131. [PubMed: 18528314]
2. Gavin L, MacKay AP, Brown K, Harrier S, Ventura SJ, Kann L, et al. Sexual and reproductive health of persons aged 10–24 years - United States, 2002–2007. *MMWR Surveill Summ.* 2009; 58(6):1–58. [PubMed: 19609250]
3. Branson BM, Handsfield HH, Lampe MA, Janssen RS, Taylor AW, Lyss SB, et al. Revised recommendations for HIV testing of adults, adolescents, and pregnant women in health-care settings. *MMWR Recomm Rep.* 2006; 55(RR-14):1–17. [PubMed: 16988643]
4. U.S. Preventive Services Task Force. Agency for Healthcare Research and Quality. Behavioral Counseling to Prevent Sexually Transmitted Infections, Topic Page. Rockville, MD: U.S. Preventive Services Task Force; 2008. <http://www.ahrq.gov/clinic/uspstf/uspstfstds.htm>
5. Division of STD Prevention. Male Chlamydia Screening Consultation. Atlanta, Georgia: National Center for HIV/AIDS, Viral Hepatitis, STD and TB Prevention. U.S. Centers for Disease Control and Prevention; 2006. <http://www.cdc.gov/std/chlamydia/>
6. Elster, A.; Kuzsets, N. American Medical Association Guidelines for Adolescent Preventive Services (GAPS). Baltimore, MD: Williams & Wilkins; 1993.
7. Hagan, JF., Jr; Shaw, JS.; Duncan, P., editors. Bright Futures: Guidelines for health supervision of infants, children, and adolescents-Third edition. Elk Grove Village, IL: American Academy of Pediatrics; 2008.
8. Lafferty WE, Downey L, Holan CM, Lind A, Kassler W, Tao G, et al. Provision of sexual health services to adolescent enrollees in Medicaid managed care. *Am J Public Health.* 2002; 92(11): 1779–83. [PubMed: 12406808]
9. Ziv A, Boulet JR, Slap GB. Utilization of physician offices by adolescents in the United States. *Pediatrics.* 1999; 104(1 Pt 1):35–42. [PubMed: 10390257]
10. Marcell AV, Klein JD, Fischer I, Allan MJ, Kokotailo PK. Male adolescent use of health care services: where are the boys? *J Adolesc Health.* 2002; 30(1):35–43. [PubMed: 11755799]

11. Burstein GR, Lowry R, Klein JD, Santelli JS. Missed opportunities for sexually transmitted diseases, human immunodeficiency virus, and pregnancy prevention services during adolescent health supervision visits. *Pediatrics*. 2003; 111(5 Pt 1):996–1001. [PubMed: 12728079]
12. McKee MD, Fletcher J, Schechter CB. Predictors of timely initiation of gynecologic care among urban adolescent girls. *J Adolesc Health*. 2006; 39(2):183–91. [PubMed: 16857529]
13. Thrall JS, McCloskey L, Ettner SL, Rothman E, Tighe JE, Emans SJ. Confidentiality and adolescents' use of providers for health information and for pelvic examinations. *Arch Pediatr Adolesc Med*. 2000; 154(9):885–92. [PubMed: 10980791]
14. Harris, KM.; Florey, F.; Tabor, J.; Bearman, PS.; Jones, J.; Udry, JR. The National Longitudinal Study of Adolescent Health: research design, 2003. 2003 [Accessed November 7, 2007]. Available at: <http://www.cpc.unc.edu/projects/addhealth/design>
15. Singer, JD.; Willett, JB. Applied longitudinal data analysis: Modeling change and event occurrence. New York, NY: Oxford Press; 2003.
16. Marcell AV, Ford CA, Pleck JH, Sonenstein F. Masculine beliefs, parental communication, and adolescent males' health care use. *Pediatrics*. 2007; 119(4):e965–74.
17. Goodman E, Huang B. Socioeconomic status, depression, and health service utilization among adolescent women. *Womens Health Issues*. 2001; 11(5):416–26. [PubMed: 11566284]
18. Harris KM, Gordon-Larsen P, Chantala K, Udry JR. Longitudinal trends in race/ethnic disparities in leading health indicators from adolescence to young adulthood. *Arch Pediatr Adolesc Med*. 2006; 160(1):74–81. [PubMed: 16389215]
19. Sonenstein, F., editor. *Young Men's Sexual and Reproductive Health: Toward a National Strategy - Getting Started*. Washington, D.C: The Urban Institute; 2000.
20. ACOG Committee Opinion. Number 335, May 2006: The initial reproductive health visit. *Obstet Gynecol*. 2006; 107(5):1215–9. [PubMed: 16648436]
21. ACOG Committee on Adolescent Health Care. *Tool Kit for Teen Care. 2*. Washington, DC: American College of Obstetricians and Gynecology; 2009.
22. Klein JD, Wilson KM, McNulty M, Kaphahn C, Collins KS. Access to medical care for adolescents: results from the 1997 Commonwealth Fund Survey of the Health of Adolescent Girls. *J Adolesc Health*. 1999; 25(2):120–30. [PubMed: 10447039]
23. Kalmuss D, Austrian K. Real men do...real men don't: Young Latino and African American mens discourses regarding sexual health care utilization. *Am J Mens Health*. 2010; 4(3):218–30. [PubMed: 19477755]
24. Fortenberry JD, McFarlane M, Bleakley A, Bull S, Fishbein M, Grimley DM, et al. Relationships of stigma and shame to gonorrhea and HIV screening. *Am J Public Health*. 2002; 92(3):378–81. [PubMed: 11867314]
25. Frankel L. An appeal for additional research about the development of heterosexual male sexual identity. *J Psychology Human Sexuality*. 2004; 16(4):1–16.
26. Zuvekas SH, Weinick RM. Changes in access to care, 1977–1996: the role of health insurance. *Health Serv Res*. 1999; 34(1 Pt 2):271–9. [PubMed: 10199674]
27. Marcell AV, Bell DL, Lindberg LD, Takruri A. Prevalence of STI/HIV counseling services received by teen males, 1995 to 2002. *J Adolesc Health*. 2010; 46(6):553–9. [PubMed: 20472212]
28. Halpern-Felsher BL, Ozer EM, Millstein SG, Wibbelsman CJ, Fuster CD, Elster AB, et al. Preventive services in a health maintenance organization: how well do pediatricians screen and educate adolescent patients? *Arch Pediatr Adolesc Med*. 2000; 154(2):173–9. [PubMed: 10665605]
29. Wimberly YH, Hogben M, Moore-Ruffin J, Moore SE, Fry-Johnson Y. Sexual history-taking among primary care physicians. *J Natl Med Assoc*. 2006; 98(12):1924–9. [PubMed: 17225835]
30. Rand CM, Auinger P, Klein JD, Weitzman M. Preventive counseling at adolescent ambulatory visits. *J Adolesc Health*. 2005; 37(2):87–93. [PubMed: 16026717]
31. Screening for HIV: recommendation statement. *Ann Intern Med*. 2005; 143(1):32–7. [PubMed: 15998753]
32. Calonge N. Screening for syphilis infection: recommendation statement. *Ann Fam Med*. 2004; 2(4):362–5. [PubMed: 15335137]

33. Screening for gonorrhea: recommendation statement. *Ann Fam Med*. 2005; 3(3):263–7. [PubMed: 15928231]
34. Screening for chlamydial infection: U.S. Preventive Services Task Force recommendation statement. *Ann Intern Med*. 2007; 147(2):128–34. [PubMed: 17576996]
35. Centers for Disease Control. Sexually transmitted diseases treatment guidelines, 2006; *Morbidity and Mortality Weekly Report* 2006. p. 1-94.<http://www.cdc.gov/mmwr/pdf/rr/tr5511.pdf>
36. Advisory Committee on Immunization Practice (ACIP). ACIP Recommendations. <http://www.cdc.gov/vaccines/pubs/ACIP-list.htm>. [cited 2010 October 1]; Available from
37. Ralph LJ, Brindis CD. Access to reproductive healthcare for adolescents: establishing healthy behaviors at a critical juncture in the lifecourse. *Curr Opin Obstet Gynecol*. 2010; 22(5):369–74. [PubMed: 20733485]
38. Soleimanpour S, Geierstanger SP, Kaller S, McCarter V, Brindis CD. The role of school health centers in health care access and client outcomes. *Am J Public Health*. 2010; 100(9):1597–603. [PubMed: 20634445]
39. Hock-Long L, Herceg-Baron R, Cassidy AM, Whittaker PG. Access to adolescent reproductive health services: financial and structural barriers to care. *Perspect Sex Reprod Health*. 2003; 35(3): 144–7. [PubMed: 12866788]

Table 1

Participant sociodemographic and healthcare access characteristics, sexual behavior status and report of a physical examination in the last year

	Male (N=4328)		Female (N=4911)	
	N ^a	% ^b	N ^a	% ^b
Baseline sociodemographic factors				
Age				
12–14 years old	1372	42.0	1742	44.8
15–16 years old	1973	39.1	2226	39.9
17–18 years old	983	18.8	943	15.3
Race/ethnicity				
White Non-Hispanic	2432	71.1	2655	69.2
Hispanic	698	10.2	756	9.7
Black Non-Hispanic	768	12.2	1101	16.0
Asian or other race	430	6.4	399	5.1
Parent education				
<12 th grade	555	12.2	722	14.2
≥12 th grade	3287	79.0	3574	74.9
Family welfare recipient	938	23.1	1180	27.4
Baseline healthcare access factors				
Health insurance last year				
Continuous coverage	3183	75.4	3495	72.6
Interrupted coverage	261	6.7	282	6.0
No insurance	422	10.1	551	11.6
Participate in sports	2795	65.1	2780	57.4
Main predictor variable				
Sexual behavior status in last year				
At baseline	584	12.1	678	13.5
At follow-up	1515	31.6	1804	35.7
Main outcome variable				
Physical examination in last year				
At baseline	2551	58.8	2576	53.1
At follow-up	2756	64.6	3231	66.6

^aUnweighted;

^bWeighted, accounting for weight and strata

Table 2

Patterns of change in sexual behavior and physical examination from baseline to follow-up

	Male (N=4328)		Female (N=4911)	
	N ^a	% ^b	N ^a	% ^b
Changes in sexual behavior from baseline to follow-up				
Sexual initiator over time	1080	22.4	1247	24.7
Sexual behavior at both times	435	9.2	557	11.1
Decline in sexual behavior report	149	2.9	121	2.4
No sexual behavior at either time	2664	65.5	2986	61.8
Changes in physical examination from baseline to follow-up				
Increase in routine exam report	812	19.2	1184	24.0
Exam at both times	1944	45.5	2047	42.6
Decline in routine exam report	607	13.3	529	10.5
No exam at either time	965	22.1	1151	22.9

^aUnweighted;^bWeighted, accounting for weight and strata

Table 3
Frequencies, unadjusted and adjusted odds in individual change of physical examination report among each sexual behavior category by gender

Sexual behavior status category from baseline to follow-up	% Individuals who Report Physical Exam at Baseline & Follow-Up ^a				Unadjusted Odds Ratio ^b		Adjusted Odds Ratio ^{b,c}	
	Yes	No	Only Baseline	Only Follow-up	(95% CI)	p-value	(95% CI)	p-value
Male								
Sexual initiator	45.1	22.0	14.5	18.4	1.27 (0.93–1.75)	0.134	1.27 (0.92–1.76)	0.143
Sexual behavior both times	47.9	21.2	15.8	15.1	0.96 (0.51–1.79)	0.889	0.96 (0.52–1.77)	0.889
Decline in report	39.4	24.3	12.7	23.7	2.42 (0.98–5.97)	0.054	2.69 (0.96–7.49)	0.059
No sexual behavior	45.5	22.1	12.6	19.8	1.57 (0.70–3.50)	0.270	1.57 (1.26–1.96)	0.000
Female								
Sexual initiator	42.5	20.0	12.1	25.3	2.09 (1.67–2.62)	0.000	2.09 (1.66–2.64)	0.000
Sexual behavior both times	46.9	18.5	10.9	23.6	2.18 (1.49–3.19)	0.000	2.16 (1.51–3.09)	0.000
Decline in report	31.7	31.3	14.7	22.3	1.67 (0.61–4.56)	0.314	1.86 (0.56–6.20)	0.310
No sexual behavior	42.3	24.5	9.6	23.6	2.47 (2.00–3.04)	0.000	2.47 (2.00–3.04)	0.000

“Yes” indicates respondent reported an exam within the previous 12 months at both baseline and follow-up; “No” indicates respondent reported no exam within the previous 12 months at both baseline and follow-up.

^aWeighted, accounting for weight and strata

^bLogistic regression with random effects estimating individual odds of physical examination report at follow-up compared to baseline for individuals with each sexual behavior category, accounting for weight and strata

^cAdjusting for age, race/ethnicity, parent education, family welfare status, health insurance status and sports participation