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CENTER FOR SEXUAL HEALTH PROMOTION
INDIANA UNIVERSITY

THE JOURNAL OF

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2. King RE. Sexual dysfunction in men and women. Taylor and Francis: Philadelphia 1974, 86pp.
3. Stevens RA, Otis PN. Persistent sexual arousal syndrome. In: Johnson DA, ed. Female sexual dysfunction. Little Brown and Company: Boston, 1976, pp. 100–6.

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The Journal of Sexual Medicine

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Findings from the National Survey of Sexual Health and Behavior (NSSHB)
Center for Sexual Health Promotion
Indiana University

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GUEST EDITORIAL

Background and Considerations on the National Survey of Sexual Health and Behavior (NSSHB) from the Investigators

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Background

As we enter the second decade of the 21st century, the United States continues to face significant challenges in terms of the sexual and reproductive health of its population. With the Human Immunodeficiency Virus (HIV) continuing to have considerable and disproportionate impacts on diverse communities, high rates of other sexually transmissible infections and high numbers of unintended pregnancies each year, those on the front lines of public health and medicine are challenged to implement appropriate and effective strategies in response. While sexual health problems such as these have driven much of the nation's social and health priorities and research agendas in the past, it remains the case that sexual behaviors, and the associated behaviors that occur within the context of a sexual event (e.g., condom use), continue to garner significant interest among both scientific and lay communities. However, the delivery of sexual health services and the conduct of sexual health research remain challenging and, at times, controversial.

Just over 60 years ago, Dr. Alfred Kinsey and his research team made available, to both scientists and the general public, the first large-scale systematic studies of human sexual behavior [1–2]. For decades, much of what was known about human sexual behaviors was based upon the thousands of interviews conducted by Kinsey and his team, most of which were collected during the 1930s and 1940s. Later on, in the 1980s, the realities of the epidemics of HIV and Acquired Immune Deficiency Syndrome (AIDS) made clear how little was known about contemporary human sexual interactions, how they had changed over time, and the manner in which individuals and couples make decisions to protect themselves from infection and pregnancy. In 1994, a team of researchers had a profound impact on our understanding of these issues with the results from the first nationally representative probability study of sex and sexuality-related behavior in the U.S. (the National Health and Social Life Survey-NHSLS), which they had conducted two years earlier [3–4]. Since that time, there have been thousands of studies focusing on specific sexuality and health-related topics among a diverse range of communities that have continued to advance scientific understanding of sexuality-related behaviors, condom and contraceptive use, and that have driven the development of increasingly effective public health interventions. There have been only a few nationally representative probability samples of sexual behavior among specific age groups (e.g., Youth Risk Behavior Survey; National Social Life, Health, and Aging Project) or of sexual concerns or distress. Studies specific to condom use have been more frequent, with a great deal of effort being expended to document trends in cond om use both across the general population and within specific communities disproportionately impacted by sexual health problems for which the latex condom is an accessible and efficacious solution.

Studies such as these have clear relevance for the development and delivery of social service and health programs that address issues related to sexuality and sexual health. They are also central to those individuals whose scientific interests are grounded within areas related to human sexuality, and over the past two decades, such scientists have discussed and debated the need for, and the possible mechanisms for conducting, a contemporary

study of sexual behaviors in the U.S. In addition to the merits of such data for these scientific purposes, as the research teams at The Institute for Sex Research at Indiana University (in the 1940s and 1950s) and at the University of Chicago (in the 1990s) recognized, men and women in the general public are interested, for reasons of curiosity and personal comparison, in knowing who does what sexually and how often. Humans appear to be innately curious about how often other people who are like them (e.g., single, partnered, or married)—or who are around the same age—have sex or the types of sexual activities in which others engage. This includes an interest in sexual expression over the lifespan, from the sexual activities of adolescents to the nature of sexual expression in later stages of life, including how behaviors might vary with changes in partnership and health status.

Much has changed in American society since the first nationally representative study of sexual behavior in the U.S. was conducted in 1992, with likely impacts on the manner in which individuals construct their sexual lives. The emergence of new medications in response to both sexuality-related disease and dysfunction, shifts in policies that shaped the types of sexuality education available to youth who are entering adulthood, changes in social attitudes regarding issues of sexual orientation, and the introduction of the Internet and the rapid evolution of technology-based tools for human interactions, among others, beg for data that expands our contemporary understanding of the sexual health and behaviors of the U.S. population. Such data are essential to support ongoing advancements to the development and implementation of programs and policies that aim to improve the sexual health of the nation.

The NSSHB

In response, with this supplemental issue of *The Journal of Sexual Medicine*, we present a series of nine papers from the National Survey of Sexual Health and Behavior (NSSHB), a nationally representative study of the sexual and sexual health-related behaviors of 5,865 adolescents and adults in the U.S. Our team, based at the Center for Sexual Health Promotion at Indiana University, and representing the disciplines of public health, psychology, medicine, and gender studies, sought to conduct a study that would provide a contemporary snapshot of sexual behaviors, condom and contraceptive use, and sexual health of the U.S. population. We sought to do so in a way that would build upon the traditions of sexology pioneered by Kinsey and that have been advanced by generations of sexual and public health researchers over the past 60 years. Our aim was to be considerate of a developmental and age cohort perspective on human sexual behavior and, as a result, we collected data from individuals across ages that span 80 years (14 to 94 years). We also sought to merge the methodological and measurement advances made by sexual and public health with those now available given the utility of the Internet as a research tool for overcoming the challenges posed by traditional forms of probability-based sampling.

Papers in this Supplement

We were strategic in our selection of the nine papers to be initially released from the NSSHB data and strived to assemble a collection of papers that would be of interest and value to both scientific and lay communities. With the two leading papers, we sought to provide baseline rates of sexual behaviors and condom use among individuals aged 14–94 years, as such rates not only serve as a valuable foundation for health and social policies and programs and for sexuality researchers; they also provide for a source of common knowledge when made available to the general population. We present separate papers that document the reported sexual behaviors of adult men and women by decade in order to provide contemporary information about sexuality across the life course. We chose to present individual papers focused on sexual behaviors and condom use within three specific subpopulations (adolescents, aging adults, and black and Hispanic Americans) given the efforts by those in public health and education who continue to work toward the development of policies and programs that are appropriately responsive to developmental and cultural aspects of one's behaviors. We present an event-level analysis of condom use during the most recent sexual event reported by adults during which penile-vaginal intercourse occurred given the importance of understanding condom use within the context of a particular sexual event so that the situational, relational, and experiential nature of that sexual event could be examined in relation to condom use or non-use. To provide additional insight into the nature of a sexual event, we built on previous research that has assessed the varying combinations of behaviors that comprise a sexual event and, in a separate paper, present our findings among adults ages 18 to 60.

Methodological Considerations

To conduct the NSSHB, our team partnered with Knowledge Networks (Menlo Park, CA, USA) given their ability to combine the use of statistically valid sampling methods with the advantages of the Internet as a research tool. Sampling included a dual-frame approach based upon both random digit dial and address-based sampling, a combination that provides statistically valid representation of the United States population in a way that attends to the challenges presented by cell phone-only households and that ensures representation of communities that are often difficult to reach in sexuality-related research. We provide an in-depth overview of the methods within each of the papers contained in this supplement.

While we believe that the NSSHB provides a valuable snapshot of sexual health and sexual behaviors for an expansive range of the United States population, studies of this nature inherently have limitations, and when considering this study within the context of others to which it may be compared, some of these limitations should be discussed in addition to the specific limitations discussed within each paper. Although the NSSHB did include the collection of some qualitative data, it was highly quantitative in nature. As a result, it cannot offer much of the rich contextual insights that were available in other studies that used in-depth interview methods, particularly those conducted by Kinsey and those used in the NHSLS. While the NSSHB contains data that allows for comparisons across the lifespan, one such strength of the other studies that employed interview methods is that they allowed for the collection and consideration of data *within* the context of one's place within their lifespan and their lived experiences to date. Also inherent in data from both this and the other national studies of sexual behavior is that, while they offer a representative assessment of the United States population on the whole, none have oversampled those who identify as homosexual or bisexual. Although papers in this supplement do provide data related to same-gender sexual interactions (among individuals of all reported sexual orientations), future analyses and publications will provide additional data on both behaviors by sexual orientation and same-gender behaviors overall. However, there remains the need for research of this nature to include mechanisms that more fully attend to the complexities of establishing representative samples of individuals of varying sexual orientations.

Funding for the NSSHB

Funding for the NSSHB was provided by Church & Dwight Co., Inc. In 2007, our team entered into a strategic scientific partnership with Church & Dwight Co., Inc., known to sexual and public health professionals for their Trojan brand condoms. This partnership has the goal of addressing critical knowledge gaps related to the manner in which individuals make health-related decisions once they decide to become sexually active and to better bridge public health research with the sexual health promotion activities and products to which American consumers are exposed daily. To facilitate this partnership, our mutual teams work to demonstrate a model for collaboration between academic and corporate partners that is grounded by principles of participatory research and the highest levels of scientific integrity. Our team is grateful for the support provided by Church & Dwight Co., Inc., and to their commitment to advancing a scientific understanding of sexual health in the United States, which resulted in a study of this nature for which funding from any other entity has not been made available for close to two decades.

Acknowledgments

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References

1 Kinsey AC, Pomeroy WB, Martin, CE. Sexual Behavior in the Human Male. Philadelphia: W.B. Saunders; 1948.
2 Kinsey AC, Pomeroy WB, Martin CE, & Gebhard PH. Sexual Behavior in the Human Female. Philadelphia: W.B. Saunders; 1953.
3 Laumann E, Gagnon JH, Michael RT, Michaels S. The Social Organization of Sexuality: Sexual Practices in the United States. Chicago: University of Chicago Press; 1994.
4 Laumann EO, Michael RT, Gagnon JH. A political history of the national sex survey of adults. Fam Plann Perspect 1994;26:34–8.

COMMENTARIES

Looking at Sexual Behavior 60 Years after Kinsey

Irwin Goldstein, MD, Editor-in-Chief

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More than 60 years ago Alfred C. Kinsey, then a Professor of Zoology, and his colleagues at Indiana University, Wardell B. Pomeroy and Clyde E. Martin shook the academic scientific world with one of the first-ever, large-scale evidence-based reports in human sexuality entitled "Sexual Behavior in the Human Male".

As Dr. Kinsey explained, the study was undertaken because students were asking him questions on matters of sex. They hoped that he would provide them with factual information in working out their patterns of sexual behavior. These same students found it difficult to obtain factual information free of moral, philosophic, or social interpretations.

The monumental Kinsey undertaking involved recording testimonials and interviews from 12,000 individuals, young and old, from various socioeconomic backgrounds and different races. A total of 5,300 males participated in the 1948 study. But the success of the Kinsey study was based on more than the size of the population studied. Kinsey's group not only investigated one of the least studied of all human biologic functions, but they performed this difficult research without discrimination, with an intense thoroughness, and with a high level of objectivity. The data presented were noteworthy in that they were free of the social, cultural, and political taboos that almost always accompany human sexual behavior.

Alan Gregg of the Rockefeller Foundation, the agency that funded this research, wrote the following: "*Certainly no aspect of human biology in our current civilization stands in more need of scientific knowledge and courageous humility than that of sex. . . As long as sex is dealt with in the current confusion of ignorance and sophistication, denial and indulgence, suppression and stimulation, punishment and exploitation, secrecy and display, it will be associated with a duplicity and indecency that lead neither to intellectual honesty nor human dignity.*"

In the history of sexual medicine, Kinsey and Indiana University will always be regarded as the place that opened the door, long closed to thorough and careful scientific research in the field. In essence, current sexual medicine journals, such as *The Journal of Sexual Medicine* (JSM) would not exist without the groundbreaking work of Kinsey and his colleagues. Later researchers such as Masters and Johnson and Helen Singer Kaplan, kept the research door open. It was, however, Kinsey's home, Indiana University, that became one of the true centers of the universe when it came to human sex research. And it has been maintained as a home for such innovative research.

In 1953, seven years after their first publication, Kinsey, Pomeroy, Martin and Paul H. Gebhard of the Institute for Sex Research at Indiana University published the first-ever, large-scale, population-based and evidence-based scientific work in women's sexual behavior entitled "Sexual Behavior in the Human Female." Nearly 8,000 women contributed data. In this book, Robert M. Yerkes and George W. Corner as members of the National Research Council wrote: "*The current report makes a notable contribution of fact in replacement of ignorance and of inadequately verified surmise. We look forward to the possibility that the Institute for Sex Research may long serve to inform, enlighten and guide us in an area where knowledge and understanding may affect the very existence of the genus Homo. We, as scientists, have large faith in the values of knowledge, little faith in ignorance.*"

There are havens for all kinds of research in the United States. Sex research and sexual medicine research continues at The Kinsey Institute at Indiana University. And just next door, figuratively, is the Center for Sexual Health Promotion. The Center is a collaboration of experts from both within Indiana University and the broader sexual health and sexual medicine community. At a time when we can have nudity on HBO but cannot use

the names of our genitals on the evening news, there remains a need to continue research on sexual health.

More than half a century after Kinsey, The Center for Sexual Health Promotion brings us all new knowledge in this wonderful and exciting yet understudied, and underfunded field of human sex research. This supplement exists as a result of extensive research performed at the Center for Sexual Health Promotion, bringing information relevant to those of us working in the field of sexual medicine. These also bring information relevant to the general public–just like Kinsey's work. And just like then, these papers contain material that is avant garde and often considered off limits because of the social, cultural, and political taboos that are inevitably linked to human sexual behavior.

The Journal of Sexual Medicine is proud to have been chosen to publish this outstanding body of work, comprised of a series of manuscripts that underwent the same extensive and detailed peer review process as all manuscripts in the *JSM*. Hopefully this supplement will inspire others to learn more about human sexual function and dysfunction. We now live in an era where we can discuss human sexual behavior openly. Thank you, Dr. Kinsey. Thank you, Indiana University. Thank you, Center for Sexual Health Promotion. Thank you, *JSM*.

Sex for Health and Pleasure throughout a Lifetime

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Sex is for more than procreation once or twice in life; sex is also for a lifetime of pleasure. While this is not news to anyone, it is not part of our national conversation. We have finally included masturbation in our national conversation and as a result stopped checking our hands for growing hair. Now it is time to include sex and sexuality as pleasurable and natural in open frank conversation about the human condition. Knowledge and open discussion are the paths to societal change that lead us away from viewing sexuality primarily in negative terms and towards viewing sexuality as a part of life that is wholesome and pleasurable.

We have a sexually dysfunctional society because of our limited views of sexuality and our lack of knowledge and understanding concerning the complexities and joys of humanity. We must revolutionize our conversation from sex only as prevention of pregnancy and disease to a discussion of pleasure. Talk concerning procreation is not enough, because it neither addresses accurately the varied sexuality of Americans nor the broad range of sexual practice.

It is difficult to have ubiquitous conversations about sexuality and sex for pleasure in the absence of accurate data about the actual sexual experiences that are common.

Researchers from Indiana University's Center for Sexual Health Promotion, School of Medicine and Kinsey Institute for Research in Sex, Gender, and Reproduction have used Internet-based Knowledge Networks to conduct a comprehensive assessment of sexual behaviors, condom use, and other sexual health indicators in Americans aged 14–94. The results of these nationally representative studies on sexual behavior in the United States across the lifespan are presented in this special issue.

These data are important for keeping the nation moving forward in the area of sexual health and well being. In the absence of scientific data available to construct an accurate and up-to-date view, opinions in the field of sexual science can vary widely from person to person. Without current data, it is impossible to make sound recommendations concerning sexual behavior to medical personnel, educators, and others who need to make decisions in this area. These papers offer tools we need to improve the health and decrease the dysfunction we have in the area of sexual behavior.

Studies in the area of sexuality, sexual health, and responsible sexual behaviors are critical to our understanding of what must be done to revolutionize sexual health in America. Accurate and assessable knowledge are keys to powerful and positive change. Such data is essential for numerous reasons.

- Thirty percent of our healthcare cost is related to sexuality.
- Some of our millennium goals are related to sexuality. Therefore, understanding the societal changes taking place in sexuality and sexual behaviors is essential.
- In order for physicians, nurses, pharmacists, and other healthcare professionals to provide sexual health information to their patients, they must first have the understanding of what the sexual behaviors are in the community and how they are manifested. They must understand that humans are sexual beings from birth to death.
- People are living longer and spending a greater portion of their lives as sexually active individuals.

Sexual health and responsible sexual behaviors remain a serious public health challenge in the United States and in societies around the world. The Surgeon General's Call to Action to Promote Sexual Health and Responsible Sexual Behavior was issued in 2001. It addressed the significant public health challenges regarding the sexual health of America and proposed three strategies for initiating a mature national dialogue on issues

of sexuality, sexual health, and responsible sexual behaviors [1]. The strategies covered three fundamental areas: 1) increasing public awareness of issues relating to sexual health and responsible sexual behaviors; 2) providing the health and social interventions necessary to promote and enhance sexual health and responsible sexual behavior; and 3) investing in research related to sexual health and disseminating findings widely.

Every parent, teacher, clergy member, and adult in our society must step up to the task of raising our children in a sexually healthy manner. Hiding from sexuality is not realistic when we know that humans are inherently sexual beings. We must all step up to change our sexually dysfunctional society into a wholesome attitude about our human sexuality.

Our valued children and adolescents are dependent upon adults to help them across the often-challenging developmental bridge to adulthood. We want them to be healthy, happy persons who will develop into adults who are wholesome, educated, and well rounded.

In order to attain this goal, we must have strategies to create sexually healthier communities through effective public policy. The best contraceptive in the world is a good education. A population that is well-educated and informed about sex, sexuality, and sexual health concerns, through age-appropriate, scientifically-based universal sexual education across the lifespan, is necessary. We must have age-appropriate, science-based comprehensive health education in schools from kindergarten to 12th grades, parent education and teach partner-shared sexual responsibility. Before patients reach puberty, health care providers should give counseling concerning changes the youth can anticipate. They should encourage abstinence while providing age-appropriate counseling to reduce risky sexual behaviors. Healthcare providers must develop policies for all office procedures to ensure privacy and confidentiality of adolescents [2].

We have both a moral and ethical responsibility to protect all children and adolescents in our community. We cannot withhold information from children, adolescents, or adults, live in silence about this taboo subject and expect everything to turn out all right. We have tried ignorance and it does not work.

A national conversation about the nature of sexuality could bring about a more wholesome understanding that will endure through many lifetimes as parents teach their children. A sexually healthy society must be our new goal for the 21st century.

References

1 Office of the Surgeon General. The Surgeon General's call to action to promote sexual health and responsible sexual behavior. Rockville, MD. Office of the Surgeon General; 2001.
2 Elders MJ. Contraceptive availability to aolescents: Do Americans values violate our most vulnerable? Clin Pharmacol Ther 2008;84:741–5.

Time for Change: Rethinking and Reframing Sexual Health in the United States

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The data are both compelling and concerning. Each year more than 19 million sexually transmitted infections (STIs) are estimated to occur in the United States, with almost half of these infections occurring among young persons aged 15 to 24 years [1]. One in four women aged 14–19 years is infected with at least one STI [2], and there are an estimated 1.1 million Americans living with HIV, with over 55,000 new infections per year [3]. The annual direct and indirect costs associated with managing STIs, including HIV, are estimated at $15.9 billion per year [4,5]. One-half of all pregnancies in the United States are unintended [6], and rates of teenage pregnancies are again on the rise after a decade of relative stabilization [7]. There is growing concentration of adverse sexual and reproductive health outcomes among the economically disadvantaged or socially marginalized [8–9], challenging our work to achieve sustained improvements in health for all persons in the United States. Today, men who have sex with men (MSM) of all races, young people, African Americans, and Hispanic/Latinos bear a severe, pervasive, and disproportionate burden of many of these and other adverse health outcomes [10]. The enormity of the challenges appears daunting—it's time for change.

It is time for us to question whether this status quo is either acceptable or just. While individual-level sexual risk behaviors are among the strongest predictors of STI acquisition, there is now a greater appreciation of the role of interpersonal, network, community, and societal level influences on the sexual health of individuals and communities [11]. As our understanding of the complex and dynamic interactions between these multi-layered determinants evolve, they challenge communities, practitioners, and policymakers to question long-held beliefs regarding the role and responsibilities of individuals, clinical, and public health services. Similarly, generational changes resulting from major demographic shifts in sexual attitudes and behaviors, combined with the global expansion of the internet; mobile technology; social networking; novel patterns of sexual mixing; globalization of sex work; and technological advances in preventive, diagnostic, and clinical services, suggest that simultaneous evolutions in our practice are required to remain relevant and effective in today's society [12].

Nowhere is this challenge to the status quo in the United States more clearly articulated than in the recently released National HIV/AIDS Strategy (NHAS) [13]. The strategy establishes a clear vision for change, promotes improved interagency cooperation to achieve concrete goals focused on reducing incidence of HIV and health disparities, and improving access to quality care. The NHAS calls for the use of evidence-based strategies to intensify interventions with individuals and communities in greatest need, while scaling these efforts for maximum impact.

It is within these contexts that the studies on sexual health and behavior presented in this supplemental issue take on new and exciting relevance. The papers present long overdue data from the United States that provide an excellent opportunity to assess critically the impact of our efforts to improve sexual and reproductive health over the past two decades. They also provide a strong foundation on which our future health protection activities can be based. Public health can only assert its role in this evolving domain with a strong commitment to the systematic measurement and tracking of the nation's sexual attitudes and behaviors; a more critical approach to selecting, implementing, and bringing to scale the most

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The findings and conclusions in this report are those of the author(s) and do not necessarily represent the views of the Centers for Disease Control and Prevention.

effective evidence-based interventions; and fostering a sustained commitment to maintaining supportive policy environments for success.

Robust data provide the cornerstone for an effective public health response. Population-based surveys of sexual health and behavior are critical to informing effective health policy; identifying gaps and opportunties for service provision; determining community health needs; developing culturally competent interventions; and providing evidence to characterize normative, diverse, and evolving sexual attitudes and behaviors. Although methodologically complex, expensive, and infrequently undertaken, these national probability sample surveys also enable cross-national comparative analyses, with the ability to examine heterogeneity within and between population subgroups of interest [14]. The insights obtained on the patterns and distribution of sexual behavior, use, and uptake of sexual health services and interventions, and the prevalence of relevant sexual attitudes and social norms should help guide the development and provision of sexual and reproductive services, professional training, and resource allocation, especially in the new era of health reform in the U.S.

The study findings confirm the results of previous sex surveys regarding the heterogeneity between and within demographic groups with age, gender, sexual orientation, marital status, geographic area of residence, and socio-economic status being major determinants of sexual attitudes, behaviors, and health outcomes. Especially important, the studies provide updated population-based estimates on infrequently examined subgroups, for example those aged over 65 years, or infrequently reported sexual practices. By highlighting the evolution of sexual practices, health needs and the role of sexual relationships over the lifespan, we obtain new insights on how sexual health is understood, achieved and maintained by individuals, and their partners, over time. These insights allow us to re-conceptualize and design approaches and policies to improve sexual health based upon contemporary realities and contexts, rather than received beliefs or ideology. Ultimately, these data challenge us to reconsider the nature of the "prevention toolkit" and urge a critical rethinking of its content. This requires the development of a broader range of evidence-based and culturally competent interventions that cover the lifespan and that can be adapted and tailored as needed.

By characterizing behavioral and attitudinal norms within the society, the findings in this issue confirm that not everyone is at equal risk of adverse sexual and reproductive health outcomes; that some potentially risky behaviors are quite prevalent; and highlight encouraging signs of individual and community resilience and commitment to maintaining sexual health. Understanding where risk behaviors are most prevalent; where infections are occurring; and where, when, and how best to intensify efforts to mitigate adverse health outcomes are important elements of enhancing our prevention and control efforts. The latter may involve using novel approaches, scaling-up existing interventions, or employing combinations of either of these for maximal impact. Strategic trade-offs between intervention efficiency, effectiveness, and coverage may need to be taken occasionally [15]. In this respect, the data from these studies will be especially useful in helping policy makers and program planners provide the required leadership to acknowledge and incorporate the rapidly changing external environments; adopt more comprehensive and holistic efforts, shifting away from the usual disease-specific focus; and address the devastating impact of stigma and other social determinants of health.

As we think about the challenges and opportunities ahead, realigning our public health efforts to incorporate a more holistic frame of improving sexual health would be a major step in a bold new direction, and the data presented in this supplement provide a compelling case for change. As we prepare to implement the National HIV/AIDS Strategy, and reconsider roles and opportunities within a transformed health system, the stage is set for a long overdue reframing of our efforts to accelerate health impact. We must seize this moment.

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References

1 Centers for Disease Control and Prevention. Sexually Transmitted Disease Surveillance, 2008. Atlanta, GA: U.S. Department of Health and Human Services; November 2009.

2 Forhan SE, Gottlieb SL, Sternberg MR, Xu F, Datta SD, McQuillan GM, Berman SM, Markowitz LE. Prevalence of sexually transmitted infections among female adolescents aged 14 to 19 in the United States. Pediatrics. 2009;124:1505–12.

3 Centers for Disease Control and Prevention. HIV/AIDS Annual Surveillance Report, 2008; vol 20. Available at http://www.cdc.gov/hiv/topics/surveillance/resources/reports/. Published June 2010. Accessed August 17, 2010.
4 Chesson HW. Medical costs of STDs. Perspect Sex Reprod Health. 2009;41:217.
5 Chesson HW, Blandford JM, Gift TL, Tao G, Irwin KL. The estimated direct medical cost of sexually transmitted diseases among American youth, 2000. Perspect Sex Reprod Health. 2004;36:11–9.
6 Eaton DK, Kann L, Kinchen S, Shanklin S, Ross J, Hawkins J, Harris WA, Lowry R, McManus T, Chyen D, Lim C, Whittle L, Brener ND, Wechsler H. Centers for Disease Control and Prevention (CDC). Youth risk behavior surveillance—United States, 2009. MMWR Surveill Summ. 2010;59:1–142.
7 Hamilton BA, Martin JA and Ventura SJ. Births: Preliminary Data for 2007. National Vital Statistics Reports, vol. 57, no 12, National Center for Health Statistics, Hyattsville, MD (2009).
8 Centers for Disease Control and Prevention. Addressing Social Determinants of Health: Accelerating the Prevention and Control of HIV/AIDS, Viral Hepatitis, STD and TB. External Consultation Meeting Report. Atlanta, Georgia: Centers for Disease Control and Prevention; April, 2009. Available at http://www.cdc.gov/socialdeterminants/docs/final_SDHConsultation_ForWeb_061109.pdf Last accessed August 12, 2010.
9 Denning P and DiNenno E. Communities in Crisis: Is There a Generalized HIV Epidemic in Impoverished Urban Areas of the United States? Poster Presentation at the International AIDS Conference, Vienna Austria, 2010. Available at http://www.cdc.gov/hiv/topics/surveillance/resources/other/pdf/poverty_poster.pdf Last accessed August 12, 2010.
10 Steele CB, Meléndez-Morales L, Campoluci R, DeLuca N, and Dean HD. Health Disparities in HIV/AIDS, Viral Hepatitis, Sexually Transmitted Diseases, and Tuberculosis: Issues, Burden, and Response, A Retrospective Review, 2000–2004. Atlanta, GA: Department of Health and Human Services, Centers for Disease Control and Prevention, November 2007. Available at: http://www.cdc.gov/nchhstp/healthdisparities/ Last accessed August 12, 2010.
11 Dean HD, Fenton KA. Addressing social determinants of health in the prevention and control of HIV/AIDS, viral hepatitis, sexually transmitted infections, and tuberculosis. Public Health Rep. 2010;125 Suppl 4:1–5.
12 Aral SO, Lipshutz J, Blanchard J. Drivers of STD/HIV epidemiology and the timing and targets of STD/HIV prevention. Sex Transm Infect. 2007;83 Suppl 1:i1–4.
13 The White House. The *National HIV/AIDS Strategy for the United States*. July 2010. Available at www.WhiteHouse.gov/ONAP. Lastt Accessed August 17, 2010.
14 Fenton KA, Johnson AM, McManus S, Erens B. Measuring sexual behaviour: methodological challenges in survey research. Sex Transm Infect. 2001;77:84–92.
15 Aral SO, Blanchard J, Lipshutz J. STD/HIV prevention intervention: efficacy, effectiveness and population impact. Sex Transm Infect. 2008 Oct;84 Suppl 2:ii1–3.

Commentary on the National Survey of Sexual Health and Behavior (NSSHB)

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It was with great interest and anticipation that I read the reports from the team at the Center for Sexual Health Promotion at Indiana University. A comprehensive study of sexual and sexual health-related behaviors in the United States hasn't been conducted in almost two decades—far too long. The data and insights from this new research will guide future thoughts, plans, research, and ultimately, education and advocacy efforts in the field of sexual health.

Certainly, the study will help inform our work at the American Social Health Association (ASHA). Since 1914 ASHA has advocated on behalf of patients to help improve public health outcomes, with an emphasis on sexually transmitted infections (STIs). We have always felt that knowledge was key, and this research into sexual behavior across the life course is critically important if we are going to stem the tide of rising rates of unintended pregnancy and STIs. In our efforts to address this, ASHA has made a shift in recent years from an emphasis on disease and prevention to a more positive model focused on sexual health. This shift is predicated on the assumption that this new positive, health-centered approach will allow us to reach people in new ways we've not accomplished before. But understanding where people are in their thoughts and behavior is key to making this change have real meaning, and this new study will provide us valuable insights as we move forward.

Of particular value is the scope and breadth of this work. The study affords us a view of sexual behaviors and attitudes of men and women across the lifespan, from adolescents to midlife and older adults, as well as highlights issues relevant to specific populations, including black and Hispanic men and women. It fills in gaps in our knowledge and is critical to our understanding of areas of opportunity for organizations such as ASHA to communicate more effectively and make an impact on issues related to sexuality and sexual health. The data on condoms is an excellent example. Beyond abstinence, condoms are the most effective way to prevent both STIs and unintended pregnancy, and thus insights from this study help increase our understanding of who is using condoms, and when. While the data suggests that adolescents do indeed have the capacity to be sexually responsible if given the educational and other tools needed, it also indicates an education and communication gap—and a corresponding opportunity to fill that gap.

At ASHA, we know from our own work communicating with the public that there is not clarity on how to use a condom *effectively*. Condoms are, of course, most effective when used both consistently and correctly, and evidence suggests this is an area where adolescents may fall short. In one telling study from the *Archives of Pediatrics and Adolescent Medicine* [1], researchers noted that "The most prevalent condom error reported by adolescents in our study was starting sex without a condom, reported by more than 40% of condom users . . . other studies have reported prevalence of this error from 8% to 38% among university students." So research suggest that teens are using condoms, and seem to understand the value of condoms for contraception, but may not be using condoms as effectively as they could be. This knowledge allows us to target our education and communication efforts to this population, focusing not on simply encouraging use, but emphasizing *effective* use.

Of course these messages are important for people of all age groups, yet again we look to the data to guide our understanding and the development of appropriate communication. The study shows condom use declines as people age, with an initial decline in the 20s continuing into midlife and beyond, with only 20% of men and 25% of women 50 and older reporting condom use. This isn't due to a lack of sexual activity; with the

widespread use of drugs to treat erectile dysfunction, older adults are sexually active, but freed from concerns about contraception by virtue of age, they remain unclear or unaware about the need to continue protecting themselves and their partners from STIs. While messages geared toward adolescents and older adults would necessarily take a different approach in style, we can see the need for clear differences in substance as well.

The data and analysis presented here are both exciting and important for the field, but there is still so much more we need to know. Even limited to the subject of condoms, there are many more questions to explore. We need more research on same gender sexual interaction, on the role partner communication plays in condom negotiation and the tools needed, and on effective methods for instructing condom users in order to reduce user errors. Beyond condoms, there is much in this research, from health disparities among black and Hispanic populations to same sex sexual behaviors, that calls for additional study. Yet this effort by the Indiana University team, and leadership and foresight from Church & Dwight, is a significant step forward, and I can only hope continued research in this area will advance the national dialogue on sexual health and health promotion.

In 2000, then Surgeon General David Satcher issued a national "Call to Action" on sexual health. Since that time, very little has been done. I hope that this new research will reinvigorate the public health and medical communities and compel all of us—professionals, parents, clergy, teachers—to heed Dr. Satcher's call to "begin a mature and thoughtful discussion about sexuality." As he so clearly states, "Doing nothing is unacceptable."

We applaud this effort and look forward to future findings from this and other research projects.

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Reference

1 Paz-Bailey G, Koumans EH, Sternberg M, Pierce A, Papp J, Unger ER, Sawyer M, Black CM, Markowitz LE. The effect of correct and consistent condom use on chlamydial and gonococcal infection among urban adolescents. Arch Pediatr Adolesc Med 2005;159:536–42.

ORIGINAL RESEARCH

Sexual Behavior in the United States: Results from a National Probability Sample of Men and Women Ages 14–94

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ABSTRACT

Introduction. Despite a demonstrated relationship between sexual behaviors and health, including clinical risks, little is known about contemporary sexual behavior.

Aims. To assess the rates of sexual behavior among adolescents and adults in the United States.

Methods. We report the recent (past month, past year) and lifetime prevalence of sexual behaviors in a nationally representative probability sample of 5,865 men and women ages 14 to 94 in the United States (2,936 men, 2,929 women).

Main Outcome Measures. Behaviors assessed included solo masturbation, partnered masturbation, giving and receiving oral sex, vaginal intercourse, and anal intercourse.

Results. Masturbation was common throughout the lifespan and more common than partnered sexual activities during adolescence and older age (70+). Although uncommon among 14- to 15-year olds, in the past year 18.3% of 16- to 17-year-old males and 22.4% of 16- to 17-year-old females performed oral sex with an other-sex partner. Also in the past year, more than half of women and men ages 18 to 49 engaged in oral sex. The proportion of adults who reported vaginal sex in the past year was highest among men ages 25–39 and for women ages 20–29, then progressively declined among older age groups. More than 20% of men ages 25–49 and women ages 20–39 reported anal sex in the past year. Same-sex sexual behaviors occurring in the past year were uncommonly reported.

Conclusions. Men and women engage in a diverse range of solo and partnered sexual behaviors throughout the life course. The rates of contemporary sexual behavior provided in this report will be valuable to those who develop, implement, and evaluate programs that seek to improve societal knowledge related to the prevalence of sexual behaviors and to sexual health clinicians whose work to improve sexual health among the population often requires such rates of behavior. **Herbenick D, Reece M, Schick V, Sanders SA, Dodge B, and Fortenberry JD. Sexual behavior in the United States: Results from a national probability sample of men and women ages 14–94. J Sex Med 2010;7(suppl 5):255–265.**

Key Words. Sexual Behavior; Adolescents; Adults; Probability Sample; United States

Introduction

Sexual health emerged during the past decade as a key unifying concept addressing clinical and public health issues as diverse as unintended pregnancy among adolescents, sexually transmitted infections (STI) among young adults, and sexual dysfunctions among older adults [1–3]. In 2002, the World Health Organization (WHO) described sexual health as ". . . a state of physical, emotional, mental and social well-being related to sexuality; it is not merely the absence of

disease, dysfunction or infirmity. Sexual health requires a positive and respectful approach to sexuality and sexual responses, as well as the possibility of having pleasurable and safe sexual experiences, free of coercion, discrimination and violence." [4]

Nationally representative up-to-date data about human sexual behavior are required to fully translate the WHO definition into public health policy and practice and to provide physicians with a suitable basis for understanding sexuality through the life course. Relatively recent national surveys (e.g., the National Survey of Family Growth [NSFG], the Youth Risk Behavior Survey, and the National Social Life, Health, and Aging Project [NSHAP]) had limited age ranges and explored a narrow range of sexual behaviors [5–7]. The most recent nationally representative survey of adult sexual behavior in the United States, conducted in 1992, was limited to adults aged 18 to 60 [8].

Much has changed since 1992 that may have influenced sexual behavior in the United States. Previously less common sexual behaviors such as oral and anal sex appear to have become more widely practiced [9–11]. Changes in oral–genital behaviors may be linked to increased rates of genital infections by Type 1 herpes simplex viruses and to increased rates of oropharyngeal cancer linked to human papilloma virus infections [12,13]. The Internet has influenced sexual knowledge, norms, and behaviors [14,15]. A vaccine for prevention of cancers associated with sexually transmitted human papilloma virus infections has been marketed amid concern about its influence on sexual behaviors [16]. Since 1997, over $1.5 billion of federal funding for abstinence-only sexuality education has been in place although with equivocal evidence of efficacy [17,18]. Since 1998, oral medications to treat erectile dysfunction have been available; more than 6 million outpatient prescriptions were written for sildenafil in the 6 months following approval by the United States Food and Drug Administration [19]. Attitudes toward same-sex relationships have changed, with same-sex marriage and civil unions now legally recognized in several U.S. states [20]. As such, there is a need for nationally representative data that adequately captures contemporary American sexual behavior given these many social and historical changes.

Aims

The purpose of this study, the National Survey of Sexual Health and Behavior (NSSHB), was to assess solo and partnered sexual behaviors in a national probability sample of men and women ages 14–94 years and to thus provide a comprehensive snapshot of American sexual behavior over a wide range of the sexual life course.

Methods

Data Collection

During March–May 2009, NSSHB data were collected using a population-based cross-sectional survey of adolescents and adults in the United States via research panels of Knowledge Networks (Menlo Park, CA, USA). Research panels accessed through Knowledge Networks are based on a national probability sample established using both random digit dialing (RDD) and an address-based sampling (ABS) frame. ABS involves the probability sampling of a frame of residential addresses in the United States derived from the U.S. Postal Service's Delivery Sequence File, a system that contains detailed information on every mail deliverable address in the United States. Collectively, the sampling frame from which participants are recruited covers approximately 98% of all U.S. households. Randomly selected addresses are recruited to the research panel through a series of mailings and subsequently by telephone follow-ups to nonresponders when possible. To further correct sources of sampling and nonsampling error, study samples are corrected with a post-stratification adjustment using demographic distributions from the most recent data available from the Current Population Survey (CPS), the monthly population survey conducted by the U.S. Bureau of the Census considered to be the standard for measuring demographic and other trends in the United States. These adjustments result in a panel base weight that was employed in a probability proportional to size (PPS) selection method for establishing the samples for this study. Population specific distributions for this study were based upon the December 2008 CPS [21].

Once the sample frame was established, all individuals within that frame received a recruitment message from Knowledge Networks that provided a brief description of the NSSHB and invited them to participate. Adolescent recruitment included obtaining consent from a parent (or legal guardian) and, if provided, subsequently from the adolescent. A total of 2,172 parents (or legal guardians) reviewed a study description, including the survey, and 62% (N = 1,347) consented for

their child to be invited to participate. Of 1,347 adolescents contacted electronically, 831 responded, with 99.0% (N = 820) consenting to participate. An electronic recruitment message was sent to 9,600 potential adult participants, of whom 6,182 (64%) responded, with 82% (N = 5,045) consenting to participate. All study protocols were approved by the Institutional Review Board of the primary authors' academic institution.

All data were collected by Knowledge Networks via the Internet; participants in a given Knowledge Networks panel were provided with access to the Internet and hardware if needed. Multiple researchers have used Knowledge Networks for multiple health-related studies, substantiating the validity of such methods for obtaining data from nationally representative samples of the U.S. population [22–28].

Main Outcome Measures

Some participant characteristics were previously collected by Knowledge Networks for purposes of sample stratification and for sample adjustments using post-stratification data weights. These measures included gender, age, race (black, Hispanic, white, other), U.S. geographic region (Midwest, North, South, West), and sexual orientation (heterosexual/straight, homosexual/gay/lesbian, bisexual, asexual, other). Household income included an adult's reported household income; for adolescents household income was reported by their parent or guardian. Additionally, level of educational attainment and marital status were collected from adult participants.

Participants were asked to report whether or not they had engaged in certain solo and partnered sexual behaviors and, if so, how recently each behavior had occurred (never, within the past month, within the past year, more than 1 year ago), consistent with other nationally representative studies of sexual behaviors [27,28].

Measures of oral sex were specific to the participant's role and partner's sex (receiving from male, receiving from female, giving to female, giving to male). Also assessed were receptive (men and women) and insertive (men only) anal intercourse.

Analyses

The proportions of participants reporting histories of participating in each sexual behavior are reported based upon whether that behavior occurred within the past month, past year, or at some other point during one's lifetime. For each percentage of individuals reporting a history of participating in a behavior during the specified periods of time, corresponding 95% confidence intervals using the Adjusted Wald method [29,30], were calculated and are presented by age group. During analyses, post-stratification data weights were applied to reduce variance and minimize bias caused by nonsampling error. Distributions for age, race, gender, Hispanic ethnicity, education, and U.S. census region were used in post-stratification adjustments. These distributions were based upon the December 2008 CPS [21].

Results

A total of 5,865 individuals (2,936 men, 2,929 women) ages 14 to 94 years participated. The weighted demographic characteristics of the sample are presented in Table 1.

Men's Sexual Behaviors

Men's sexual behaviors are presented in Table 2.

Masturbation

Solo masturbation was reported with the most consistency, as 27.9% to 68.6% of men in each age group reported masturbation during the past month. The majority of men in all age groups reported masturbation during the past year with the exception of the 14- to 15-year-old and 70+ age groups. Solo masturbation (past month and past year) was more commonly reported than most partnered sexual behaviors for ages 14 through 24 years and among those aged 50 years or older.

Vaginal Intercourse

Although most men in the 18- to 19-year-old age group had experienced vaginal intercourse, it was not a fixed aspect of every man's experience. For example, although about 85% of men in their 20s and 30s reported engaging in vaginal intercourse in the previous year, this proportion decreased to 73.6% among men in their 40s and to 57.9% among men in their 50s. For men ages 25 to 49 years, vaginal intercourse was more common than other sexual behaviors.

Partnered Noncoital Behaviors

Partnered noncoital behaviors were reported by at least some men in all age groups. Although a minority of those ages 14–15 years had ever engaged in partnered masturbation (5.7%) or received oral sex from a female (13.0%), among the 16- to 17-year-old cohort, approximately one-fifth reported having engaged in partnered mas-

Table 1 Weighted participant characteristics (N = 5,865)

	Adolescents (N = 820)				Adults (N = 5,045)			
	Males N = 414 (50.5%)		Females N = 406 (49.5%)		Males N = 2,522 (49.9%)		Females N = 2,523 (50.1%)	
Characteristics	N	%	N	%	N	%	N	%
Gender								
Males	414	100.0	—	—	2,522	100.0	—	—
Females	—	—	406	100.0	—	—	2,523	100.0
Age								
14–15	193	46.7	190	46.8	—	—	—	—
16–17	221	53.3	216	53.2	—	—	—	—
18–19	—	—	—	—	73	2.9	50	2.0
20–24	—	—	—	—	203	8.1	145	5.8
25–29	—	—	—	—	341	13.5	394	15.6
30–39	—	—	—	—	410	16.2	430	17
40–49	—	—	—	—	522	20.7	502	19.9
50–59	—	—	—	—	466	18.5	452	17.9
60–69	—	—	—	—	322	12.8	342	13.6
≥70	—	—	—	—	184	7.3	207	8.2
Race or ethnic group	(N = 413)		(N = 405)					
White	253	61.3	241	59.6	1,735	68.8	1,737	68.8
Hispanic	77	18.6	74	18.2	376	14.9	317	12.6
Black	55	13.4	59	14.6	250	9.9	303	12.0
Other	28	6.7	31	7.6	161	6.4	166	6.6
Sexual orientation					(N = 2,521)		(N = 2,521)	
Heterosexual	398	96.1	367	90.5	2,325	92.2	2,348	93.1
Gay or Lesbian	7	1.8	1	0.2	105	4.2	23	0.9
Bisexual	6	1.5	34	8.4	66	2.6	92	3.6
Other	2	0.1	3	0.9	25	1	58	2.3
Geographic region			(N = 405)					
South	145	35.0	143	35.4	922	36.5	1,065	36.4
West	96	23.2	96	23.7	591	23.4	668	22.8
Midwest	95	23.0	92	22.7	552	21.9	622	21.1
Northeast	78	18.7	74	18.2	458	18.1	573	19.7
Education completed†								
Less than high school	—	—	—	—	342	13.6	290	11.5
High school	—	—	—	—	757	30.0	760	30.1
Some college	—	—	—	—	685	27.2	750	29.7
College degree or higher	—	—	—	—	737	29.2	723	28.7
Marital status†								
Married	—	—	—	—	1,206	47.8	1,118	44.3
Never married	—	—	—	—	709	28.1	601	23.8
Divorced	—	—	—	—	278	11.0	334	13.2
Living with partner	—	—	—	—	227	9.0	222	8.8
Widowed	—	—	—	—	53	2.1	185	7.3
Separated	—	—	—	—	50	2.0	63	2.5
Annual income ($)‡								
<25,000	52	12.6	52	12.8	506	20.1	605	24.0
25,000–49,999	86	20.8	92	22.6	745	29.6	773	30.7
50,000–74,999	86	20.8	85	21.0	522	20.7	548	21.7
≥75,000	190	45.8	177	43.6	749	29.7	597	23.7

†Education and marital status data presented only for adult participants.
‡Income levels for adolescents based on parental income level reported by parent or guardian.

turbation and one-third having received oral sex from a female partner. The highest proportions who reported having engaged in recent (past month) partnered masturbation and who reported oral sex with a woman (giving and receiving) were between 25 and 49 years.

Anal Intercourse

Insertive anal intercourse was less common than other partnered behaviors but was not rare, being reported in the past year by more than 5% of 16- to 19-year olds, 10.8% of those ages 20–24 years, greater than 20% of those 25–49 years and 11.3% of men in their fifties. More than 40% of men ages 25–59 years reported ever having engaged in insertive anal intercourse during their lifetime.

Same-Sex Sexual Behavior

Sexual activity between men was relatively uncommon. Among men ages 18 to 59, 4.8% to 8.4% reported having received oral sex from another man in the previous year. However, 13.8% of men

ages 40–49 years and 14.9% ages 50–59 years reported such lifetime behavior. A total of 4.3% to 8.0% of men aged 18–59 years reported having performed oral sex on another man in the previous year; however, more than 10% of men in the 18–19, 40–49, and 50–59 age groups reported having ever engaged in this behavior. Receptive penile-anal intercourse was the least common behavior reported (less than 6% of men in any age group in the past year). Lifetime receptive anal intercourse was most prevalent among 20- to 24-year olds (10.8%) and those aged 40–49 and 50–59 years (8.5% and 9.5%, respectively).

Women's Sexual Behaviors

Women's sexual behaviors are presented in Table 3.

Masturbation

Solo masturbation was reported by more than 20% of women in all age groups during the past month and by more than 40% of all women within the past year, with the exception of those over 70 years. A greater proportion of those ages 14 to 17 reported lifetime solo masturbation compared with any other sexual behavior.

Vaginal Intercourse

Beginning with women ages 18–19 years (26.0% of women reported solo masturbation and 43.1% reported vaginal intercourse during the previous month), vaginal intercourse was the sexual behavior that more women in all age groups reported as having occurred during the past month compared with all other sexual behaviors assessed. Beginning in the cohort in their thirties, increasing proportions of women reported having had no vaginal intercourse during the previous year; this was the case for approximately one-fourth of women ages 30–39, nearly 1/3 of women 40–49, one-half of women ages 50–59, and ultimately nearly four-fifths of women ages 70 years and older.

Partnered Noncoital Behaviors

Masturbation with a partner during the previous month and year was most commonly reported by women ages 16 through 49 and most women between the ages of 25–49 reported this behavior in their lifetime. Approximately 10% of 14- to 15-year-old women and 23.5% of 16- to 17-year-old women reported receiving oral sex from a male partner in the previous year. More than half of women in the age groups between 18 and 49 had received oral sex from a male partner in the previous year as had 34.2% of females ages 50–59 and 24.8% of females ages 60–69 years.

A total of 11.8% of 14- to 15-year-old women and 22.4% of 16- to 17-year-old women reported having given oral sex to a male partner in the past year. Also, most women in the age groups between 18 and 49 years reported having given oral sex to a man in the past year. Oral–genital sex given to male partners during the previous month was rarely reported by women in the 70+ age group in the past year (6.8%) though 42.7% had done so in their lifetime.

Anal Intercourse

A total of 4% or less of 14- to 17-year-old women and those aged 50 or older reported anal intercourse in the previous year. However, 18.0% of 18- to 19-year-old females and more than 20% of those between the ages of 20 and 39 reported anal sex in the past year. Lifetime anal sex was reported by 40% or more of women ages 20–49 years, and by about 30% or more of women ages 50–69 years.

Same-Sex Sexual Behavior

Sexual activity between women was relatively uncommon. Fewer than 5% of women in most age groups reported having received oral sex in the past year from a female partner, with the exception of the 8.5% of women ages 20–24 who reported having performed oral sex on a woman in the past year. A total of 2.0% to 9.2% of those ages 16 to 49 years reported having given oral sex to another woman in the past year.

Discussion

These findings provide a detailed picture of solo and partnered sexual behavior through a lifespan, showing that one's sexual repertoire varies across different age cohorts, with masturbation relatively more common in young and older individuals and vaginal intercourse being more common than other sexual behaviors from early to late adulthood. Partnered noncoital sexual behaviors (oral and anal sex) also appear to be well established aspects of a contemporary sexual repertoire in the United States. The baseline rates of behavior established by the analyses provided in this report will be helpful to sexuality educators who develop, implement, and evaluate programs that seek to improve societal knowledge related to the prevalence of sexual behaviors and to sexual health clinicians whose work to improve sexual health among the population often requires such rates of behavior.

Although the largest proportion of adults reported vaginal intercourse during the past month throughout most of the reproductive year

Table 2 Men's sexual behaviors past month, past year, and lifetime (N = 2,857)

	Adolescents (N = 410)		Adults		
	14–15 191	16–17 219	18–19 72	20–24 196	25–29 334
	Percent (95% confidence interval)				
Masturbated alone					
Past month	42.9% (36.1%–50.0%)	58.0% (51.4%–64.3%)	61.1% (49.5%–71.5%)	62.8% (55.8%–69.3%)	68.6% (63.4%–73.3%)
Past year	62.1% (55.0%–68.7%)	74.8% (68.6%–80.1%)	80.6% (69.9%–88.2%)	82.7% (76.8%–87.4%)	83.6% (79.2%–87.2%)
Lifetime	67.5% (60.6%–73.7%)	78.9% (73.0%–83.8%)	86.1% (76.1%–92.5%)	91.8% (87.0%–95.0%)	94.3% (91.2%–96.4%)
Masturbated with partner					
Past month	3.6% (1.6%–7.4%)	7.1% (4.3%–11.4%)	14.5% (8.0%–24.6%)	15.0% (10.6%–20.7%)	20.5% (16.5%–25.2%)
Past year	5.2% (2.7%–9.4%)	16.0% (11.7%–21.5%)	42.0% (31.3%–53.5%)	43.5% (36.7%–50.5%)	49.3% (44.0%–54.6%)
Lifetime	5.7% (3.1%–10.1%)	20.3% (15.5%–26.1%)	49.3% (38.1%–60.6%)	54.5% (47.5%–61.3%)	69.0% (63.8%–73.7%)
Received oral from female					
Past month	7.8% (4.7%–12.6%)	17.5% (13.0%–23.1%)	22.9% (14.6%–33.9%)	34.7% (28.4%–41.6%)	45.5% (40.2%–50.9%)
Past year	11.9% (8.0%–17.3%)	30.9% (25.1%–37.3%)	53.6% (42.2%–64.6%)	62.8% (55.8%–69.3%)	77.2% (72.4%–81.4%)
Lifetime	13.0% (8.9%–18.6%)	34.4% (28.4%–40.9%)	59.4% (47.9%–70.0%)	73.5% (66.9%–79.2%)	91.0% (87.4%–93.7%)
Received oral from male					
Past month	0.5% –(0.2%–3.2%)	1.4% (0.3%–4.2%)	1.5% –(0.4%–8.3%)	5.2% (2.8%–9.4%)	1.2% (0.4%–3.2%)
Past year	0.5% –(0.2%–3.2%)	2.8% (1.2%–6.1%)	5.9% (2.0%–14.3%)	6.2% (3.5%–10.6%)	4.8% (2.9%–7.7%)
Lifetime	1.6% (0.3%–4.8%)	3.2% (1.4%–6.6%)	8.8% (3.9%–17.9%)	9.3% (5.9%–14.3%)	7.6% (5.2%–11.0%)
Gave oral to female					
Past month	2.6% (0.9%–6.1%)	13.8% (9.8%–19.0%)	20.3% (12.5%–31.1%)	28.1% (22.3%–34.8%)	40.4% (35.3%–45.7%)
Past year	7.8% (4.7%–12.6%)	18.3% (13.7%–24.0%)	50.7% (39.4%–61.9%)	54.9% (47.9%–61.7%)	73.5% (68.5%–78.0%)
Lifetime	8.3% (5.1%–13.2%)	20.2% (15.4%–26.0%)	60.9% (49.3%–71.4%)	70.9% (64.2%–76.8%)	85.6% (81.4%–89.0%)
Gave oral to male					
Past month	1.0% (0.0%–3.9%)	0.9% (0.0%–3.5%)	1.4% –(0.5%–8.2%)	5.2% (2.8%–9.4%)	2.7% (1.4%–5.1%)
Past year	1.0% (0.0%–3.9%)	2.3% (0.8%–5.4%)	4.3% (1.0%–12.2%)	6.7% (3.9%–11.2%)	4.8% (2.9%–7.7%)
Lifetime	1.6% (0.3%–4.8%)	2.8% (1.2%–6.1%)	10.1% (4.8%–19.5%)	9.3% (5.9%–14.3%)	6.3% (4.1%–9.5%)
Vaginal intercourse					
Past month	7.9% (4.8%–12.7%)	16.1% (11.8%–21.6%)	31.0% (21.5%–42.5%)	52.0% (45.0%–58.9%)	74.4% (69.5%–78.8%)
Past year	8.9% (5.6%–13.9%)	30.3% (24.6%–36.7%)	52.8% (41.4%–63.9%)	63.3% (56.4%–69.7%)	85.7% (81.5%–89.1%)
Lifetime	9.9% (6.4%–15.0%)	30.3% (24.6%–36.7%)	62.5% (50.9%–72.8%)	70.3% (63.6%–76.3%)	89.3% (85.5%–92.2%)
Inserted penis into anus					
Past month	0.5% –(0.2%–3.2%)	1.4% (0.3%–4.2%)	0% –(1.0%–6.1%)	6.2% (3.5%–10.6%)	10.3% (7.4%–14.1%)
Past year	3.1% (1.3%–6.8%)	5.5% (3.1%–9.4%)	5.6% (1.8%–13.9%)	10.8% (7.1%–16.0%)	26.6% (22.1%–31.6%)
Lifetime	3.7% (1.7%–7.6%)	6.0% (3.5%–10.1%)	9.7% (4.5%–19.0%)	23.7% (18.3%–30.1%)	45.2% (39.9%–50.6%)
Received penis in anus					
Past month	1.0% (0.0%–3.9%)	0.9% (0.0%–3.5%)	1.4% –(0.5%–8.2%)	2.1% (0.6%–5.4%)	0.9% (0.2%–2.7%)
Past year	1.0% (0.0%–3.9%)	0.9% (0.0%–3.5%)	4.2% (1.0%–12.1%)	5.2% (2.8%–9.4%)	4.0% (2.3%–6.7%)
Lifetime	1.0% (0.0%–3.9%)	0.9% (0.0%–3.5%)	4.3% (1.0%–12.2%)	10.8% (7.1%–16.0%)	5.2% (3.2%–8.2%)

age cohorts, the reproductive years are not marked exclusively by potentially procreative sex. Sizable proportions of individuals ages 18 and 49 years reported solo masturbation, partnered masturbation, oral sex, and anal sex during the previous year, a common time frame between wellness visits, particularly for women.

Data about sexual activity in the previous year inform clinicians about the proportions of patients who are likely to have engaged in various sexual behaviors since their last clinical exam and who may benefit from annual, detailed sexual history taking. Also, the lack of sexual behavior experienced by some groups has clinical relevance. For example, the decreasing proportion of men in their forties engaging in vaginal intercourse may reflect, at least in part, a growing incidence of erectile dysfunction that may be related to cardiovascular disease or diabetes [31,32]. Similarly, the decreasing proportion of sexual activity among women as they age may, for some, reflect pain with vaginal intercourse (caused by vaginal dryness), lower libido, or other sexual health concerns [33,34].

Also related to important clinical concerns, the rates of behavior established in this report may be helpful to those dedicated to reducing rates of human immunodeficiency virus, STIs, and unintended pregnancy. The rates of these sexual health challenges do provide a rationale for continued surveillance of sexual behaviors among both adults and adolescents in order to inform health-related policy and practice. However, given the purpose of this particular report, the analyses presented do not consider the situational or partner-related variables that influence the extent to which a sexual behavior poses the potential for negative impacts to sexual health, and those using these data to substantiate public health programs should consider the lack of context that underlies the rates presented here. The NSSHB did collect such variables, and additional in-depth analyses from the NSSHB are presented in multiple other reports

Adults (N = 2,447)				
30–39 396	40–49 499	50–59 454	60–69 317	70+ 179
Percent (95% confidence interval)				
66.4% (61.6%–70.9%)	60.1% (55.7%–64.3%)	55.7% (51.1%–60.2%)	42.3% (37.0%–47.8%)	27.9% (21.8%–34.9%)
80.1% (75.9%–83.7%)	76.0% (72.1%–79.5%)	72.1% (67.8%–76.0%)	61.2% (55.7%–66.4%)	46.4% (39.2%–53.7%)
93.4% (90.5%–95.5%)	92.0% (89.3%–94.1%)	89.2% (86.0%–91.8%)	90.2% (86.4%–93.0%)	80.4% (73.9%–85.6%)
22.9% (19.0%–27.3%)	19.2% (16.0%–22.9%)	14.4% (11.5%–17.9%)	10.3% (7.4%–14.2%)	4.1% (1.9%–8.2%)
44.7% (39.9%–49.6%)	38.1% (33.9%–42.4%)	27.9% (24.0%–32.2%)	17.0% (13.2%–21.5%)	12.9% (8.7%–18.7%)
68.3% (63.6%–72.7%)	61.5% (57.2%–65.7%)	51.9% (47.3%–56.5%)	37.0% (31.9%–42.4%)	31.6% (25.2%–38.7%)
49.4% (44.5%–54.3%)	37.7% (33.6%–42.0%)	24.4% (20.7%–28.6%)	18.6% (14.7%–23.3%)	12.4% (8.3%–18.1%)
77.6% (73.2%–81.4%)	62.1% (57.8%–66.2%)	48.5% (43.9%–53.1%)	37.5% (32.3%–43.0%)	19.2% (14.1%–25.6%)
89.7% (86.3%–92.3%)	86.2% (82.9%–89.0%)	82.6% (78.8%–85.8%)	75.3% (70.3%–79.7%)	57.6% (50.3%–64.6%)
2.0% (0.9%–4.0%)	4.6% (3.1%–6.8%)	4.7% (3.1%–7.1%)	1.0% (0.2%–3.0%)	0% –(0.4%–2.5%)
5.5% (3.6%–8.2%)	5.8% (4.0%–8.2%)	8.4% (6.2%–11.3%)	2.6% (1.3%–5.1%)	2.4% (0.8%–6.0%)
9.0% (6.5%–12.3%)	13.8% (11.0%–17.1%)	14.9% (11.9%–18.5%)	8.7% (6.0%–12.4%)	7.7% (4.5%–12.7%)
38.1% (33.5%–43.0%)	32.6% (28.6%–36.8%)	20.8% (17.3%–24.8%)	14.3% (10.8%–18.6%)	12.4% (8.3%–18.1%)
68.7% (64.0%–73.1%)	57.4% (53.0%–61.7%)	44.1% (39.6%–48.7%)	34.3% (29.3%–39.7%)	24.3% (18.6%–31.1%)
88.2% (84.6%–91.0%)	84.4% (80.9%–87.3%)	77.3% (73.2%–80.9%)	72.5% (67.3%–77.1%)	61.6% (54.3%–68.4%)
2.8% (1.5%–5.0%)	4.7% (3.1%–7.0%)	6.4% (4.5%–9.1%)	1.3% (0.4%–3.4%)	0% –(0.4%–2.5%)
5.0% (3.2%–7.7%)	6.7% (4.8%–9.3%)	8.0% (5.8%–10.9%)	2.6% (1.3%–5.1%)	3.0% (1.2%–6.8%)
7.3% (5.1%–10.3%)	13.2% (10.5%–16.5%)	13.1% (10.3%–16.5%)	5.6% (3.5%–8.8%)	5.3% (2.7%–9.7%)
71.3% (66.7%–75.5%)	61.0% (56.7%–65.2%)	44.1% (39.6%–48.7%)	38.9% (33.7%–44.4%)	28.2% (22.1%–35.2%)
85.3% (81.5%–88.5%)	73.6% (69.6%–77.3%)	57.9% (53.3%–62.4%)	53.5% (48.0%–58.9%)	42.9% (35.9%–50.2%)
92.6% (89.6%–94.8%)	89.3% (86.3%–91.7%)	85.8% (82.3%–88.7%)	86.9% (82.7%–90.2%)	88.1% (82.5%–92.1%)
7.1% (4.9%–10.1%)	7.2% (5.2%–9.8%)	3.3% (2.0%–5.4%)	4.2% (2.4%–7.1%)	0% –(0.4%–2.5%)
23.9% (20.0%–28.3%)	21.2% (17.8%–25.0%)	11.3% (8.7%–14.6%)	5.8% (3.7%–9.0%)	1.7% (0.4%–5.1%)
44.5% (39.7%–49.4%)	43.1% (38.8%–47.5%)	40.4% (36.0%–45.0%)	26.7% (22.1%–31.8%)	13.8% (9.4%–19.7%)
1.3% (0.5%–3.1%)	2.0% (1.0%–3.7%)	2.9% (1.7%–4.9%)	0% –(0.2%–1.4%)	0% –(0.4%–2.5%)
3.3% (1.9%–5.6%)	4.4% (2.9%–6.6%)	4.6% (3.0%–7.0%)	6% (0.0%–2.4%)	1.7% (0.4%–5.1%)
6.3% (4.3%–9.2%)	8.5% (6.3%–11.3%)	9.5% (7.1%–12.6%)	3.8% (2.1%–6.6%)	4.7% (2.3%–9.0%)

that provide rates of condom use for both adolescents and adults [35], and those that consider the situational characteristics and potential health consequences of recent sexual events among both adolescents [36] and adults [37], including reports focused specifically on the aging population [38] and ethnic minorities [39].

Although not longitudinal, a strength of this study, compared with other studies that have focused on more narrow age ranges, is that a developmental trajectory of sexual expression is apparent. A minority of 14- to 17-year-old adolescents report engaging in partnered sexual activity with sharply raised proportions of partnered sexual behavior reported among 18- to 24-year olds. Although partnered sexual activity remains common throughout the 20s, 30s, and 40s, there is a clear decline in partnered activity for both genders in their 50s and 60s and a sharper decline as individuals reach age 70. The latter echoes findings from the recent NSHAP, which found substantial declines in sexual activity among individuals aged 74 or older in association with partner loss and health problems [7]. Of course, differences in sexual behavior between various age groups are likely to be influenced not only by development throughout the life course but also by cohort effects that reflect socialization related to sexuality.

Compared with the 1992 National Health and Social Life Survey (NHSLS), in this present study more men and women have engaged in oral sex and a significantly greater proportion have engaged in anal sex. The larger proportions of those who had engaged in anal sex were not limited to the youngest cohorts. Most participants in all adult (18+) age groups had engaged in oral sex with the exception of females in the 70+ age group, of whom slightly less than half had done so. Anal sex was reported by sizable proportions of adults ages 20 to 49 and twice the proportion of 18- to 19-year-old females reported lifetime receptive anal sex (20.0%) as the proportion of 18- to

Table 3 Women's sexual behaviors past month, year, and lifetime (N = 2,813)

	Adolescents (N = 400)		Adults		
	14–15	16–17	18–19	20–24	25–29
	188	212	50	142	383
N	Percent (95% confidence interval)				
Masturbated alone					
Past month	24.1% (18.5%–30.7%)	25.5% (20.1%–31.8%)	26.0% (15.8%–39.7%)	43.7% (35.8%–51.9%)	51.7% (46.7%–56.7%)
Past year	40.4% (33.6%–47.5%)	44.8% (38.3%–51.5%)	60.0% (46.2%–72.4%)	64.3% (56.1%–71.7%)	71.5% (66.8%–75.8%)
Lifetime	43.3% (36.4%–50.4%)	52.4% (45.7%–59.0%)	66.0% (52.1%–77.6%)	76.8% (69.2%–83.0%)	84.6% (80.6%–87.9%)
Masturbated with partner					
Past month	4.3% (2.1%–8.4%)	11.2% (7.6%–16.2%)	18.4% (9.8%–31.5%)	16.1% (10.9%–23.1%)	24.1% (20.1%–28.6%)
Past year	7.5% (4.4%–12.3%)	18.9% (14.2%–24.7%)	36.0% (24.1%–49.9%)	35.9% (28.5%–44.1%)	48.2% (43.2%–53.2%)
Lifetime	9.0% (5.6%–14.0%)	19.7% (14.9%–25.6%)	38.8% (26.5%–52.7%)	46.9% (38.9%–55.1%)	64.0% (59.1%–68.6%)
Received oral from female					
Past month	0% –(0.4%–2.4%)	2.3% (0.8%–5.5%)	0% –(1.4%–8.5%)	1.4% (0.1%–5.3%)	5% (0.0%–2.0%)
Past year	1.1% (0.1%–4.1%)	4.7% (2.5%–8.5%)	3.9% (0.3%–14.1%)	8.5% (4.8%–14.4%)	2.6% (1.4%–4.8%)
Lifetime	3.8% (1.7%–7.7%)	6.6% (3.9%–10.9%)	8.0% (2.6%–19.4%)	16.8% (11.5%–23.9%)	10.8% (8.0%–14.3%)
Received oral from male					
Past month	3.7% (1.7%–7.6%)	16.4% (12.0%–22.0%)	32.0% (20.7%–45.9%)	38.0% (30.4%–46.2%)	36.1% (31.4%–41.0%)
Past year	10.0% (6.4%–15.2%)	23.5% (18.3%–29.7%)	58.0% (44.2%–70.6%)	70.4% (62.4%–77.3%)	71.8% (67.1%–76.1%)
Lifetime	10.1% (6.5%–15.3%)	25.8% (20.4%–32.1%)	62.0% (48.1%–74.2%)	79.7% (72.3%–85.5%)	88.1% (84.5%–91.0%)
Gave oral to female					
Past month	0.5% –(0.2%–3.2%)	4.2% (2.1%–7.9%)	2% –(1.3%–8.8%)	1.4% (0.1%–5.3%)	1.1% (0.3%–2.8%)
Past year	1.6% (0.3%–4.8%)	7.1% (4.3%–11.5%)	2.0% –(0.6%–11.5%)	9.2% (5.3%–15.2%)	2.6% (1.4%–4.8%)
Lifetime	5.4% (2.9%–9.7%)	9.0% (5.8%–13.7%)	8.2% (2.8%–19.6%)	14.0% (9.2%–20.7%)	9.5% (6.9%–12.9%)
Gave oral to male					
Past month	8.0% (4.8%–12.9%)	14.6% (10.4%–20.0%)	34.7% (23.0%–48.6%)	47.2% (39.2%–55.4%)	49.9% (44.9%–54.9%)
Past year	11.8% (7.9%–17.3%)	22.4% (17.3%–28.5%)	58.5% (44.7%–71.1%)	74.3% (66.5%–80.8%)	75.9% (71.4%–79.9%)
Lifetime	12.8% (8.7%–18.4%)	29.1% (23.4%–35.6%)	61.2% (47.3%–73.5%)	77.6% (70.0%–83.7%)	89.0% (85.4%–91.8%)
Vaginal intercourse					
Past month	5.9% (3.2%–10.3%)	20.8% (15.9%–26.8%)	43.1% (30.3%–56.8%)	61.9% (53.7%–69.5%)	74.3% (69.7%–78.4%)
Past year	10.7% (7.0%–16.0%)	29.7% (23.9%–36.2%)	62.0% (48.1%–74.2%)	79.9% (72.5%–85.7%)	86.5% (82.7%–89.6%)
Lifetime	12.4% (8.4%–17.9%)	31.6% (25.7%–38.1%)	64.0% (50.1%–75.9%)	85.6% (78.8%–90.5%)	90.7% (87.3%–93.2%)
Received penis in anus					
Past month	3.2% (1.3%–7.0%)	0.5% –(0.2%–2.9%)	8.0% (2.6%–19.4%)	7.3% (3.9%–12.9%)	5.3% (3.4%–8.1%)
Past year	3.7% (1.7%–7.6%)	4.7% (2.5%–8.5%)	18.0% (9.5%–31.0%)	23.4% (17.2%–31.0%)	21.1% (17.3%–25.5%)
Lifetime	4.3% (2.1%–8.4%)	6.6% (3.9%–10.9%)	20.0% (11.1%–33.2%)	39.9% (32.2%–48.1%)	45.6% (40.7%–50.6%)

19-year-old males who reported lifetime insertive anal sex (9.7%). These proportions were twice as large for each gender in the 20- to 24-year-old cohort.

Neither the NHSLS nor the NSHAP included questions about mutual masturbation or the gender of respondents' oral sex partners [7,8]. As such, it is not known to what extent mutual masturbation, or same-sex vs. other-sex oral sex behaviors, may have changed over time. Little is known about same-sex behaviors from nationally representative studies, as none—including ours—have oversampled those who identify as homosexual or bisexual, leaving the numbers too few for adequate statistical analysis. However, findings reflect those from the NHSLS and from the Kinsey interview data in that a greater number of males and females have engaged in same-sex sexual behaviors than identify as homosexual or bisexual [8,40,41].

The current study is only the second nationally representative study of sexual behavior of adults living in the United States and the first to include such an expansive range of ages. Although Alfred Kinsey and his team reported data from adults about their sexual lives from childhood through older age, sampling was not nationally representative, people married at younger ages, the life expectancy was lower when data were collected (late 1930s to early 1950s) and older age was experienced in clinically different ways that likely impacted sexuality [40,41]. The social changes occurring since both of the large-scale studies of sexual behavior have been significant and up-to-date data about human sexual behavior among different age groups is important.

Depending on the country and time period in which sexual behavior has been studied, previous studies of sexual behavior in the United States and in other countries have recruited participants and collected data via in-person interviews, computer-assisted interviews, questionnaires, RDD phone interviews, computer-assisted telephone interviewing, intercept methods, or door-to-door sampling [42–49]. In our study, by recruiting participants and collecting data over the Internet, respondents may have felt more comfortable reporting taboo sexual behaviors compared with the NHSLS data, which were collected via in-person interviews.

Adults (N = 2,413)				
30–39	40–49	50–59	60–69	70+
412	468	435	331	192
Percent (95% confidence interval)				
38.6% (34.0%–43.4%)	38.5% (34.2%–43.0%)	28.3% (24.3%–32.7%)	21.5% (17.4%–26.3%)	11.5% (7.7%–16.8%)
62.9% (58.1%–67.4%)	64.9% (60.5%–69.1%)	54.1% (49.4%–58.7%)	46.5% (41.2%–51.9%)	32.8% (26.5%–39.7%)
80.3% (76.2%–83.9%)	78.0% (74.0%–81.5%)	77.2% (73.0%–80.9%)	72.0% (66.9%–76.6%)	58.3% (51.2%–65.0%)
19.3% (15.8%–23.4%)	12.7% (10.0%–16.0%)	6.7% (4.7%–9.5%)	5.9% (3.8%–9.0%)	2.1% (0.6%–5.4%)
43.3% (38.6%–48.1%)	34.8% (30.6%–39.2%)	17.7% (14.4%–21.6%)	13.1% (9.9%–17.2%)	5.3% (2.8%–9.5%)
63.1% (58.3%–67.6%)	56.1% (51.6%–60.5%)	46.9% (42.3%–51.6%)	36.4% (31.4%–41.7%)	17.5% (12.7%–23.5%)
1.2% (0.4%–2.9%)	8% (0.2%–2.2%)	0.7% (0.1%–2.1%)	0.3% –(0.1%–1.9%)	1.0% (0.0%–3.9%)
4.9% (3.2%–7.5%)	2.3% (1.2%–4.1%)	0.9% (0.3%–2.4%)	0.6% (0.0%–2.3%)	1.5% (0.3%–4.6%)
16.5% (13.2%–20.4%)	10.1% (7.7%–13.2%)	8.2% (5.9%–11.2%)	4.4% (2.6%–7.2%)	2.1% (0.6%–5.4%)
36.2% (31.7%–41.0%)	24.1% (20.4%–28.2%)	16.9% (13.7%–20.7%)	11.7% (8.6%–15.6%)	2.6% (0.9%–6.1%)
58.7% (53.9%–63.4%)	52.3% (47.8%–56.8%)	34.2% (29.9%–38.8%)	24.8% (20.4%–29.7%)	7.8% (4.7%–12.6%)
82.0% (78.0%–85.4%)	86.3% (82.9%–89.1%)	83.4% (79.6%–86.6%)	79.0% (74.3%–83.1%)	47.4% (40.5%–54.4%)
1% –(0.2%–1.3%)	1.1% (0.4%–2.6%)	0% –(0.2%–1.1%)	0.6% (0.0%–2.3%)	1.0% (0.0%–3.9%)
4.0% (2.4%–6.4%)	2.5% (1.4%–4.4%)	0.9% (0.3%–2.4%)	0.9% (0.2%–2.7%)	1.5% (0.3%–4.6%)
14.2% (11.1%–17.9%)	11.6% (9.0%–14.8%)	7.3% (5.2%–10.2%)	3.4% (1.9%–6.0%)	2.1% (0.6%–5.4%)
43.9% (39.2%–48.7%)	26.8% (23.0%–31.0%)	18.5% (15.1%–22.4%)	13.1% (9.9%–17.2%)	3.6% (1.6%–7.4%)
59.2% (54.4%–63.8%)	52.7% (48.2%–57.2%)	36.2% (31.8%–40.8%)	23.4% (19.1%–28.3%)	6.8% (3.9%–11.4%)
80.1% (76.0%–83.7%)	83.1% (79.4%–86.2%)	80.0% (76.0%–83.5%)	73.1% (68.1%–77.6%)	42.7% (35.9%–49.8%)
63.5% (58.7%–68.0%)	55.8% (51.3%–60.2%)	39.9% (35.4%–44.6%)	28.9% (24.3%–34.0%)	11.9% (8.0%–17.3%)
73.5% (69.0%–77.5%)	70.3% (66.0%–74.3%)	51.4% (46.7%–56.1%)	42.2% (37.0%–47.6%)	21.6% (16.3%–28.0%)
88.7% (85.3%–91.4%)	94.5% (92.0%–96.3%)	94.0% (91.3%–95.9%)	92.4% (89.0%–94.8%)	89.2% (84.0%–92.9%)
6.4% (4.4%–9.2%)	3.6% (2.2%–5.7%)	1.6% (0.7%–3.3%)	2.2% (1.0%–4.5%)	0% –(0.4%–2.4%)
21.6% (17.9%–25.8%)	11.7% (9.1%–14.9%)	5.6% (3.8%–8.2%)	4.0% (2.3%–6.8%)	1.0% (0.0%–3.9%)
40.4% (35.8%–45.2%)	40.6% (36.2%–45.1%)	34.6% (30.3%–39.2%)	29.8% (25.1%–34.9%)	21.2% (16.0%–27.5%)

In addition, while some studies have focused on only men [45–48], only women [43], or a more narrow age range [2,3,6,7,48] we sampled both women and men from adolescence through old age, resulting in a sample of individuals that spanned eight decades of age. However, a limitation of the present study is that, like the NHSLS and NSHAP, the sample was likely only accessible to those who were living in the community and so is not representative of all adults, particularly older adults, who are more likely to be hospitalized or living in long term care facilities.

A limitation of the study is that nationally representative survey data often obscures data points of minority groups, such as those who identify as gay, lesbian or bisexual. Certainly a proportion of those individuals who did not engage in sexual behaviors between women and men (such as vaginal intercourse) were likely to be gay or lesbian. The present data cannot therefore be generalized to gay, lesbian, or bisexual individuals and more detailed analyses are needed to illuminate the sexual behaviors of these individuals. Like other studies of sexual behavior, this study may have been subject to self-selection. Although the sampling procedures ensured a lack of differences on key sociodemographic characteristics between those who chose to participate and those who refused, sexual behavior data are not available on nonresponders, and it is therefore not possible to assess the extent to which participants were different from those who either did not respond to the recruitment messages or those who responded and chose not to participate. However, the proportion of those who responded and chose to participate was slightly higher than the participation rate of the eligible, contacted individuals in the NHSLS who were recruited through in-person recruitment efforts at their homes [8].

Although statistical differences between men's and women's reports of sexual behaviors were not assessed for this particular paper, the data demonstrate that, for all age cohorts, recent (past month and past year) masturbation was strikingly more prevalent among men than women. Similarly, with the exception of the 25- to 29-year-old age cohort, more men reported vaginal intercourse in the past month and more men reported vaginal intercourse

in the past year in advanced age, likely caused by the greater number of available female partners. Compared with men's reports of insertive anal intercourse, more women in the 18- to 19-year-old age cohort reported receptive anal intercourse, which may be an artifact of having the small number of individuals in this age group or the result of younger women partnering with older men. More detailed data related to the sexual behavior of women and men in this sample can be found in other reports that have examined gender-specific behaviors and that collectively offer in-depth analyses that provide for comparisons across genders [50,51].

Conclusions

In summary, findings provide medical and public health professionals with up-to-date information about solo and partnered sexual behaviors throughout the life course. Such information should assist both educators and clinicians in their efforts to increase knowledge about contemporary sexual behaviors and provide a valuable context that can be useful particularly to health professionals during sexual history taking and during discussion with patients about sexual problems and dysfunctions.

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References

1 U.S. Department of Health and Human Services. The surgeon general's call to action to promote sexual health and responsible sexual behavior. Rockville, MD: U.S. Department of Health and Human Services; 2001.
2 Santelli JS, Lindberg LD, Abma J, McNeely CS, Resnick M, Waite LJ. Adolescent sexual behaviors: Estimates and trends from four nationally representative surveys. Fam Plann Perspect 2000;32:156–94.
3 Laumann EO, Das A, Waite LJ, Dysfunction S. Sexual Dysfunction among Older Adults: Prevalence and risk factors from a nationally representative U.S. probability sample of men and women 57–85 years of age. J Sex Med 2008;5:2300–11.
4 World Health Organization. Defining sexual health: Report of a technical consultation on sexual health 28–31 January 2001, Geneva. Geneva, Switzerland. 2006.
5 Mosher WD, Chandra A, Jones J. Sexual behavior and selected health measures: Men and women 15–44 years of age, United States, 2002. Advance data from vital and health statistics; no 362. Hyattsville, MD: National Center for Health Statistics. 2005.
6 Eaton DK, Kann L, Kinchen S, Shanklin S, Ross J, Hawkins J, Harris WA, Lowry R, McManus T, Chyen D, Lim C, Brener N, Wechsler H. Youth risk behavior surveillance—United States, 2007. MMWR 2008;57:1131.
7 Lindau ST, Schumm LP, Laumann EO, Levinson W, O'Muircheartaigh CA, Waite LJ. A study of sexuality and health among older adults in the United States. N Engl J Med 2007;357:762–74.
8 Laumann EO, Gagnon JH, Michael RT, Michael S. The social organization of sexuality: Sexual practices in the United States. Chicago, IL: The University of Chicago Press; 1994.
9 Lescano CM, Houck CD. Brown LK, Doherty G, DiClemente RJ, Fernandez I, Pugatch D, Schlenger WE, Silver BJ. Correlates of heterosexual anal intercourse among at-risk adolescents and young adults. Am J Public Health 2009;99:1131–6.
10 Lindberg LD, Jones R, Santelli JS. Non-coital sexual activities among adolescents. J Adolesc Health 2008;43:231–8.
11 McBride KR, Fortenberry JD. Heterosexual anal sexuality and anal sex behaviors: A review. J Sex Res 2010;47:123–36.
12 Xu F, Stemberg MR, Kottiri BJ, McQuillan GM, Lee FK, Nahmias AJ, Berman SM, Markowitz LE. (2006)Trends in herpes simplex virus type 1 and type 2 seroprevalence in the United States. JAMA 2002;296:964–73.
13 D'Souza G, Kreimer AR, Viscidi R, Pawlita M, Fakhry C, Koch WM, Westra WH, Gillison ML. Case-control study of human papillomavirus and oropharyngeal cancer. N Engl J Med 2007;356:1944–56.
14 McFarlane M, Bull SS, Rietmeijer CA. The Internet as a newly emerging risk environment for sexually transmitted diseases. JAMA 2000;284:443–6.
15 Toomey K, Rothenberg R. Sex and cyberspace—Virtual networks leading to high risk sex. JAMA 2000;284:485–7.
16 Charo AR. Politics, Parents, and Prophylaxis—Mandating HPV vaccination in the United States. JAMA 2007;356: 1905–8.
17 Devaney B, Johnson A, Maynard R, Trenholm C. The evaluation of abstinence education programs funded under Title V Section 510: Interim report to Congress on a multi-site evaluation. Princeton, NJ: Mathematica Policy Research, Inc; 2002.
18 Hampton T. Abstinence-only programs under fire. JAMA 2008;299:2103–5.
19 Lue TF. Erectile dysfunction. N Engl J Med 2000;342:1802–13.
20 Herek G. Legal recognition of same-sex relationships in the United States. Am Psychol 2006;61:607–21.
21 Current Population Survey December 2008. U.S. Census Bureau. 1994. [cited June 9, 2010]. Available from: http://www.bls.census.gov/ferretftp.htm.
22 Baker LC, Bundorf MK, Singer S, Wagner TH. Validity of the survey of health and internet and knowledge network's panel and sampling. Stanford, CA: Stanford University; 2003.
23 Baker L, Wagner TH, Singer S, Bundorf MK. Use of the Internet and e-mail for health care information: Results from a national survey. JAMA 2003;289:2400–6.
24 Heiss F, McFadden D, Winter J. Who failed to enroll in Medicare Part D, and why? Early results. Health Aff (Millwood) 2006;25:344–54.
25 Holman EA, Silver RC, Poulin M, Andersen J, Gil-Rivas V, McIntosh DN. Terrorism, acute stress, and cardiovascular health: A 3-year national study following the September 11th attacks. Arch Gen Psychiatry 2008;65:73–80.

26 Silver RC, Holman EA, McIntosh DN, Poulin M, Gil-Rivas V. Nationwide longitudinal study of psychological responses to September 11. JAMA 2002;288:1235.
27 Herbenick D, Reece M, Sanders SA, Dodge B, Ghassemi A, Fortenberry JD. Prevalence and characteristics of vibrator use by women in the United States: Results from a nationally representative study. J Sex Med 2009;6:1857–66.
28 Reece M, Herbenick D, Sanders SA, Dodge B, Ghassemi A, Fortenberry JD. Prevalence and characteristics of vibrator use by men in the United States. J Sex Med 2009;6:1867–74.
29 Fleiss JL, Levin B, Paik MC. Statistical methods for rates and proportions. 3rd edition. New York: John Wiley; 2003.
30 Agresti A, Coull B. Approximate is better than exact for interval estimation of binomial proportions. Am Stat 1998;52:119–26.
31 Thompson IM, Tangen CM, Goodman PJ, Probstfield JI, Moinpour CM, Coltman CA. Erectile dysfunction and subsequent cardiovascular disease. JAMA 2005;294:2996–3002.
32 Feldman HA, Goldstein I, Hatzichristou DG, Krane RJ, McKinlay JB. Impotence and its medical and psychosocial correlates: Results of the Massachusetts Male Aging Study. J Urol 1994;151:54–61.
33 Dennerstein L, Dudley EC, Hopper JL, Guthrie JR, Burger HG. A prospective population-based study of menopausal symptoms. Obstet Gynecol 2000;96:351–8.
34 Dennerstein L, Dudley E, Burger H. Are changes in sexual functioning in midlife due to aging or menopause? Fertil Steril 2001;76:456–60.
35 Reece M, Herbenick D, Schick V, Sanders SA, Dodge B, Fortenberry JD. Condom use rates in a national probability sample of males and females aged 14 to 94 in the United States. J Sex Med 2010;7(suppl 5):266–76.
36 Fortenberry JD, Schick V, Herbenick D, Sanders SA, Dodge B, Reece M. Sexual behaviors and condom use at last vaginal intercourse: A national sample of adolescents ages 14 to 17 years. J Sex Med 2010;7(suppl 5):305–14.
37 Sanders SA, Reece M, Herbenick D, Schick V, Dodge B, Fortenberry JD. Condom use during most recent vaginal intercourse event among a probability sample of adults in the United States. J Sex Med 2010;7(suppl 5):362–73.
38 Schick V, Herbenick D, Reece M, Sanders SA, Dodge B, Middlestadt SE, Fortenberry JD. Sexual behaviors, condom use, and sexual health of Americans over 50: Implications for sexual health promotion for aging adults. J Sex Med 2010; 7(suppl 5):315–29.
39 Dodge B, Reece M, Herbenick D, Schick V, Sanders SA, Fortenberry JD. Hispanic men and women: Sexual health among US Black and Hispanic men and women: a nationally representative study. J Sex Med 2010;7(suppl 5):330–45.
40 Kinsey AC, Pomeroy WB, Martin CE. Sexual behavior in the human male. Philadelphia: W.B. Saunders; 1948.
41 Kinsey AC, Pomeroy WB, Martin CE, Gebhard PH. Sexual behavior in the human female. Philadelphia: W.B. Saunders; 1953.
42 Nicolosi A, Laumann EO, Glasser DB, Moreira ED, Paik A, Gingell C. Sexual behavior and sexual dysfunction after age 40: The global study of sexual attitudes and behaviors. J Urol 2004;64:991–7.
43 Bancroft J, Loftus J, Long JS. Distress about sex: A national survey of women in heterosexual relationships. Arch Sex Behav 2003;32:193–208.
44 Wellings K, Nanchahal K, Macdowell W, McManus S, Erens B, Mercer CH, Johnson AM. Sexual behavior in Britain: Early heterosexual experience. Lancet 2001;358:1843–50.
45 Rosen RC, Fisher WA, Eardley I, Niederberger C, Nadel A, Sand M. The multinational Men's Attitudes to Life Events and Sexuality (MALES) study: Prevalence of erectile dysfunction and related health concerns in the general population. Curr Med Res Opin 2004;20:607–17.
46 Ansong KS, Lewis C, Jenkins P, Bell J. Epidemiology of erectile dysfunction: A community-based study in rural New York State. Ann Epidemiol 2000;10:293–6.
47 Panser LA, Rhodes T, Girman CJ, Guess HA. Sexual function of men ages 40 to 79 years: The Olmsted county study of urinary symptoms and health status among men. J Am Geriatr Soc 1995;43:1107.
48 Corona G, Lee DM, Forti G, O'Connor DB, Maggi M, O'Neill TW, Pendleton N, Bartfai G, Boonen S, Casanueva FF, Finn JD, Giwercman A, Han TS, Huhtaniemi IT, Kula K, Lean MEJ, Punab M, Silman AJ, Vanderschueren D, Wu FCW, EMAS Study Group. Age-related changes in general and sexual health in middle-aged and older men: Results from the European Male Ageing Study (EMAS). J Sex Med 2009; 7:1362–80.
49 Laumann EO, Glasser DB, Neves RCS, Moreira ED. A population-based survey of sexual activity, sexual problems and associated help-seeking behavior patterns in mature adults in the United States of America. Int J Impot Res 2009;21:171–8.
50 Herbenick D, Reece M, Schick V, Sanders SA, Dodge B, Fortenberry JD. Sexual behaviors, relationships, and perceived health status among adult women in the United States: Results from a national probability sample. J Sex Med 2010;7(suppl 5):277–90.
51 Reece M, Herbenick D, Schick V, Sanders SA, Dodge B, Fortenberry JD. Sexual behaviors, relationships, and perceived health among adult men in the United States: Results from a national probability sample. J Sex Med 2010;7(suppl 5):291–304.

Condom Use Rates in a National Probability Sample of Males and Females Ages 14 to 94 in the United States

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ABSTRACT

Introduction. Given the efficacy of latex condoms for preventing pregnancy, HIV, and most STI, their promotion remains central to global sexual health efforts. To inform the development of accurate and appropriately-targeted interventions, there is a need for contemporary condom use rates among specific populations.

Aims. The purpose of this study was to establish rates of condom use among sexually active individuals in the U.S. population.

Methods. Data were collected via a national probability sample of 5,865 U.S. adolescents and adults aged 14 to 94 years.

Main Outcome Measures. Condom use was assessed during the most recent partnered vaginal or anal sexual event and over the past 10 vaginal and anal intercourse events.

Results. Condom use by men during past 10 vaginal intercourse events was slightly higher (21.5%) than that reported by women (18.4%), and consistent with rates of condom use reported during most recent vaginal intercourse by men (24.7%) and women (21.8%). Adolescent men reported condom use during 79.1% of the past 10 vaginal intercourse events, adolescent women reported use during 58.1% of the same. Condom use during past 10 anal intercourse events was higher among men (25.8%) than women (13.2%); the same was observed for most recent anal intercourse event (26.5% for insertive men, 44.1% for receptive men, and 10.8% for receptive women). Generally, condom use was highest among unmarried adults, higher among adolescents than adults, and higher among black and Hispanic individuals when compared with other racial groups.

Conclusion. These data indicate clear trends in condom use across age, gender, relationship status, and race/ethnicity. These contemporary rates of condom use will be helpful to those who lead efforts to increase condom use among individuals who may be at risk for sexually transmitted infections or who desire to prevent pregnancy. **Reece M, Herbenick D, Schick V, Sanders SA, Dodge B, and Fortenberry JD. Condom use rates in a national probability sample of males and females ages 14 to 94 in the United States. J Sex Med 2010;7(suppl 5):266–276.**

Key Words. Condoms; Sexual Health; Probability Sample; Sexual Behavior

Introduction

The male condom is one of the oldest methods of contraception and offers significant advantages because it is not made with hormones, is available without a prescription, can be used directly by men, is widely available in the United States and in many parts of the world, and its use can be visibly validated by both sex partners. The condom is the only current contraceptive method (other than abstinence) that protects against most sexually transmissible infections (STI), and its efficacy for the prevention of human immunodeficiency virus (HIV) transmission, unintended pregnancy, and the reduction of risk for most STI has been well documented [1,2].

Sexual health practitioners have long promoted condom use for prevention of STI and unintended

pregnancy [3,4]. However, it was the recognition of the serious threat posed by the HIV epidemic that propelled extensive research agendas related to condom use and condom education, promotion, and distribution programs. As correct and consistent condom use remains one of the most cost-effective STI/HIV and contraceptive methods, their promotion continues to be a major component of STI/HIV interventions worldwide [5–7].

Prior studies have indicated increasing rates of condom use for HIV/STI and pregnancy prevention purposes among both adolescents [8–13] and adults [14–19] in the general population of the United States. Unfortunately, surveillance of condom use across expansive segments of the U.S. population is less routine as the collection of such data is methodologically complex, time-consuming, and costly [20,21].

Most national studies providing rates of condom use among adolescents and adults in the general U.S. population were conducted and published in the mid- to late-1990s to early 2000s [5–11,14,15,22–24], with the most recent data focused on sexual health among aging adults, collected in 2005–2006 [25]. However, given constant shifts in social attitudes and policies about condoms, changes in sexual relationship structures and behaviors, and changes in the epidemiology of STI and HIV, there is a need for the ongoing surveillance of condom use behaviors across the general U.S. population. The availability of contemporary condom use data will help to inform and guide accurate and appropriately targeted sexual health interventions

Aims

The purpose of this study was to establish contemporary condom use rates in a probability sample of the U.S. population aged 14 to 94 years.

Methods

Data Collection

Data presented are from the National Survey of Sexual Health and Behavior (NSSHB), conducted during early 2009. NSSHB data were collected using a population-based cross-sectional survey of adolescents and adults in the United States via research panels of Knowledge Networks (Menlo Park, CA, USA). Research panels accessed through Knowledge Networks are based on a national probability sample established using both random digit dialing (RDD) and an address-based sampling (ABS) frame. ABS involves the probability sampling of a frame of residential addresses in the United States derived from the U.S. Postal Service's Delivery Sequence File, which contains detailed information on every mail deliverable address in the United States. Collectively, the sampling frame from which participants are recruited covers approximately 98% of all U.S. households. Randomly selected households are recruited to panels through a series of mailings and subsequently by telephone follow-ups to nonresponders when possible. Once an individual agrees to be in a panel of Knowledge Networks, they are provided with access to the Internet and computer hardware if needed, and data collection by Knowledge Networks occurs via the Internet. Multiple health-related studies have substantiated the validity of such methods for obtaining data from nationally representative samples of the U.S. population [26–31].

To further correct sources of sampling and non-sampling error, study samples were corrected with post-stratification adjustments using demographic distributions from the most recent data available (at the time of the study) from the Current Population Survey (CPS), the monthly population survey conducted by the U.S. Bureau of the Census considered to be the standard for measuring demographic and other trends in the United States. These adjustments result in a panel base weight that was employed in a probability-proportional-to-size selection method for establishing the samples for this study. Population specific distributions for this study were based upon data from the December 2008 CPS [32].

Once the sample frame for this study was established, all adult individuals within that frame received a recruitment message from Knowledge Networks that provided a brief description of the NSSHB and invited them to participate. Of 6,182 adults (≥18 years), 5,045 (82%) consented to and participated in the study. Adolescent (14–17 years) recruitment included obtaining consent from a parent (or guardian) and subsequently from the adolescent. A total of 2,172 parents reviewed the study description and 62% (N = 1,347) consented for their child to be recruited. Of 1,347 adolescents who were contacted, 831 responded, with 98.7% (N = 820) consenting to and completing the study.

All study protocols were approved by the Institutional Review Board of the primary authors' academic institution.

Main Outcome Measures

Measures included those related to participant characteristics, sexual behaviors, and condom use. Participant characteristics were previously collected by Knowledge Networks and form the foundation for establishing stratified samples and establishing post-stratification weights. For adolescents and adults, these included gender, age, race (black, Hispanic, white, other), U.S. geographic region (Midwest, North, South, West), and sexual orientation. Household income was based upon an adult's reported household income; for adolescents, these data represent income reported by their parent or guardian. Additionally, educational attainment and marital status were collected from adults.

Sexual behaviors were collected using two different measures, one related to participants' most recent partnered sexual event for those who had indicated partnered sexual interactions within the past year, and the other to their lifetime and recent (past month, past 3 months, past year, ever) sexual behaviors (both solo and partnered), consistent with other nationally representative studies of sexual behaviors [26,27]. For most recent event and lifetime assessments presented in this article, behaviors included vaginal intercourse, being the receptive partner in anal intercourse (defined as having a man insert his penis into one's anus), and being the insertive partner in penile–anal intercourse (males only).

For the most recent partnered sexual event, participants were asked to indicate the occurrence (yes/no) of each specific sexual behavior, the partner's gender, and their relationship with that partner. Relationship to partner was dichotomized in order to compare relationship partners (including spouse or domestic partner, girlfriend/boyfriend or significant other, or dating partner) to casual partners (friend, recent or new acquaintance, or transactional sex partner). Participants also reported their participation in these sexual behaviors during specific periods of life (lifetime, within the past month, within the past 6 months, within the past year, more than 1 year ago). All sexual behavior measures were pretested with a group of 10 adolescents who agreed upon clarifying language to be added to items presented to adolescent participants.

Condom use measures included one specific to the most recent vaginal or anal intercourse event and one specific to condom use over the past 10 vaginal and anal intercourse events. Condom use during the most recent intercourse event was collected to facilitate comparisons with condom use rates from other nationally representative studies, across which the most uniform measure has been condom use during the last or most recent event (e.g., General Social Survey, National Household Survey of Drug Abuse, National Survey of Family Growth [NSFG], Youth Risk Behavior Surveillance Survey [YRBS], The National Longitudinal Study of Adolescent Health [Add Health]) [5–11,14,15,22–24]. A last or most recent event-specific measure has also been found to be a fairly good proxy of condom use over time [33].

Considering that a sexual encounter and the behaviors that occur within it are influenced by contextual and situational factors that may be missed by assessing only one single event, condom use was also assessed for intercourse across time. Measures estimating the proportion of past events including condom use have been utilized in past national studies of condom use (e.g., National AIDS Behavioral Survey, National Household Survey of Drug Abuse, National Social Life, Health, and Aging Project, NSFG, National Sexual Health Survey) [14,15,19,25,34,35]. To reduce the potential for participant error possible when asking individuals to calculate a condom use rate [21], individuals reporting intercourse within the past year were asked to estimate the number of events of the past 10 that involved condom use for each specific type of intercourse. Each item included the response option "I have not had (anal or vaginal) intercourse at least 10 times;" those choosing this response did not provide estimates.

Analyses

During analyses, post-stratification data weights were used to reduce variance and minimize bias caused by nonsampling error, including distributions for age, race, gender, Hispanic ethnicity, education, and U.S. census region. Mean rates of condom use, with corresponding 95% confidence intervals using Adjusted Wald methods [36,37], were calculated for vaginal and anal intercourse during the most recent partnered sexual event and for the past 10 vaginal and anal intercourse events. Chi-square tests, independent samples *t*-tests, and one-way analyses of variance (ANOVA) were also conducted to assess the statistical significance of specific trends across age ranges and between race groups. Level of significance was set at $\alpha = 0.05$.

To assess whether sociodemographic variables (relationship status, race/ethnicity, income, geographical region, sexual orientation, and

education) predicted condom use during the last 10 intercourse events, analysis of covariance was used with age entered as a covariate. Participants were categorized into one of four models based upon gender and age (adolescent females, adolescent males, adult females, adult males). Post hoc comparisons were considered to be significant if *P* values were under 0.05 after using Bonferroni's adjustment for multiple comparisons.

Results

A total of 5,865 participants completed the NSSHB. Of the adolescents (14–17 years), 50.5% (N = 414) were males and 49.5% (N = 406) were females. Of adults (≥18 years), 49.9% (N = 2,522) were men and 50.1% (N = 2,523) were women. Table 1 provides an overview of participant characteristics, which closely match

Table 1 Weighted participant characteristics (N = 5,865)

	Adolescents (N = 820)				Adults (N = 5,045)			
	Males N = 414 (50.5%)		Females N = 406 (49.5%)		Males N = 2,522 (49.9%)		Females N = 2,523 (50.1%)	
Characteristics	N	%	N	%	N	%	N	%
Gender								
Males	414	100.0	—	—	2,552	100.0	—	—
Females	—	—	406	100.0	—	—	2,523	100.0
Age								
14–15	193	46.7	190	46.8	—	—	—	—
16–17	221	53.3	216	53.2	—	—	—	—
18–19	—	—	—	—	73	2.9	50	2.0
20–24	—	—	—	—	203	8.1	145	5.8
25–29	—	—	—	—	341	13.5	394	15.6
30–39	—	—	—	—	410	16.2	430	17
40–49	—	—	—	—	522	20.7	502	19.9
50–59	—	—	—	—	466	18.5	452	17.9
60–69	—	—	—	—	322	12.8	342	13.6
≥70	—	—	—	—	184	7.3	207	8.2
Race or ethnic group	(n = 413)		(n = 405)					
White	253	61.3	241	59.6	1,735	68.8	1,737	68.8
Hispanic	77	18.6	74	18.2	376	14.9	317	12.6
Black	55	13.4	59	14.6	250	9.9	303	12.0
Other	28	6.7	31	7.6	161	6.4	166	6.6
Sexual orientation					(n = 2,521)		(n = 2,521)	
Heterosexual	398	96.1	367	90.5	2,325	92.2	2,348	93.1
Gay or lesbian	7	1.8	1	0.2	105	4.2	23	0.9
Bisexual	6	1.5	34	8.4	66	2.6	92	3.6
Other	2	0.1	3	0.9	25	1	58	2.3
Geographic region			(n = 405)					
South	145	35.0	143	35.4	922	36.5	1,065	36.4
West	96	23.2	96	23.7	591	23.4	668	22.8
Midwest	95	23.0	92	22.7	552	21.9	622	21.1
Northeast	78	18.7	74	18.2	458	18.1	573	19.7
Education completed†								
Less than high school	—	—	—	—	342	13.6	290	11.5
High school	—	—	—	—	757	30.0	760	30.1
Some college	—	—	—	—	685	27.2	750	29.7
College degree or higher	—	—	—	—	737	29.2	723	28.7
Marital status†								
Married	—	—	—	—	1,206	47.8	1,118	44.3
Never married	—	—	—	—	709	28.1	601	23.8
Divorced	—	—	—	—	278	11.0	334	13.2
Living with partner	—	—	—	—	227	9.0	222	8.8
Widowed	—	—	—	—	53	2.1	185	7.3
Separated	—	—	—	—	50	2.0	63	2.5
Annual income ($)‡								
<25,000	52	12.6	52	12.8	506	20.1	605	24.0
25,000–49,999	96	20.8	92	22.6	745	29.6	773	30.7
50,000–74,999	96	20.8	85	21.0	522	20.7	548	21.7
≥75,000	190	45.8	177	43.6	749	29.7	597	23.7

†Education and marital status data presented only for adult participants.
‡Income levels for adolescents based on parental income level reported by parent or guardian.

Table 2 Percent of past 10 vaginal intercourse events condom protected by age (N = 3,272)

	Males (N = 1,702)			Females (N = 1,570)		
Age	%	(95% CI)	N	%	(95% CI)	N
14–17	79.1%	(66.7%–87.8%)	57	58.1%	(46.3%–69.0%)	69
18–24	44.9%	(37.4%–52.7%)	158	38.7%	(31.0%–47.0%)	138
25–29	28.0%	(23.0%–33.5%)	279	26.7%	(22.2%–31.8%)	326
30–39	26.4%	(21.9%–31.4%)	332	17.7%	(13.8%–22.4%)	307
40–49	20.5%	(16.7%–24.9%)	371	13.6%	(10.3%–17.8%)	328
50–59	9.9%	(6.8%–14.1%)	265	10.5%	(7.1%–15.3%)	222
60–69	5.8%	(3.0%–10.6%)	165	9.2%	(5.3%–15.3%)	138
≥70	5.4%	(1.7%–13.4%)	75	1.9%	–(0.9%–12.8%)	42

CI = confidence interval.

those of the U.S. population at the time data were collected [31].

Condom Use Rates During Past 10 Vaginal Intercourse Events

Table 2 presents condom use rates during past 10 vaginal intercourse events by gender and age. Among adults reporting vaginal intercourse within the past year (N = 3,146, 62.4%), condoms were reported for an average of 20.0% of past 10 vaginal events, with use slightly higher among men (21.5% of events) than women (18.4% of events). Among adolescents reporting past year vaginal intercourse (N = 125, 15.2%), condoms were reported by men for 79.1% and by women for 58.1% of past 10 vaginal intercourse events.

Condom use during the past 10 vaginal intercourse events among adults varied by relationship status. Condom use was highest among single adults (46.7% of past 10 events), followed by those who were single but in a relationship (24.1%), and married adults (11.1%) [F (2, 3146) = 228.45, $P = 0.000$]. Among unmarried adults (N = 1,260), condoms were used during one-third of vaginal intercourse events (33.3%). The highest proportions of condom use over past 10 vaginal events were by those who identified as black (30.9%), followed by Hispanic (25.4%), other (22.9%) and white (17.1%) (F [3, 3146] = 17.9, $P < 0.001$).

Condom Use Rates During Most Recent Vaginal Intercourse Event

Rates of condom use at most recent vaginal intercourse by gender, age and partner type are provided in Table 3. Among adults whose most recent sexual event included vaginal intercourse, condoms were reported by men (N = 992) for 24.7% of events, and by women (N = 870) for 21.8% of events. Condoms were reported for 79.6% of events reported by adolescent men (N = 57) and 70.2% events reported by adolescent women (N = 58). Condoms were used more often at last event with casual sexual partners than with relationship partners, a trend that is apparent among men and women across all cohorts, although rates were slightly more similar between these two types of partners among adolescents.

Condom use rates for most recent vaginal intercourse event also varied by race/ethnicity among different age cohorts as detailed in Table 4. Rates of condom use at most recent vaginal intercourse event were higher for black (36.9%) and Hispanic (37.8%) males than white (22.4%) or "other" (25.0%) males (X^2 [3, 846] = 17.8, $P < 0.001$). Rates for white and Hispanic females (20.5% and 20.0%, respectively) were lower than for black females (39.5%) and those of other ethnicities (30.1%) (X^2 [3, 733] = 15.9, $P = 0.001$). These differences are more striking when considered at specific points along the lifespan, with rates among black and Hispanic individuals being approximately twice that of white individuals, a trend that is sustained throughout much of the first three decades of adulthood.

Condom Use Rates During Anal Intercourse

Anal intercourse during both the past year and at most recent event was rare among adolescents (<5%) and therefore rates for anal intercourse are presented only for adults, among whom anal intercourse was also uncommonly practiced and infrequent. Within the past year, 12.7% of adult women (N = 304) and 3.6% of adult men (N = 86) reported being receptive in anal intercourse and 15.9% of men (N = 385) were insertive in anal intercourse. Condom use was reported for 20.3% of the past 10 anal intercourse events (of both types combined). Men reported more frequent condom use (25.8%) than women (13.2%) (t = 4.67, d.f. = 675, $P < 0.001$).

Table 3 Condom use during most recent vaginal intercourse event by age, gender, and partner type (N = 1,968)

Males (N = 1,044)								Females (N = 924)						
		Relationship partner			Casual partner				Relationship partner			Casual partner		
Age	N	%	(95% CI)	N	%	(95% CI)	N	N	%	(95% CI)	N	%	(95% CI)	N
14–17	57	76.3%	(60.6%–87.2%)	38	84.2%	(61.6%–95.3%)	19	58	63.2%	(47.5%–76.6%)	39	88.9%	(66.7%–98.0%)	19
18–24	116	22.2%	(8.5%–45.7%)	18	46.9%	(37.3%–56.7%)	98	98	20.0%	(7.5%–42.2%)	20	31.0%	(21.8%–42.0%)	78
25–29	160	19.8%	(13.4%–28.2%)	111	53.1%	(39.4%–66.3%)	49	206	19.4%	(13.3%–27.3%)	124	41.5%	(31.4%–52.3%)	82
30–39	202	16.8%	(11.3%–24.2%)	131	57.7%	(46.1%–68.5%)	71	168	15.5%	(9.5%–24.1%)	97	31.0%	(21.4%–42.5%)	71
40–49	215	14.9%	(9.6%–22.4%)	121	36.2%	(27.2%–46.3%)	94	191	10.9%	(6.2%–18.2%)	110	19.8%	(12.5%–29.9%)	81
50–59	158	2.2%	(0.1%–8.2%)	90	27.9%	(18.6%–39.6%)	68	112	11.3%	(5.3%–21.8%)	62	24.0%	(14.2%–37.6%)	50
60–69	99	0.0%	–(1.1%–6.7%)	62	17.6%	(7.9%–33.8%)	34	70	8.3%	(2.7%–20.0%)	48	31.8%	(16.2%–52.8%)	22
≥70	37	8.7%	(1.2%–28.0%)	23	7.1%	–(0.8%–33.5%)	14	21	0.0%	–(3.1%–20.7%)	18	0.0%	–(5.6%–61.7%)	3

CI = confidence interval.

Table 4 Condom use during most recent vaginal intercourse event by age, gender, and ethnicity (N = 1,963)

		White			Black			Hispanic			Other		
Age	N	%	(95% CI)	N	%	(95% CI)	N	%	(95% CI)	N	%	(95% CI)	N
Males (N =1,036)													
14–17	56	68.8%	(51.4%–82.2%)	32	92.3%	(64.6%–100.7%)	13	100.0%	(65.5%–104.5%)	9	100.0%	(29.0%–105.2%)	2
18–24	117	46.9%	(36.4%–57.7%)	81	50.0%	(15.0%–85.0%)	4	32.1%	(17.8%–50.7%)	28	25.0%	(3.4%–71.1%)	4
25–29	163	30.4%	(23.3%–38.6%)	135	60.0%	(22.9%–88.4%)	5	46.2%	(23.2%–70.9%)	13	10.0%	–(0.4%–42.6%)	10
30–39	200	19.3%	(13.2%–27.4%)	119	40.0%	(21.8%–61.4%)	20	59.5%	(43.5%–73.7%)	37	37.5%	(21.1%–57.4%)	24
40–49	217	19.0%	(13.3%–26.3%)	142	42.9%	(26.5%–61.0%)	28	30.0%	(16.5%–48.0%)	30	23.5%	(9.0%–47.7%)	17
50–59	148	10.0%	(5.1%–18.1%)	90	22.2%	(10.2%–41.1%)	27	16.0%	(5.8%–35.3%)	25	16.7%	(1.2%–58.2%)	6
60–69	98	5.2%	(1.6%–13.0%)	77	18.2%	(4.0%–48.9%)	11	0.0%	–(5.5%–48.9%)	5	0.0%	–(5.5%–48.9%)	5
≥70	37	10.0%	(2.7%–26.4%)	30	0.0%	–(5.2%–71.0%)	2	0.0%	–(5.2%–71.0%)	2	0.0%	–(5.6%–61.7%)	3
Females (N = 927)													
14–17	59	79.2%	(59.1%–91.2%)	24	100.0%	(67.9%–104.3%)	10	40.0%	(19.7%–64.3%)	15	60.0%	(31.2%–83.3%)	10
18–24	99	36.2%	(25.8%–48.0%)	69	20.0%	(4.6%–52.1%)	10	43.8%	(23.1%–66.9%)	16	66.7%	(24.0%–93.0%)	4
25–29	205	24.8%	(18.6%–32.2%)	153	50.0%	(29.9%–70.1%)	20	31.6%	(15.2%–54.2%)	19	30.8%	(12.4%–58.0%)	13
30–39	166	22.9%	(15.8%–31.9%)	105	37.5%	(18.4%–61.5%)	16	13.3%	(4.7%–30.3%)	30	13.3%	(2.5%–39.1%)	15
40–49	191	11.5%	(6.9%–18.5%)	122	24.0%	(11.2%–43.8%)	25	8.8%	(2.3%–23.7%)	34	60.0%	(31.2%–83.3%)	10
50–59	116	11.4%	(5.9%–20.5%)	79	54.5%	(28.0%–78.7%)	11	19.0%	(7.0%–40.5%)	21	20.0%	(2.0%–64.0%)	5
60–69	70	10.6%	(4.2%–23.0%)	47	41.7%	(19.3%–68.1%)	12	0.0%	–(5.2%–44.3%)	6	0.0%	–(5.5%–48.9%)	5
≥70	21	0.0%	–(3.1%–20.7%)	18	0.0%	(0.0%–100.0%)	0	0.0%	–(3.9%–83.3%)	1	0.0%	–(5.2%–71.0%)	2

CI = confidence interval.

During their most recent sexual events, 6.5% (N = 77) of males were anally insertive, with 26.5% of events including condoms. Of these men, 100% of heterosexual men (N = 56) indicated a female partner and used condoms for 37.5% of events. Of gay men, 100% (N = 13) indicated a male partner and used condoms for 61.5% of events. For bisexual men (N = 6), 66.7% of insertive anal partners were men, with condoms used for 40.0% of events, and 33.3% were women with which condoms were used for 0% of events. Only 2.4% of men (N = 34) and 3.1% of women (N = 36) reporting being receptive in anal intercourse, with condom use being reported for 44.1% of events described by men and 10.8% of events described by women.

Predictors of Condom Use During Past 10 Vaginal Intercourse Events

Predictors of condom use were assessed across four different multivariate models (adolescent males, adolescent females, adult males, and adult females). In the model for adolescent males (accounting for 21.9% of the variance), race/ethnicity emerged as a significant predictor of condom use with Hispanic men reporting more consistent condom use than white men ($P = 0.01$). The model for adolescent females accounted for 39.3% of the variance in condom use, with predictors of more consistent use including education (10–11th graders reported less consistent use than 8th–9th graders) ($P < 0.05$); race/ethnicity (those with "other" race/ethnicity reporting less consistent use than white ($P < 0.01$) and black ($P = 0.001$) females); and sexual orientation (heterosexual females reported more consistent use than bisexuals) ($P < 0.01$).

In the model for adult men (accounting for 24.3% of the variance), significant predictors of condom use included education (men with a bachelor's degree reported more consistent use than those with less education) ($P < 0.001$); relationship status (partnered participants reported less condom than singles) ($P < 0.001$); and race/ethnicity (Hispanic men reported more consistent use than white men ($P < 0.001$) and men of black or of other race/ethnicity) ($P < 0.01$).

In the model for adult women (accounting for 12.9% of the variance), significant predictors of condom use included education (more consistent use by women with a bachelor's degree or higher than participants with less education) ($P < 0.01$); relationship (partnered women used condoms less consistently than single women) ($P < 0.001$); and race/ethnicity (black women used condoms more consistently than white or Hispanic women) ($P < 0.001$).

Predictors of Condom Use During Past 10 Anal Intercourse Events

Because of the low occurrence of anal intercourse during the most recent sexual event, the multivariate model was only replicated to predict condom use during adults' past 10 anal intercourse events. In the adult male model (accounting for 23.8% of the variance), significant predictors of condom use included education (participants with a bachelor's degree reported more consistent use than men with a high school or less education) ($P < 0.01$); relationship status (use was less consistent among men in partnered relationships) ($P < 0.01$); and sexual orientation (gay or bisexually identified men reported more consistent use than heterosexual men) ($P < 0.01$). In the model for adult women (accounting for 3.8% of the variance), the only significant predictor was relationship status, with partnered women reporting less consistent condom use than single women ($P < 0.01$).

Predictors of Condom Use During Most Recent Vaginal Intercourse Event

The NSSHB collected an extensive range of variables related to the characteristics of the most recent sexual event. These included those related to the characteristics of a participant's sexual partner, contraceptive use, and intentions related to pregnancy, alcohol, and marijuana use, STI status of self and knowledge of partner's STI status, sexual history with the partner, one's own and knowledge of partner's recent sexual activities with others, and a range of situational characteristics related to the event (e.g., place) and other evaluations of the sexual event (e.g., pleasure, orgasm, pain). Given this, specific and more extensive analyses of the predictors of condom use during the most recent vaginal intercourse event have been presented in other reports from the NSSHB [38–41].

Discussion

These data provide a valuable snapshot of contemporary condom use rates for sexually active Americans. Of particular importance is that these data provide for population-based assessments of condom use across ages that represent a range of sexually active participants from middle

adolescence to advanced age. Consistencies between this and other studies in terms of the measures used for assessing condom use allow for some comparisons of the rates of condom use established by these collective studies, particularly those conducted within the past two decades. However, differences in the methods used for the collection of data (particularly that this study used Internet-based data collection) and the social and generational shifts that are inherent in studies conducted among different groups of people at different points in time, should be considered when rates from this and other studies are being compared. Regardless, these data do add to the collective body of data related to condom use rates in the United States and therefore some consideration of the consistencies between this and other studies is important.

These data document higher rates of condom use when compared with those available from other studies made available in recent years among adults for most recent sexual intercourse, with 24.7% of men and 21.8% of women reporting condom use for most recent vaginal intercourse, compared with rates from the General Social Survey that stayed reasonably stable at 19.5% from 1996 to 2000 [14]. However, adult rates of condom use in this sample for past 10 vaginal events (20.0%) are highly consistent with these previously reported rates.

Also consistent with other studies was that condoms continue to be used more with casual sexual partners than with relationship partners; usage rates among casual sex partners are at least 100% higher than among relationship partners; a trend that holds steady across age groups that span 50 years for both men and women. However, rates of condom use among casual partners are lowest among men over age 50, suggesting the need to ensure that condom use with casual partners can be maintained as individuals age and have sexual interactions with non-relational partners.

These data are consistent with a trend suggested by other reports that have described condom use among adolescents as increasing over studies conducted since 1991 [9,10,12,14]. Compared with data from the YRBS over the period 1991–2001, which have shown increases in condom use over time, these data provide condom use rates that are slightly higher among both adolescent males and females. YRBS data in 2001 suggested a rate of 65.1% for males and 51.3% for females at last intercourse compared with rates from this study of 79.1% and 58.1%, respectively. Collectively, rates from this study, when considered among the body of literature documenting condom use rates among adolescents over the past two decades, document a trend in adolescent condom use that might suggest that public health efforts to encourage the use of condoms from the onset of sexual activity have been effective.

However, rates of condom use are significantly lower among the early age categories of adulthood than in adolescence. This suggests that sexual health promotion efforts should focus on the maintenance of condom use as individuals transition from adolescence to adulthood and as they enter into a range of both short- and long-term relationships. The data related to less condom use among individuals in relationships is consistent with other studies that have documented this as being related to the desire to conceive among some, and more generally both factors related to relationship maintenance and the use of other contraceptives [14,42–44]. However, public health efforts to ensure that sexually active individuals have the knowledge and skills necessary to make informed decisions about both pregnancy and STI prevention remain important. This is particularly true for those who are involved in romantic or sexual relationships and who may use other non-condom contraceptives to avoid pregnancy, but for whom the relative risk for STI or HIV infection is unknown. The sampling and data collection methods used for this study could be applied to studies that are longitudinal in nature, resulting in the ability to better understand the factors that influence condom use as individuals move from adolescence to adulthood and across evolving relationships and sexual partners.

There was a great deal of consistency between the condom use rates for past 10 intercourse events and rates of condom use during intercourse reported at most recent event. Among adolescents, 82.8% of those who reported using a condom during their most recent vaginal intercourse event were those who reported condom use for ≥70% of their past 10 vaginal intercourse events. Among adults, there was greater condom use consistency between past 10 and most recent vaginal intercourse events among those who were single; of single adults aged 18–44, those using a condom at most recent vaginal event were also those whose condom use rate across past 10 vaginal events was >80%. Among all adults however these rates were also consistent. The lowest level of consistency was among those over age 60, with those using a condom at most recent vaginal event being those

whose rate for past 10 events of the same behavior was 66.7%; the highest consistency was among those aged 25–34, for which this rate was 85.1%.

It is impossible to accurately assess the extent to which the rates of condom use provided for the past 10 vaginal and anal intercourse events reflect those that could be considered to present some risk in terms of the likelihood for unintended pregnancy or for HIV or STI transmission. A more appropriate assessment of such risk is possible with an analysis of condom use during the most recent sexual event. In more detailed reports from the NSSHB for the general population [38] and for specific groups such as those of black or Hispanic race [39], adolescents [40], and the aging [41], we present analyses of condom use within the context of variables that help to determine the level of risk present in a particular sexual encounter. However, a limitation of our study, as with all self-report condom and STI studies, is that largely unknown is the prevalence of pathogens present in any sexual interaction for which condom use is assessed. Valid assessments of condom use in relation to infection status are possible with daily diary studies that incorporate clinical STI tests within the study protocols [45,46].

These data also document differences in condom use rates when individuals are compared by race and gender. Men (both adolescent and adult) consistently reported more condom use over their past 10 vaginal intercourse events than women. However, in the NSSHB single men in particular reported a more diverse range of sexual partner types within the past year than did women and also reported more frequent vaginal intercourse, which could be among the factors that influence more consistent condom use by men. For both past 10 and most recent intercourse events, black and Hispanic men on the whole reported more condom use than white men, and black women and women of "other" races, across all ages, reported more condom use than white and Hispanic women. Major sexual health disparities continue to exist between black and Hispanic individuals and their white counterparts in the United States, most notably in terms of HIV infection. Particularly over the past decade, significant public health efforts (including those that encourage more consistent condom use) have been focused on black and Hispanic communities; these efforts may be related to the higher condom use rates observed among these racial groups for both adolescents and adults. Additionally in the NSSHB data, black or Hispanic adults were generally more likely to describe themselves as single and accordingly to report that their partner at most recent sexual event was a casual partner when compared with white adults. The differences in condom use rates by partnership status and nature of sexual partner at most recent event observed across the total sample may also help to explain these increased condom use rates among black and Hispanic adults.

One limitation of population-based sampling is that it does not provide for a comprehensive analysis of condom use trends among groups who have been prioritized by public health given disproportionate rates of infections like HIV. For example, these data do not allow for analyses of data within the population of men who identify as gay or bisexual given that, as is consistent with other population-based studies, these men represent less than 5% of the total sample of men. Additionally, 62% of parents or guardians consented to their child being contacted during recruitment, yet 99% of those adolescents subsequently consented to participate in the study. Although the sampling methods helped to control for differences between those who consented and those who did not (in terms of sociodemographic characteristics), it could be that those parents who allowed their child to participate, and their children, could be different on other important variables that could influence sexual behaviors and condom use. Lastly, the purpose of this study was to provide baseline condom use rates for the United States. Comparisons between the results of this study with those establishing rates of condom use in other countries might be helpful for those considering sexual health policies on a global scale. However, such comparisons should attend carefully to not only methodological differences between these studies but also to differences related to culture, geography, and language, and condom use considered within a particular culture's or country's societal attitudes toward sexuality and sexuality-related education.

Conclusions

These data document that condom use rates are highest among adolescents, higher among black and Hispanic individuals, and higher among men than women. Although analyses presented in this article do not consider the risk for infection or pregnancy (nor desire for pregnancy) during the sexual events considered, they do contribute to the foundation of data available to those in clinical,

educational, and other settings who are on the frontline of efforts in the United States to improve sexual health yet who need updated data to substantiate and evaluate efforts to promote condom use among individuals at risk for sexually transmitted infections or who desire to prevent pregnancy.

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References

1 Gallo MF, Steiner MJ, Warner L, Hylton-Kong T, Figueroa JP, Hobbs MM, Behets FM. Self-reported condom use is associated with reduced risk of chlamydia, gonorrhea, and trichomoniasis. Sex Transm Dis 2007;34:829–33.
2 Rietmeijer CA, Krebs JW, Feorino PM, Judson FN. Condoms as physical and chemical barriers against human immunodeficiency virus. JAMA 1988;259:1851–53.
3 Valdiserri RO. Cum hastis sic clypeatis: The turbulent history of the condom. Bull NY Acad Med 1988;64:237–45.
4 Guyotjeannin C. The history of the contraceptive sheath. Contracept Fertil Sex 1984;12:847–51.
5 Albarracin D, Durantini MR, Earl A. Empirical and theoretical conclusions of an analysis of outcomes of HIV-prevention interventions. Curr Dir Psychol Sci 2006;15:73–8.
6 Koyama A, Corliss HL, Santelli JS. Global lessons on healthy adolescent sexual development. Curr Opin Pediatr 2009; 21:444–9.
7 CDC. Male latex condoms and sexually transmitted diseases. 2010. Available at: http://www.cdc.gov/condomeffectiveness/condoms.pdf (accessed January 25, 2010).
8 Everett SA, Warren CW, Santelli JS, Kann L, Collins JL, Kolbe LJ. Use of birth control pills, condoms, and withdrawal among U.S. high school students. J Adolesc Health 2000; 27:112–8.
9 Santelli JS, Lindberg LD, Abma J, McNeely CS, Resnick M. Adolescent sexual behavior: Estimates and trends from four nationally representative surveys. Fam Plann Perspect 2000;32:156–94.
10 Anderson JE, Santelli J, Gilbert BC. Adolescent dual use of condoms and hormonal contraception. Sex Transm Dis 2003;30:719–22.
11 Santelli J, Carter M, Orr M, Dittus P. Trends in sexual risk behaviors, by nonsexual risk behavior involvement, U.S. high school students, 1991–2007. J Adolesc Health 2009;44:372–79.
12 Anderson JE, Santelli JS, Morrow B. Trends in adolescent contraceptive use, unprotected and poorly protected sex, 1991–2003. J Adolesc Health 2006;38:734–39.
13 Santelli JS, Morrow B, Anderson JE, Lindberg LD. Contraceptive use and pregnancy risk among U.s. high school students, 1991–2003. Perspect Sex Reprod Health 2006; 38:106–11.
14 Anderson JE. Condom use and HIV risk among US adults. Am J Public Health 2003;93:912–4.
15 Catania JA, Canchola J, Binson D, Dolcini MM, Paul JP, Fisher L, Choi KH, Pollack L, Chang J, Yarber WL, Heiman JR, Coates T. National trends in condom use among at-risk heterosexuals in the united states. J Acquir Immune Defic Syndr 2001;27:176.
16 Piccinino LJ, Mosher WD. Trends in contraceptive use in the United States: 1982–1995. Fam Plann Perspect 1998;30: 4–46.
17 Anderson JE, Wilson R, Doll L, Jones TS, Barker P. Condom use and HIV risk behaviors among U.S. adults: Data from a national survey. Fam Plann Perspect 1999;31:24–8.
18 Anderson JE, Santelli J, Mugalla C. Changes in HIV-related preventive behavior in the US population. J Acquir Immune Defic Syndr 2003;34:195–202.
19 Catania JA, Coates TJ, Stall R, Turner H, Peterson J, Hearst N, Dolcini MM, Hudes E, Gagnon J, Wiley J, Groves R. Prevalence of AIDS-related risk factors and condom use in the United States. Science 1992;258:1101–6.
20 Laumann EO, Michael RT, Gagnon JH. A political history of the national sex survey of adults. Fam Plann Perspect 1994;26:34–8.
21 Noar SM, Cole C, Carlyle K. Condom use measurement in 56 studies of sexual risk behavior: Review and recommendations. Arch Sex Behav 2006;35:327–45.
22 Anderson JE, Mosher WD, Chandra A. Measuring HIV risk in the U.S. population aged 15–44: Results from Cycle 6 of the National Survey of Family Growth. Adv Data 2006;377: 1–27.
23 Sieving RE, Beuhring T, Resnick MD, Bearinger LH, Shew M, Ireland M, Blum RW. Development of adolescent self-report measures from the National Longitudinal Study of Adolescent Heath. J Adolesc Health 2001;28:73–81.
24 Kann L, Kinchen SA, Williams BI, Ross JG, Lowry R, Grunbaum JA, Kolbe LJ; State and Local YRBSS Coodinators.

Youth Risk Behavior Surveillance System. Youth risk behavior surveillance—United States, 1999. MMWR CDC Surveill Summ 2000;49:1–32.
25 Waite LJ, Laumann EO, Das A, Schumm LP. Sexuality: Measures of partnerships, practices, attitudes, and problems in the National Social Life, Health, and Aging Study. J Gerontol B Psychol Sci Soc Sci 2009;64(1 suppl):i56–i66.
26 Herbenick D, Reece M, Sanders SA, Dodge B, Ghassemi A, Fortenberry JD. Prevalence and characteristics of vibrator use by women in the United States: Results from a nationally representative study. J Sex Med 2009;6:1857–66.
27 Reece M, Herbenick D, Sanders SA, Dodge B, Ghassemi A, Fortenberry JD. Prevalence and characteristics of vibrator use by men in the United States. J Sex Med 2009;6:1867–74.
28 Baker L, Wagner TH, Singer S, Bundorf MK. Use of the Internet and e-mail for health care information: Results from a national survey. JAMA 2003;289:2400–6.
29 Heiss F, McFadden D, Winter J. Who failed to enroll in Medicare Part D, and why? Early results. Health Aff 2006;25:344–54.
30 Holman EA, Silver RC, Poulin M, Andersen J, Gil-Rivas V, McIntosh DN. Terrorism, acute stress, and cardiovascular health: A 3-year national study following the September 11th attacks. Arch Gen Psychiatry 2008;65:73–80.
31 Silver RC, Holman EA, McIntosh DN, Poulin M, Gil-Rivas V. Nationwide longitudinal study of psychological responses to September 11. JAMA 2002;288:1235.
32 Current Population Survey December 2008. U.S. Census Bureau. 1994—[cited June 9, 2010]. Available from: http://www.bls.census.gov/ferretftp.htm.
33 Younge SN, Salazar LF, Crosby RF, DiClemente RJ, Wingood GM. Rose condom use at last sex as a proxy for other measures of condom use: Is it good enough? Adolescence 2008;43:927–31.
34 Manlove M, Ikramullah E, Terry-Humen E. Condom use and consistency among male adolescents in the United States. J Adolesc Health 2008;43:325–33.
35 Choi KH, Catania JA, Dolcini MM. Extramarital sex and HIV risk behavior among US adults: Results from the national AIDS behavioral survey. Am J Public Health 1994;84:2003–7.
36 Fleiss JL, Levin B, Paik MC. Statistical methods for rates and proportions. 3rd edition. New York: John Wiley; 2003.
37 Agresti A, Coull B. Approximate is better than exact for interval estimation of binomial proportions. Am Stat 1998;52:119–26.
38 Sanders SA, Reece M, Herbenick D, Schick V, Dodge B, Fortenberry JD. Condom use during most recent vaginal intercourse event among a probability sample of adults in the United States. J Sex Med 2010;7(suppl 5):362–73.
39 Dodge B, Reece M, Herbenick D, Schick V, Sanders SA, Fortenberry JD. Sexual health among U.S. Black and Hispanic Men and Women: A Nationally Representative Study. J Sex Med 2010;7(suppl 5):330–45.
40 Fortenberry JD, Schick V, Herbenick D, Sanders SA, Reece M. Sexual behaviors and condom use at last vaginal intercourse: A national sample of adolescents ages 14 to 17 years. J Sex Med 2010;7(suppl 5):305–14.
41 Schick V, Herbenick D, Reece M, Sanders SA, Dodge B, Middlestadt SE, Fortenberry JD. Sexual behaviors, condom use, and sexual health of Americans over 50: Implications for sexual health promotion among aging adults. J Sex Med 2010;7(suppl 5):315–29.
42 Misovich SJ, Fisher JD, Fisher WA. Close relationships and elevated HIV risk behavior: Evidence and possible underlying psychological processes. Rev Gen Psychol 1997;1:72–107.
43 Fortenberry JD, Tu W, Harezlak J, Katz BP, Orr DP. Condom use as a function of time in new and established adolescent sexual relationships. Am J Public Health 2002;92:211–3.
44 Sayegh MA, Fortenberry JD, Shew M, Orr DP. The developmental association of relationship quality, hormonal contraceptive choice and condom non-use among adolescent women. J Adolescent Health 2006;39:388–95.
45 Batteiger BE, Tu W, Ofner S, Van Der Pol B, Stothard DR, Orr DP, Katz BP, Fortenberry JD. Repeated Chlamydia trachomatis genital infections in adolescent women. J Infect Dis 2010;201:42–51.
46 Ott MA, Ofner S, Fortenberry JD. Beyond douching: Use of feminine hygiene products and STI risk among young women. J Sex Med 2009;6:1335–40.

Sexual Behaviors, Relationships, and Perceived Health Status Among Adult Women in the United States: Results from a National Probability Sample

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ABSTRACT

Introduction. Past surveys of sexual behavior have demonstrated that female sexual behavior is influenced by medical and sociocultural changes. To be most attentive to women and their sexual lives, it is important to have an understanding of the continually evolving sexual behaviors of contemporary women in the United States.

Aims. The purpose of this study, the National Survey of Sexual Health and Behavior (NSSHB), was to, in a national probability survey of women ages 18–92, assess the proportion of women in various age cohorts who had engaged in solo and partnered sexual activities in the past 90 days and to explore associations with participants' sexual behavior and their relationship and perceived health status. Past year frequencies of masturbation, vaginal intercourse, and anal intercourse were also assessed.

Methods. A national probability sample of 2,523 women ages 18 to 92 completed a cross-sectional internet based survey about their sexual behavior.

Main Outcome Measures. Relationship status; perceived health status; experience of solo masturbation, partnered masturbation, giving oral sex, receiving oral sex, vaginal intercourse, anal intercourse, in the past 90 days; frequency of solo masturbation, vaginal intercourse, and anal intercourse in the past year.

Results. Recent solo masturbation, oral sex, and vaginal intercourse were prevalent among women, decreased with age, and varied in their associations with relationship and perceived health status. Recent anal sex and same-sex oral sex were uncommonly reported. Solo masturbation was most frequent among women ages 18 to 39, vaginal intercourse was most frequent among women ages 18 to 29 and anal sex was infrequently reported.

Conclusion. Contemporary women in the United States engage in a diverse range of solo and partnered sexual activities, though sexual behavior is less common and more infrequent among older age cohorts. **Herbenick D, Reece M, Schick V, Sanders SA, Dodge B, and Fortenberry JD. Sexual behaviors, relationships, and perceived health status among adult women in the United States: Results from a national probability sample. J Sex Med 2010;7(suppl 5):277–290.**

Key Words. Women; Sexual Behavior; Probability Sample; United States

Introduction

Between 1892 and 1920, Clelia Mosher interviewed women about their sexual experiences though her findings were not published until 1980, decades after her death [1,2]. Her contemporary, physician Robert Latou Dickinson, published his impressions about the sexual lives of married and single women in 1932 and 1934, respectively, based on patient data [3,4]. However, it is Alfred Kinsey and his research team's study of their interviews with 5,940 women in the United States, published in 1953 as *Sexual Behavior in the Human Female*, that was the first large-scale systematic

study of female sexual behavior in the United States—and the most comprehensive—although the sample was admittedly limited in terms of participants' race, age, and geographic location [5].

In the following decades, the U.S. society experienced medical advances and sociocultural changes that were highly relevant to sexual behavior. Oral contraceptives, introduced to (mostly married) women in the United States in 1960, made sex with little risk of pregnancy possible [6]. Social movements in the 1960s and 1970s related to women's rights, gay rights, civil rights, and the sexual revolution created expanded norms and opportunities for women in terms of their relationships and their solo and partnered sexual practices [7].

In spite of these changes, little was known about how female sexual behavior had evolved since 1953. In the 1980s, however, the emerging human immunodeficiency virus (HIV) epidemic highlighted how a lack of knowledge about human sexual behavior could influence disease distribution and human mortality. This inspired interest and, eventually, financial support for the first nationally representative probability survey of sexual behavior in the United States—the National Health and Social Life Survey (NHSLS)—conducted in 1992 [8,9]. NHSLS data established that sexual behavior had changed considerably since the Kinsey Reports and that greater numbers of women reported engaging in masturbation, oral sex, and anal sex.

Since 1992, there have been rapid social, technological and medical advances that have likely influenced female sexual behavior. Specifically, there has been increased public dialogue about oral sex [10], evolving definitions of what constitutes "having sex" [11,12], expanded opportunities for civil unions and same-sex marriage [13], speculation about an increased prevalence of anal sex [14], and expanded use of the internet and proliferation of electronic media that have provided more immediate access to information about, and images of, sex than has been available during any other time in history [15,16]. For individuals living in the United States, HIV/AIDS is now considered by many to be a chronic but manageable disease [17]. Recently, two vaccines have been approved by the United States Food and Drug Administration to prevent some strains of the human papillomavirus, an infection that few women were familiar with in the early 1990s [18,19].

Many sexual behavior studies have focused on younger adults even though, because of advances in medicine and public health, more women live greater proportions of their sexual lives after menopause. Also, because of divorce, separation, partner illness, or death, more older women now live large portions of their lives without a partner or with changing partners. To address this knowledge gap, the National Social Life, Health, and Aging Project (NSHAP)—a national probability survey of the sexual lives of adults aged 57 to 84—was conducted in 2005 and 2006 [20].

These data, like data from other studies conducted since 1998 (when the introduction of sildenafil citrate [Viagra] highlighted the relevance of sexual behavior to people's sexual lives), reported on the sexual behaviors and problems experienced by men and women [20]. In fact, a great deal of recent research about women's sexuality has centered on definitions of female sexual dysfunction, sexual problems, and women's distress related to sexual problems [21–24]. However, sexual problems need to be considered in the context of normative female sexual behavior, particularly as past studies have demonstrated that sexual behavior changes over time and is influenced by health and relationship status. To be most attentive to women and their sexual lives, it is important to have an understanding of the continually changing sexual behaviors of contemporary women in the United States.

Aims

The purpose of these analyses from the National Survey of Sexual Health and Behavior (NSSHB), was to, in a national probability survey of women ages 18–92, assess the proportion of women in various age cohorts who had engaged in solo and partnered sexual activities in the past 90 days and to explore associations with participants' sexual behavior and their relationship and perceived health status. A second purpose was to assess the frequency with which women in different age cohorts have engaged in solo masturbation, vaginal intercourse, and anal intercourse in the previous year.

Methods

During March–May 2009, the NSSHB data were collected using a population-based cross-sectional survey of adolescents and adults in the United States via research panels of Knowledge Networks (Menlo Park, CA, USA). Research panels accessed through Knowledge Networks are based on a national probability sample established using both

random digit dialing and an address-based sampling (ABS) frame. ABS involves the probability sampling of a frame of residential addresses in the U.S. derived from the U.S. Postal Service's Delivery Sequence File, a system that contains detailed information on every mail deliverable address in the United States. Collectively, the sampling frame from which participants are recruited covers approximately 98% of all United States households. Randomly selected addresses are recruited to the research panel through a series of mailings and subsequently by telephone follow-ups to nonresponders when possible. To further correct sources of sampling and nonsampling error, study samples are corrected with a post-stratification adjustment using demographic distributions from the most recent data available from the Current Population Survey, the monthly population survey conducted by the U.S. Bureau of the Census considered to be the standard for measuring demographic and other trends in the United States. These adjustments result in a panel base weight that was employed in a probability-proportional-to-size selection method for establishing the samples for this study. Population specific distributions for this study were based upon the December 2008 CPS [25].

Once the sample frame was established, all individuals within that frame received a recruitment message from Knowledge Networks that provided a brief description of the NSSHB and invited them to participate. Of 6,182 adults reviewing the study description, 5,045 (82%) consented to and participated. The data presented in this report are limited to the 2,523 adult women (ages 18+) surveyed in the NSSHB.

All data were collected by Knowledge Networks via the Internet; participants in a given Knowledge Networks panel were provided with access to the Internet and hardware if needed. Multiple researchers have used Knowledge Networks for multiple health-related studies, substantiating the validity of such methods for obtaining data from nationally representative samples of the U.S. population [26–32].

Main Outcome Measures

Sexual Behaviors

Participants were asked to indicate the extent to which they had participated in various solo and partnered sexual behaviors during specific time periods (within the past month, past 90 days, past year, more than one year ago), consistent with other recent nationally representative studies of sexual behaviors [31,32]. Behaviors assessed included solo masturbation, partnered masturbation, receiving oral sex and giving oral sex (with measures specific to their partner's sex), vaginal intercourse, and receptive anal intercourse. This article includes summaries of sexual behaviors that occurred within the past 90 days. Women who reported having participated in masturbation, vaginal intercourse and/or anal intercourse within the past year were asked to indicate the frequency with which they had participated in that behavior on average during the past year (not at all, a few times per year, once a month, a few times per month, once a week, two to three times times per week, almost every day, more than once per day). The past year frequency categories were adapted and modified from those used in the NHSLS [8].

Perceived Health Status

Perceived health status was assessed by a single item that asked participants to rate their overall health through a single 5-response item (excellent, very good, good, fair, poor) that has been used across multiple studies [33,34].

Relationship Status

Participants were asked to describe their current relationship status (married, living with partner but not married, in a relationship but not living together, single but dating one or more people, or single and not dating).

Data Analyses

During analyses, post-stratification data weights were used to reduce variance and minimize bias caused by nonsampling error. Distributions for age, race, sex, Hispanic ethnicity, education, and U.S. census region were used in post-stratification adjustments. Rates of participation in sexual behaviors within the past three months, and frequency of participation in specific behaviors on average during the past year, with corresponding 95% confidence intervals were calculated using adjusted Wald's test, and are presented by relationship and perceived health status, stratified by age. For the purpose of analyses, perceived health status was dichotomized into two categories: Excellent, Very Good, or Good vs. Fair or Poor. For analyses related to behavior occurrences in the past 90 days, "single" (single or single and dating) or "partnered" (in a relationship but not living together, living together but not married, married). The frequencies of masturbation,

vaginal intercourse and anal intercourse were grouped into five categories: not in the past year, about once a month to a few times a year, a few times a month (includes about once a week), two to three times a week, and almost daily/daily ("almost every day" and "more than once per day" combined). For frequency analyses, participants were categorized as single (single, single and dating), in a relationship (in a relationship but not living together, living together but not married), or married (Table 1).

Table 1 Weighted participant characteristics for total women's sample (N = 2,523)

Sample characteristics	%	N
Age		
18–24	7.8	196
25–29	15.6	394
30–39	17.0	430
40–49	19.9	502
50–59	17.9	452
60–69	13.6	342
≥70	8.2	207
Ethnicity		
White, non-Hispanic	68.8	1,737
Black, non-Hispanic	12.0	303
Hispanic	12.6	317
Other, non-Hispanic	6.6	166
Education		
Bachelors degree or higher	28.7	723
Some college	29.7	760
High school graduate	30.1	750
Less than high school	11.5	723
Sexual orientation (N = 2,521)		
Heterosexual	93.1	2,348
Bisexual	3.6	92
Homosexual	0.9	23
Other	2.3	58
Marital status		
Married	44.3	1,118
Never married	23.8	601
Divorced	13.2	334
Living together-not married	8.8	222
Separated	2.5	63
Widowed	7.3	185
Relationship status (N = 2,522)		
Single, not dating	28.9	728
Single, dating one or more person	6.0	150
In relationship, not living together	9.4	237
In relationship, living together	10.4	262
Married, living together	43.4	1,095
Married, not living together	2.0	51
Geographic region of United States		
Northeast	19.7	496
Midwest	21.1	533
South	36.4	919
West	22.8	574
MSA status		
Metropolitan area	83.8	2,114
Non-metropolitan area	16.2	409
Annual household income		
Less than $25,000	24.0	605
$25,000–$49,999	30.7	773
$50,000–$74,999	21.7	548
Over $75,000	23.7	597
Children under 18 in household		
No	71.5	1,803
Yes	28.5	720
Health status (N = 2,520)		
Excellent	11.8	297
Very good	43.1	1,086
Good	32.5	818
Fair	10.4	262
Poor	2.2	56

Results

Masturbation

Solo Masturbation

The proportions of women in each age cohort who engaged in solo masturbation during the past 90 days are reported in Table 2 as are data related to partnership status and perceived health status in regard to masturbation. More than half of women ages 18 to 49 had masturbated in the previous 90 days though rates were highest among those 25–29 and progressively lesser in older cohorts. Being partnered was not significantly related to solo masturbation practices nor was perceived health status, except that partnered women in the 60- to 69-year cohort were significantly less likely to have reported recent solo masturbation compared with nonpartnered women. Approximately one-third of women in all relationship and age categories through the 60- to 69-year cohort reported recent masturbation. In the 70+ cohort, solo masturbation was reported by more than half of women who were in a non-cohabitating relationship compared with 12.2% of married women.

Partnered Masturbation

Partnered masturbation was most prevalent among women ages 25 to 29. However, across all age groups, partnered women were significantly more likely to report having engaged in partnered masturbation as compared with nonpartnered women. Partnered masturbation was most common among women in the 25- to 29- and 30- to 39-year cohorts who were single and dating and not significantly related to perceived health status for any age cohort.

Oral Sex

As can be seen in Table 3, half or more of women ages 18 to 39 reported giving or receiving oral sex in the past 90 days. Receptive oral sex was reported by more than half of women who were in a non-cohabitating relationship between 18 and 69. It was also reported by more than half of women who were cohabitating and between 18 and 49 and by more than half of married women ages 30–39. A

Table 2 Weighted masturbation rates by relationship and health status, stratified by age

		Relationship status								Health status		
	Total sample	Single	Single and dating	In a relationship not living together	Living together but not married	Married	Not partnered	Partnered	Partnered vs. not partnered†	Excellent to good	Fair to poor	Excellent to good vs. fair to poor††
Masturbation in past 90 days	% Engaged (Total N) (95% CI)	% Engage in behavior past 90 days (Total N) (95% CI)					% Engage in behavior past 90 days (N) (95% CI)		Adjusted odds ratio (95% CI)			Adjusted odds ratio (95% CI)
Solo masturbation												
18–24	50.0% (192)	31.6% (28) (19.0%–47.5%)	60.7% (28) (42.4%–76.5%)	56.0% (50) (42.3%–68.8%)	54.5% (44) (40.1%–68.3%)	46.9% (32) (30.9%–63.6%)	43.9% (66) (32.6%–55.9%)	53.2% (126) (44.5%–61.7%)	1.49 (0.81–2.73)	50.5% (184) (43.3%–57.6%)	44.4% (9) (18.8%–73.4%)	1.29 (0.34–4.93)
25–29	61.4% (383)	63.9% (61) (51.4%–74.9%)	94.1% (17) (71.1%–100.9%)	81.3% (32) (64.3%–91.5%)	72.1% (61) (59.8%–81.9%)	51.4% (212) (44.7%–58.1%)	70.5% (78) (59.6%–79.5%)	58.7% (305) (53.1%–64.1%)	0.65 (0.37–1.11)	61.9% (362) (56.8%–66.7%)	52.4% (21) (32.4%–71.7%)	1.59 (0.66–3.82)
30–39	49.5% (412)	45.3% (86) (35.2%–55.8%)	85.7% (28) (67.9%–94.9%)	57.9% (38) (42.2%–72.2%)	40.4% (52) (28.1%–53.9%)	46.9% (209) (40.2%–53.7%)	55.3% (114) (46.1%–64.1%)	47.2% (299) (41.6%–52.8%)	0.73 (0.47–1.14)	51.4% (366) (46.3%–56.4%)	35.4% (48) (23.4%–49.6%)	2.04 (1.08–3.85)
40–49	50.1% (467)	52.5% (122) (43.7%–61.1%)	72.2% (18) (48.8%–87.8%)	60.4% (48) (46.3%–73.0%)	54.0% (50) (40.4%–67.0%)	43.9% (230) (37.7%–50.4%)	55.0% (140) (46.7%–63.0%)	47.9% (328) (42.5%–53.3%)	0.71 (0.47–1.07)	51.3% (415) (46.5%–56.1%)	40.7% (54) (28.7%–54.0%)	1.73 (0.96–3.13)
50–59	39.6% (434)	41.1% (158) (33.8%–48.9%)	42.9% (28) (26.5%–60.9%)	56.1% (41) (41.0%–70.1%)	60.0% (30) (42.3%–75.4%)	30.5% (177) (24.2%–37.7%)	41.4% (186) (34.6%–48.6%)	38.3% (248) (32.5%–44.5%)	0.78 (0.52–1.17)	41.1% (336) (35.9%–46.4%)	35.1% (97) (26.3%–45.0%)	1.35 (0.84–2.17)
60–69	33.1% (332)	32.4% (139) (25.1%–40.6%)	87.5% (16) (62.7%–97.8%)	42.9% (14) (21.3%–67.5%)	35.7% (14) (16.2%–61.4%)	26.4% (148) (19.9%–34.0%)	38.1% (155) (30.8%–45.9%)	28.4% (176) (22.2%–35.5%)	0.57* (0.35–0.92)	34.5% (281) (29.2%–40.3%)	24.5% (49) (14.5%–38.2%)	1.92 (0.94–3.91)
70+	16.1% (192)	15.4% (104) (9.6%–23.6%)	20.0% (5) (2.0%–64.0%)	57.1% (7) (25.0%–84.2%)	25.0% (4) (3.4%–71.1%)	12.2% (74) (6.3%–21.7%)	15.6% (109) (9.9%–23.7%)	16.5% (85) (9.9%–25.9%)	1.12 (0.50–2.47)	14.3% (161) (9.6%–20.6%)	27.6% (29) (14.5%–45.9%)	0.45 (0.18–1.16)
Partnered masturbation												
18–24	25.7% (191)	5.3% (38) (0.5%–18.2%)	25.0% (28) (12.4%–43.6%)	22.0% (50) (12.6%–35.4%)	51.2% (43) (36.8%–65.4%)	25.0% (32) (13.0%–42.3%)	13.6% (66) (7.1%–24.2%)	32.8% (125) (25.2%–41.5%)	3.12** (1.38–7.06)	25.0% (184) (19.3%–31.7%)	44.4% (9) (18.8%–73.4%)	0.61 (0.15–2.47)
25–29	34.7% (383)	6.6% (61) (2.1%–16.1%)	64.7% (17) (41.2%–82.8%)	18.8% (32) (8.5%–35.7%)	45.9% (61) (34.0%–58.3%)	39.6% (212) (33.3%–46.3%)	19.2% (78) (11.9%–29.4%)	38.7% (305) (33.4%–44.3%)	2.65** (1.43–4.90)	34.4% (360) (29.7%–39.5%)	40.9% (22) (23.2%–61.3%)	0.71 (0.29–1.74)
30–39	29.9% (409)	2.3% (87) (0.1%–8.5%)	60.7% (28) (42.4%–76.5%)	48.6% (37) (33.4%–64.1%)	36.5% (52) (24.8%–50.2%)	30.4% (204) (24.5%–37.0%)	16.5% (115) (10.8%–24.5%)	33.8% (293) (28.6%–39.4%)	2.45*** (1.42–4.22)	30.2% (361) (25.7%–35.1%)	19.1% (47) (10.2%–32.8%)	1.75 (0.82–3.72)
40–49	19.7% (471)	0.0% (121) –(0.6%–3.7%)	23.8% (21) (10.2%–45.5%)	28.6% (49) (17.8%–42.5%)	38.0% (50) (25.8%–51.9%)	24.0% (229) (18.9%–30.0%)	3.5% (142) (1.3%–8.2%)	26.8% (328) (22.3%–31.9%)	9.54*** (3.70–24.57)	20.8% (419) (17.1%–24.9%)	13.0% (54) (6.1%–24.7%)	1.31 (0.53–3.21)
50–59	12.1% (429)	1.3% (157) (0.1%–4.8%)	14.3% (28) (5.1%–32.1%)	22.0% (41) (11.8%–36.9%)	3.4% (29) –(0.8%–18.6%)	20.6% (175) (15.2%–27.2%)	3.2% (185) (1.3%–7.1%)	18.8% (245) (14.4%–24.2%)	6.31*** (2.60–15.32)	11.7% (332) (8.7%–15.7%)	12.4% (97) (7.1%–20.5%)	0.69 (0.34–1.43)
60–69	8.1% (321)	0.7% (138) –(0.3%–4.4%)	25.0% (16) (9.7%–50.0%)	46.2% (13) (23.2%–70.9%)	20.0% (15) (6.3%–46.0%)	8.6% (139) (4.9%–14.6%)	3.2% (154) (1.2%–7.6%)	12.6% (167) (8.3%–18.5%)	3.43* (1.27–9.26)	9.5% (273) (6.5%–13.6%)	2.1% (48) –(0.6%–11.9%)	4.12 (0.41–41.21)
70+	3.2% (189)	0.0% (104) –(0.7%–4.4%)	0.0% (5) –(5.5%–48.9%)	0.0% (6) –(5.2%–44.3%)	25.0% (4) (3.4%–71.1%)	6.8% (74) (2.6%–15.2%)	0.0% (105) –(0.7%–4.2%)	7.1% (84) (3.0%–15.0%)	—	3.8% (159) (1.6%–8.2%)	0.0% (29) –(2.2%–13.9%)	—

*$P < 0.05$, **$P < 0.01$, ***$P < 0.001$.
†Adjusted odds ratios are based on a logistic regression including the health status as a covariate, estimated separately by age group.
††Adjusted odds ratios are based on a logistic regression including the partner status as a covariate, estimated separately by age group.
CI = confidence interval.

Table 3 Weighted oral sex rates by relationship and health status, stratified by age

		Relationship status								Health status		
Oral sex in past 90 days	Total sample	Single	Single and dating	In a relationship not living together	Living together but not married	Married	Not partnered	Partnered	Partnered vs. not partnered†	Excellent to good	Fair to poor	Excellent to good vs. fair to poor††
	% (Total N)	% Engaged in behavior past 90 days (Total N) (95% CI)					% engage in behavior past 90 days (N)		Adjusted odds ratio (95% CI)	% engage in behavior past 90 days (95% CI)		Adjusted odds ratio (95% CI)
Received oral sex												
18–24	54.7% (192)	12.8% (39) (5.1%–27.2%)	58.6% (29) (40.7%–74.5%)	69.4% (49) (55.4%–80.6%)	70.5% (44) (55.7%–81.9%)	59.4% (32) (42.2%–74.5%)	32.4% (66) (22.4%–44.2%)	67.2% (125) (58.5%–74.8%)	5.34*** (2.74–10.64)	53.0% (184) (45.8%–60.1%)	44.4% (9) (18.8%–73.4%)	2.69 (0.65–11.12)
25–29	56.6% (380)	14.8% (61) (7.7%–26.0%)	41.2% (17) (21.6%–64.0%)	62.5% (32) (45.2%–77.1%)	80.3% (61) (68.5%–88.5%)	62.0% (208) (55.3%–68.3%)	20.5% (78) (12.9%–30.9%)	65.8% (301) (60.2%–70.9%)	7.10*** (3.91–12.90)	57.9% (361) (52.7%–62.9%)	30.0% (20) (14.3%–52.1%)	3.20* (1.14–8.97)
30–39	48.3% (412)	8.0% (88) (3.7%–15.8%)	64.3% (28) (45.8%–79.4%)	60.5% (38) (44.7%–74.4%)	58.5% (53) (45.1%–70.8%)	58.7% (206) (51.9%–65.2%)	21.6% (116) (15.0%–29.9%)	58.9% (297) (53.2%–64.4%)	5.27*** (3.18–8.74)	49.9% (361) (44.7%–55.0%)	38.0% (50) (25.8%–51.9%)	1.75 (0.92–3.31)
40–49	38.4% (474)	6.7% (120) (3.2%–12.8%)	52.4% (21) (32.4%–71.7%)	51.0% (49) (37.5%–64.4%)	60.4% (53) (46.9%–72.4%)	45.7% (230) (39.3%–52.1%)	13.5% (141) (8.7%–20.2%)	48.8% (332) (43.5%–54.2%)	5.72*** (3.36–9.73)	40.4% (421) (35.8%–45.1%)	22.2% (54) (13.1%–35.1%)	1.89 (0.92–3.92)
50–59	23.2% (427)	1.9% (157) (0.4%–5.7%)	26.1% (23) (12.3%–46.8%)	51.2% (41) (36.5%–65.7%)	23.3% (30) (11.5%–41.2%)	35.8% (176) (29.1%–43.1%)	5.0% (180) (2.5%–9.4%)	36.8% (247) (31.1%–43.0%)	10.59*** (5.04–22.25)	27.3% (330) (22.7%–32.3%)	8.3% (96) (4.1%–15.8%)	3.40* (1.54–7.51)
60–69	15.7% (324)	1.4% (139) (0.1%–5.4%)	50.0% (16) (28.0%–72.0%)	72.7% (11) (42.9%–90.8%)	21.4% (14) (6.8%–48.3%)	21.0% (143) (15.1%–28.4%)	6.5% (155) (3.4%–11.6%)	24.4% (168) (18.5%–31.4%)	4.19*** (1.97–8.92)	18.2% (275) (14.1%–23.2%)	2.1% (47) –(0.7%–12.1%)	6.33 (0.87–45.88)
70+	4.2% (192)	0.0% (102) –(0.7%–4.4%)	0.0% (5) –(5.5%–48.9%)	28.6% (7) (7.6%–64.8%)	0.0% (4) –(5.6%–54.6%)	8.1% (74) (3.5%–16.9%)	0.0% (107) –(0.7%–4.2%)	9.4% (85) (4.6%–17.7%)	—	5.0% (161) (2.4%–9.6%)	0.0% (29) –(2.2%–13.9%)	—
Gave oral sex												
18–24	58.5% (193)	12.8% (39) (5.1%–27.2%)	57.1% (28) (39.1%–73.5%)	72.9% (48) (58.9%–83.5%)	74.4% (43) (59.6%–85.2%)	70.6% (34) (53.7%–83.3%)	31.3% (67) (21.5%–43.2%)	72.8% (125) (64.4%–79.9%)	7.74*** (3.81–15.72)	59.5% (185) (52.3%–66.3%)	37.5% (8) (13.5%–69.6%)	4.44 (0.95–20.76)
25–29	64.0% (381)	23.0% (61) (14.1%–35.0%)	58.8% (17) (36.0%–78.4%)	59.4% (32) (42.2%–74.5%)	88.3% (60) (77.5%–94.5%)	70.1% (211) (63.6%–75.9%)	30.8% (78) (21.6%–41.8%)	72.6% (303) (67.3%–77.3%)	5.88*** (3.37–10.27)	65.7% (362) (60.7%–70.4%)	31.6% (19) (15.2%–54.2%)	4.44* (1.54–12.75)
30–39	51.9% (412)	8.0% (87) (3.7%–15.9%)	67.9% (28) (49.2%–82.2%)	64.9% (37) (48.7%–78.2%)	58.0% (50) (44.2%–70.6%)	64.4% (208) (57.7%–70.6%)	22.6% (115) (15.9%–31.1%)	63.4% (295) (57.8%–68.7%)	6.13*** (3.70–10.15)	54.2% (365) (49.1%–59.3%)	35.4% (48) (23.4%–49.6%)	2.46* (1.26–4.80)
40–49	36.0% (475)	2.5% (121) (0.5%–7.4%)	23.8% (21) (10.2%–45.5%)	48.0% (50) (34.8%–61.5%)	69.8% (53) (56.4%–80.6%)	44.5% (229) (38.2%–51.0%)	5.6% (142) (2.7%–10.9%)	49.1% (332) (43.8%–54.5%)	14.89*** (7.06–31.42)	38.2% (421) (33.7%–43.0%)	17.0% (53) (9.0%–29.5%)	2.21* (0.99–4.96)
50–59	26.3% (426)	1.3% (154) (0.1%–4.9%)	20.8% (24) (8.8%–40.9%)	56.1% (41) (41.0%–70.1%)	36.7% (30) (21.8%–54.5%)	39.8% (176) (32.8%–47.2%)	3.9% (178) (1.8%–8.0%)	42.1% (247) (36.1%–48.3%)	17.11*** (7.63–38.40)	29.8% (329) (25.1%–34.9%)	13.7% (95) (8.0%–22.2%)	2.03* (1.03–3.99)
60–69	17.2% (320)	2.9% (140) (0.9%–7.4%)	62.5% (16) (38.5%–81.6%)	76.9% (13) (49.1%–92.5%)	26.7% (15) (10.5%–52.4%)	20.4% (137) (14.5%–28.0%)	9.0% (156) (5.3%–14.6%)	25.5% (165) (19.4%–32.6%)	2.93** (1.50–5.70)	19.9% (271) (15.6%–25.1%)	2.1% (48) –(0.6%–11.9%)	7.97* (1.11–57.32)
70+	4.7% (193)	0.0% (103) –(0.7%–4.3%)	0.0% (5) –(5.5%–48.9%)	42.9% (7) (15.8%–75.0%)	25.0% (4) (3.4%–71.1%)	6.8% (74) (2.6%–15.2%)	0.0% (108) –(0.7%–4.1%)	10.6% (85) (5.5%–19.1%)	—	5.6% (161) (2.8%–10.4%)	0.0% (29) –(2.2%–13.9%)	—

*$P < 0.05$, **$P < 0.01$, ***$P < 0.001$.
†Adjusted odds ratios are based on a logistic regression including the health status as a covariate, estimated separately by age group.
††Adjusted odds ratios are based on a logistic regression including the partner status as a covariate, estimated separately by age group.
CI = confidence interval.

similar pattern was found for performing oral sex. In each age cohort, partnered women were significantly more likely to report recent oral sex (giving or receiving). Women in the 25–29 and 50–59 age cohorts with better perceived health status were significantly more likely to report having received oral sex compared with women who rated their health as fair or poor. For most age cohorts, perceived health status was significantly associated with having performed oral sex in the past 90 days.

Vaginal Intercourse

As can be seen in Table 4, the majority of women ages 18 to 49 reported vaginal intercourse in the past 90 days. In addition, partnered women in all age groups were significantly more likely to report recent vaginal intercourse. Among those aged 18–24, almost twice as many partnered women reported vaginal intercourse compared with nonpartnered women. The gap between partnered and nonpartnered women's reports of vaginal intercourse increased with age as more than four times as many partnered women in the 30- to 39-year age cohort reported vaginal intercourse as compared with nonpartnered women (86.8% vs. 20.54%). Better perceived health status was significantly associated with a higher likelihood of reporting vaginal intercourse in the past 90 days for most age cohorts.

Anal Intercourse

Women's anal intercourse behaviors are reported in Table 4. Although anal intercourse was reported by fewer women than other partnered sex behaviors, it was not rare. A total of 10.3% to 14.4% of women in the 18–24, 25–29, and 30–39 age cohorts reported anal intercourse in the past 90 days. Among 18- to 24-year-old women, approximately one-fourth of those who were cohabitating and about one-fifth who were married reported having engaged in anal sex in the past 90 days. Partnered women in the age cohorts between 18 and 49 were significantly more likely to report having anal sex in the past 90 days. Perceived health status was not associated with reports of anal intercourse.

Same-Sex Sexual Behaviors

Oral sex with a female partner in the past 90 days was rarely reported. The age group with the highest proportion of women who reported oral sex with another woman was the 18- to 24-year-old cohort of which 3.4% (N = 7) reported receiving from and 4.1% (N = 8) reported giving oral sex to a woman. For the other age groups, receiving oral sex from a woman was reported by 0.8% (N = 3) of 25- to 29-year olds, 1.4% (N = 6) of 30- to 39-year olds, 0.8% (N = 4) of 40- to 49- and 50- to 59-year olds (N = 4 and N = 3, respectively), 0.2% of 60- to 69-year olds (N = 1), and 1.4% of those aged 70+ (N = 3). Giving oral sex to a woman was reported by 1.6% (N = 6) of both 25- to 29- and 30- to 39-year olds, 1.5% (N = 5) of 40- to 49-year olds, 0.8% of 50- to 59- and 60- to 69-year olds (N = 3 and N = 2), and 1.4% (N = 3) of 70+-year-old women.

Frequencies of Sexual Behaviors

The reported frequency of solo masturbation, vaginal intercourse, and anal intercourse in the past year are shown in Table 5.

Solo Masturbation

Relatively frequent solo masturbation (a few times each month or more) was reported by up to 48% of women ages 18 to 39 but this frequency of masturbation was progressively less common in older age groups.

Vaginal Intercourse

Women ages 18 to 24 and 25 to 29 reported the highest frequencies of vaginal intercourse. Among single women, the largest proportion of women reported having not engaged in vaginal intercourse in the past year (Table 6). For partnered women in most age groups, the largest proportion of women (but not the majority) reported vaginal intercourse that occurred a few times per month or two or three times per week. Among married women ages 18 to 24, close to half of women reported vaginal intercourse at least twice per week, on average, an intercourse frequency that decreases to just over one-third of women in the 25- to 29-year-old age group, more than one-quarter in the 30- to 39-year-old age group and less than one-quarter in the 40- to 49-year-old cohort.

Anal Intercourse

For all age groups, most women reported that they had not engaged in anal intercourse during the past year. No women, of any partnership status, reported engaging in anal intercourse four or more times per week and less than 6% of single and married women reported engaging in anal intercourse "a few times per month" or "two or three times per week" (combined). However, more than one-quarter of married women in the 18- to 24-year cohort and partnered women in the 30- to 39-year cohort reported having engaged in anal intercourse about "once a month" to "a few times per year."

Table 4 Weighted intercourse rates by relationship and health status, stratified by age

		Relationship status								Health status		
	Total sample	Single	Single and dating	In a relationship not living together	Living together but not married	Married	Not partnered	Partnered	Partnered vs. Not Partnered†	Excellent to good	Fair to poor	Excellent to good vs. fair to poor††
Intercourse in Past 90 Days	% engaged (Total N) (95% CI)	% engaged in behavior past 90 days (Total N) (95% CI)					% engage in behavior past 90 days (N)		Adjusted odds ratio (95% CI)	% engage in behavior past 90 days (95% CI)		Adjusted odds ratio (95% CI)
Vaginal intercourse												
18–24	68.4% (190)	28.6% (35) (16.2%–45.2%)	67.9% (28) (49.2%–82.2%)	83.7% (49) (70.7%–91.8%)	77.3% (44) (62.8%–87.3%)	79.4% (34) (62.9%–90.0%)	46.0% (63) (34.3%–58.2%)	80.3% (127) (72.5%–86.4%)	6.07*** (2.97–12.43)	65.5% (181) (58.3%–72.0%)	11.1% (9) –(0.2%–45.7%)	28.59** (3.73–219.06)
25–29	80.4% (377)	26.2% (61) (16.8%–38.5%)	70.6% (17) (46.6%–87.0%)	75.5% (32) (57.7%–87.0%)	96.7% (61) (88.2%–99.8%)	93.2% (206) (88.8%–96.0%)	35.9% (78) (26.1%–47.0%)	92.0% (299) (88.3%–94.6%)	23.28*** (11.88–45.62)	82.1% (358) (77.8%–85.8%)	50.0% (20) (29.9%–70.1%)	7.71*** (2.53–23.55)
30–39	69.0% (416)	10.5% (86) (5.4%–18.9%)	53.8% (26) (35.5%–71.3%)	81.6% (38) (66.3%–91.1%)	76.0% (50) (62.4%–85.8%)	90.2% (215) (85.5%–93.6%)	20.5% (112) (14.0%–29.0%)	86.8% (303) (82.5%–90.2%)	30.44*** (16.62–55.77)	71.5% (369) (66.7%–75.9%)	48.9% (45) (35.0%–63.0%)	4.97*** (2.31–10.67)
40–49	61.8% (471)	7.5% (120) (3.8%–13.8%)	68.2% (22) (47.1%–83.8%)	73.5% (49) (59.6%–83.9%)	78.8% (52) (65.8%–87.9%)	83.3% (228) (77.9%–87.6%)	16.9% (142) (11.6%–24.0%)	81.2% (329) (76.6%–85.0%)	21.31*** (12.43–36.52)	63.2% (419) (58.5%–67.7%)	48.1% (52) (35.1%–61.3%)	0.95 (0.44–2.04)
50–59	45.2% (436)	5.0% (159) (2.4%–9.8%)	50.0% (28) (32.6%–67.4%)	82.9% (41) (68.4%–91.8%)	70.0% (30) (52.0%–83.5%)	67.6% (179) (60.4%–74.0%)	11.8% (187) (7.8%–17.2%)	70.4% (250) (64.5%–75.7%)	18.35*** (10.60–31.77)	50.6% (338) (45.3%–55.9%)	25.0% (96) (17.4%–34.6%)	2.92*** (1.60–5.32)
60–69	35.8% (330)	4.3% (138) (1.8%–9.4%)	81.3% (16) (56.2%–94.2%)	100.0% (13) (73.4%–103.8%)	42.9% (14) (21.3%–67.5%)	53.7% (147) (45.7%–61.6%)	12.3% (154) (8.0%–18.5%)	56.3% (174) (48.9%–63.5%)	7.64*** (4.32–13.51)	40.2% (281) (34.6%–46.0%)	8.3% (48) (2.8%–20.1%)	4.164** (1.41–12.27)
70+	16.0% (194)	0.0% (105) –(0.7%–4.2%)	0.0% (5) –(5.5%–48.9%)	71.4% (7) (35.2%–92.4%)	42.9% (7) (15.8%–75.0%)	31.9% (72) (22.3%–43.4%)	0.0% (110) –(0.7%–4.1%)	36.0% (86) (26.6%–46.6%)	—	18.4% (163) (13.2%–25.1%)	3.3% (30) –(0.8%–18.1%)	9.01 (0.71–114.70)
Anal intercourse												
18–24	14.4% (187)	0.0% (34) –(1.9%–12.1%)	7.1% (28) (0.9%–23.7%)	16.0% (50) (8.1%–28.8%)	23.3% (43) (13.0%–37.9%)	21.9% (32) (10.7%–39.0%)	3.2% (62) (0.2%–11.7%)	20.0% (125) (13.9%–27.9%)	5.85** (1.49–22.95)	13.5% (178) (9.2%–19.3%)	44.4% (9) (18.8%–73.4%)	0.27 (0.06–1.16)
25–29	10.3% (379)	1.6% (62) –(0.5%–9.4%)	0.0% (17) –(3.2%–21.6%)	6.3% (32) (0.7%–21.2%)	18.3% (60) (10.4%–30.1%)	12.5% (208) (8.6%–17.7%)	1.3% (79) –(0.4%–7.5%)	13.0% (300) (9.6%–17.3%)	14.28** (1.72–118.31)	10.3% (360) (7.5%–13.9%)	10.5% (19) (1.7%–32.6%)	0.86 (0.19–3.76)
30–39	13.0% (409)	0.0% (86) –(0.9%–5.1%)	14.3% (28) (5.1%–32.1%)	23.7% (38) (12.8%–39.4%)	30.0% (50) (19.0%–43.8%)	11.7% (206) (7.9%–16.8%)	3.5% (114) (1.1%–9.0%)	16.3% (294) (12.5%–21.0%)	5.97 (2.05–17.35)	12.2% (360) (9.2%–16.0%)	16.7% (48) (8.4%–29.8%)	0.73 (0.31–1.70)
40–49	8.1% (471)	0.0% (120) –(0.6%–3.7%)	4.8% (21) –(0.9%–24.4%)	14.3% (49) (6.8%–27.0%)	13.2% (53) (6.2%–25.2%)	9.6% (228) (6.4%–14.2%)	0.7% (141) –(0.3%–4.3%)	10.9% (330) (8.0%–14.8%)	12.93** (2.32–72.00)	8.1% (419) (5.8%–11.2%)	7.5% (53) (2.5%–18.4%)	0.81 (0.25–2.60)
50–59	3.5% (429)	0.0% (158) –(0.5%–2.9%)	0.0% (23) –(2.6%–16.9%)	22.0% (41) (11.8%–36.9%)	3.4% (29) –(0.8%–18.6%)	2.8% (178) (1.0%–6.6%)	0.0% (181) –(0.4%–2.5%)	6.0% (248) (3.6%–9.8%)	—	4.2% (330) (2.5%–7.1%)	0.0% (96) –(0.8%–4.6%)	—
60–69	2.5% (325)	0.7% (138) –(0.3%–4.4%)	25.0% (16) (9.7%–50.0%)	15.4% (13) (3.1%–43.5%)	0.0% (14) –(3.6%–25.1%)	0.7% (143) –(0.3%–4.2%)	3.2% (154) (1.2%–7.6%)	1.8% (170) (0.4%–5.3%)	0.61 (0.15–2.55)	2.9% (277) (1.4%–5.7%)	2.1% (48) –(0.6%–11.9%)	2.09 (0.18–24.23)
70+	0.5% (192)	0.0% (101) –(0.7%–4.4%)	0.0% (5) –(5.5%–48.9%)	0.0% (7) –(5.0%–40.4%)	0.0% (7) –(5.0%–40.4%)	1.4% (74) –(0.5%–8.0%)	0.0% (106) –(0.7%–4.2%)	1.1% (88) –(0.4%–6.8%)	—	0.6% (162) –(0.2%–3.8%)	0.0% (29) –(2.2%–13.9%)	—

*$P < 0.05$, **$P < 0.01$, ***$P < 0.001$.
†Adjusted odds ratios are based on a logistic regression including the health status as a covariate, estimated separately by age group.
††Adjusted odds ratios are based on a logistic regression including the partner status as a covariate, estimated separately by age group.
CI = confidence interval.

Table 5 Weighted frequency of women's masturbation and intercourse behaviors, stratified by age

		Frequency of sexual behavior				
Age	N	Not in past year	A few times per year to monthly	A few times per month to weekly	2 or 3 times per week % Engaging in behavior (95 CI)	≥4 times per week
Masturbation (solo)						
18–24	192	36.5% (30.0%–43.5%)	28.6% (22.7%–35.4%)	24.5% (18.9%–31.1%)	7.3% (4.3%–12.0%)	3.1% (1.3%–6.8%)
25–29	382	28.5% (24.2%–33.2%)	37.2% (32.5%–42.2%)	21.5% (17.7%–25.9%)	7.9% (5.6%–11.1%)	5.0% (3.2%–7.7%)
30–39	413	37.0% (32.5%–41.8%)	30.5% (26.3%–35.1%)	22.0% (18.3%–26.3%)	9.0% (6.6%–12.2%)	1.5% (0.6%–3.3%)
40–49	465	35.3% (31.1%–39.7%)	38.3% (34.0%–42.8%)	19.8% (16.4%–23.7%)	5.2% (3.5%–7.6%)	1.5% (0.7%–3.1%)
50–59	431	46.2% (41.5%–50.9%)	36.7% (32.3%–41.4%)	13.9% (10.9%–17.5%)	2.6% (1.4%–4.6%)	0.7% (0.1%–2.1%)
60–69	328	54.0% (48.6%–59.3%)	35.7% (30.7%–41.0%)	9.8% (7.0%–13.5%)	0.3% –(0.1%–1.9%)	0.3% –(0.1%–1.9%)
70+	188	68.6% (61.6%–74.8%)	26.1% (20.3%–32.8%)	4.8% (2.4%–9.0%)	0.0% –(0.4%–2.4%)	0.5% –(0.2%–3.2%)
Vaginal intercourse						
18–24	190	25.3% (19.6%–31.9%)	15.8% (11.3%–21.7%)	24.2% (18.6%–30.8%)	25.3% (19.6%–31.9%)	9.5% (6.0%–14.6%)
25–29	370	13.8% (10.6%–17.7%)	13.5% (10.4%–17.4%)	40.0% (35.1%–45.1%)	26.5% (22.3%–31.2%)	6.2% (4.1%–9.2%)
30–39	416	26.2% (22.2%–30.6%)	14.2% (11.2%–17.9%)	38.5% (33.9%–43.3%)	16.3% (13.0%–20.2%)	4.8% (3.1%–7.3%)
40–49	463	30.2% (26.2%–34.5%)	18.4% (15.1%–22.2%)	30.5% (26.5%–34.8%)	17.5% (14.3%–21.2%)	3.5% (2.1%–5.6%)
50–59	433	49.0% (44.3%–53.7%)	15.2% (12.1%–18.9%)	23.6% (19.8%–27.8%)	10.9% (8.3%–14.2%)	1.4% (0.6%–3.1%)
60–69	327	58.1% (52.7%–63.3%)	13.1% (9.8%–17.2%)	22.6% (18.4%–27.4%)	5.2% (3.2%–8.2%)	0.9% (0.2%–2.8%)
70+	195	77.9% (71.5%–83.2%)	10.3% (6.7%–15.4%)	8.7% (5.4%–13.6%)	1.0% (0.0%–3.9%)	2.1% (0.6%–5.4%)
Anal intercourse						
18–24	187	78.1% (71.6%–83.5%)	18.2% (13.3%–24.4%)	1.6% (0.3%–4.8%)	2.1% (0.6%–5.5%)	0.0% –(0.4%–2.4%)
25–29	377	79.3% (74.9%–83.1%)	15.6% (12.3%–19.6%)	2.7% (1.4%–4.9%)	2.4% (1.2%–4.6%)	0.0% –(0.2%–1.2%)
30–39	407	78.6% (74.3%–82.3%)	17.7% (14.3%–21.7%)	3.7% (2.2%–6.1%)	0.0% –(0.2%–1.1%)	0.0% –(0.2%–1.1%)
40–49	470	88.5% (85.3%–91.1%)	9.6% (7.2%–12.6%)	1.7% (0.8%–3.4%)	0.2% –(0.1%–1.3%)	0.0% –(0.2%–1.0%)
50–59	427	94.6% (92.0%–96.4%)	4.7% (3.0%–7.2%)	0.7% (0.1%–2.1%)	0.0% –(0.2%–1.1%)	0.0% –(0.2%–1.1%)
60–69	325	96.0% (93.2%–97.7%)	2.5% (1.2%–4.9%)	1.5% (0.5%–3.6%)	0.0% –(0.2%–1.4%)	0.0% –(0.2%–1.4%)
70+	191	99.5% (96.8%–100.2%)	0.0% –(0.4%–2.4%)	0.5% –(0.2%–3.2%)	0.0% –(0.4%–2.4%)	0.0% –(0.4%–2.4%)

CI = confidence interval.

Table 6 Weighted frequencies of women's masturbation and intercourse behaviors by relationship and health status, stratified by age

		Relationship status							
		Single						Partnered	
Frequency of behavior over past year	N	Not in past year	A few times per year to weekly	A few times per month to monthly	2 or 3 times per week	≥4 times per week	N	Not in past year	A few times per year to monthly
Masturbation									
18–24	24	35.8% (19.8%–55.8%)	26.9% (13.0%–47.1%)	23.9% (10.9%–44.1%)	7.5% (0.7%–26.0%)	6.0% (0.0%–24.1%)	31	33.3% (19.3%–51.0%)	33.3% (19.3%–51.0%)
25–29	17	22.1% (8.1%–46.3%)	27.3% (11.5%–51.4%)	19.5% (6.5%–43.7%)	13.0% (2.7%–36.9%)	18.2% (5.7%–42.4%)	12	12.9% (1.5%–42.3%)	41.9% (19.5%–68.3%)
30–39	39	33.9% (21.0%–49.7%)	30.4% (18.2%–46.2%)	22.6% (12.1%–38.0%)	12.2% (4.7%–26.4%)	0.9% –(1.4%–12.0%)	32	35.2% (21.0%–52.5%)	27.5% (14.9%–44.9%)
40–49	40	28.8% (17.0%–44.3%)	36.0% (22.9%–51.5%)	22.3% (12.0%–37.5%)	10.8% (3.9%–24.6%)	2.2% –(0.9%–13.6%)	31	31.3% (17.7%–49.0%)	31.3% (17.7%–49.0%)
50–59	76	41.5% (31.1%–52.8%)	39.3% (29.1%–50.6%)	14.8% (8.3%–24.6%)	2.7% (0.2%–9.8%)	1.6% –(0.3%–8.2%)	22	30.6% (15.3%–51.6%)	40.3% (22.7%–60.7%)
60–69	79	51.0% (40.2%–61.7%)	34.8% (25.2%–45.8%)	12.9% (7.0%–22.2%)	0.6% –(0.9%–5.6%)	0.6% –(0.9%–5.6%)	10	40.0% (16.7%–68.8%)	48.0% (22.2%–74.9%)
70+	74	69.8% (58.5%–79.1%)	25.5% (16.9%–36.5%)	4.7% (1.3%–12.6%)	0.0% –(1.0%–5.9%)	0.0% –(1.0%–5.9%)	2	20.0% (0.0%–79.4%)	50.0% (9.5%–90.5%)
Vaginal intercourse									
18–24	61	50.8% (38.6%–62.9%)	16.4% (9.0%–27.8%)	19.7% (11.5%–31.5%)	8.2% (3.2%–18.2%)	4.9% (1.1%–14.0%)	93	12.9% (7.4%–21.4%)	16.1% (9.9%–25.0%)
25–29	79	43.0% (32.7%–54.0%)	21.5% (13.8%–31.9%)	24.1% (15.9%–34.6%)	1.3% –(0.4%–7.5%)	10.1% (5.0%–19.0%)	94	10.6% (5.7%–18.7%)	11.7% (6.5%–19.9%)
30–39	112	72.3% (63.4%–79.8%)	10.7% (6.1%–17.9%)	12.5% (7.5%–20.0%)	4.5% (1.7%–10.3%)	0.0% –(0.7%–4.0%)	88	14.8% (8.7%–23.8%)	13.6% (7.8%–22.5%)
40–49	142	71.1% (63.2%–78.0%)	16.9% (11.6%–24.0%)	9.9% (5.9%–16.0%)	2.1% (0.4%–6.3%)	0.0% –(0.5%–3.2%)	102	20.6% (13.8%–29.5%)	13.7% (8.2%–21.9%)
50–59	185	85.4% (79.5%–89.8%)	5.4% (2.8%–9.8%)	7.0% (4.1%–11.7%)	2.2% (0.6%–5.6%)	0.0% –(0.4%–2.4%)	71	21.1% (13.1%–32.1%)	18.3% (10.9%–29.0%)
60–69	155	84.5% (77.9%–89.4%)	6.5% (3.4%–11.6%)	6.5% (3.4%–11.6%)	2.6% (0.8%–6.7%)	0.0% –(0.5%–2.9%)	27	14.8% (5.3%–33.1%)	11.1% (3.0%–28.9%)
70+	109	100.0% (95.9%–100.7%)	0.0% –(0.7%–4.1%)	0.0% –(0.7%–4.1%)	0.0% –(0.7%–4.1%)	0.0% –(0.7%–4.1%)	13	30.8% (12.4%–58.0%)	15.4% (3.1%–43.5%)
Anal intercourse									
18–24	64	87.5% (77.0%–93.8%)	9.4% (4.0%–19.3%)	3.1% (0.2%–11.3%)	0.0% –(1.1%–6.8%)	0.0% –(1.1%–6.8%)	93	74.2% (64.4%–82.1%)	21.5% (14.3%–31.0%)
25–29	79	96.2% (89.0%–99.2%)	3.8% (0.8%–11.0%)	0.0% –(0.9%–5.6%)	0.0% –(0.9%–5.6%)	0.0% –(0.9%–5.6%)	91	73.6% (63.7%–81.6%)	18.7% (11.9%–28.0%)
30–39	114	93.0% (86.6%–96.6%)	7.0% (3.4%–13.4%)	0.0% –(0.7%–3.9%)	0.0% –(0.7%–3.9%)	0.0% –(0.7%–3.9%)	85	62.4% (51.7%–71.9%)	28.2% (19.7%–38.6%)
40–49	140	92.9% (87.2%–96.2%)	7.1% (3.8%–12.8%)	0.0% –(0.5%–3.2%)	0.0% –(0.5%–3.2%)	0.0% –(0.5%–3.2%)	102	85.3% (77.0%–91.0%)	10.8% (6.0%–18.4%)
50–59	181	98.9% (95.8%–100.0%)	1.1% (0.0%–4.2%)	0.0% –(0.4%–2.5%)	0.0% –(0.4%–2.5%)	0.0% –(0.4%–2.5%)	69	85.5% (75.1%–92.1%)	11.6% (5.7%–21.5%)
60–69	154	94.8% (89.9%–97.5%)	2.6% (0.8%–6.7%)	2.6% (0.8%–6.7%)	0.0% –(0.5%–2.9%)	0.0% –(0.5%–2.9%)	27	88.9% (71.1%–97.0%)	7.4% (1.0%–24.5%)
70+	105	100.0% (95.8%–100.7%)	0.0% –(0.7%–4.2%)	0.0% –(0.7%–4.2%)	0.0% –(0.7%–4.2%)	0.0% –(0.7%–4.2%)	14	100.0% (74.9%–103.6%)	0.0% –(3.6%–25.1%)

CI = confidence interval.

Discussion

This study documents contemporary rates of sexual behavior among adult women in the United States. Masturbation, oral sex, and vaginal intercourse are prevalent among women and particularly throughout young and middle adulthood. Women's reports of recent solo masturbation were largely unrelated to either relationship or perceived health status, although all partnered behaviors were significantly related to one or both of these.

These data both reflect and complement findings from two other nationally representative probability studies of adult sexual behavior conducted within the past two decades. Consistent with findings from NSHAP, the proportion of women who engaged in recent sexual behavior declined with age [20]. However, as the NSHAP only surveyed women who were at least 57 years old, their analyses were limited by age. A strength of our study was that it included women ages 18 to 92, illuminating trends in recent sexual behavior across the life course. Our findings demonstrate that the largest proportion of women who engaged in recent partnered sexual activities tended to be in the 25- to 29- and 30- to 39-year-old age cohorts,

Table 6 Continued

				Married				
A few times per month to weekly	2 or 3 times per week	≥4 times per week	N	Not in past year	A few times per year to monthly	A few times per month to weekly	2 or 3 times per week	≥4 times per week
23.7% (11.9%–41.2%)	7.5% (1.3%–23.1%)	2.2% –(1.3%–16.1%)	15	46.9% (25.0%–70.1%)	18.8% (5.5%–44.7%)	28.1% (11.4%–53.7%)	6.3% –(1.0%–31.4%)	0% –(3.5%–23.9%)
35.5% (15.0%–63.0%)	8.6% –(0.5%–37.8%)	1.1% –(3.6%–29.5%)	80	37.7% (27.9%–48.7%)	39.2% (29.2%–50.1%)	16.0% (9.4%–25.7%)	5.2% (1.7%–12.8%)	1.9% –(0.1%–8.3%)
26.4% (14.1%–43.7%)	9.9% (2.8%–25.6%)	1.1% –(1.6%–14.3%)	82	39.4% (29.5%–50.3%)	31.7% (22.6%–42.5%)	20.2% (12.8%–30.2%)	6.7% (2.7%–14.6%)	1.9% –(0.1%–8.3%)
29.3% (16.1%–47.0%)	6.1% (0.6%–21.3%)	2.0% –(1.3%–16.0%)	93	41.0% (31.5%–51.1%)	42.3% (32.7%–52.4%)	14.1% (8.3%–22.7%)	1.8% –(0.1%–7.4%)	0.9% –(0.5%–6.1%)
22.2% (9.4%–43.3%)	6.9% (0.2%–26.5%)	0% –(2.7%–17.5%)	101	57.4% (47.6%–66.6%)	32.4% (24.0%–42.0%)	9.7% (5.1%–17.2%)	6% –(0.5%–5.3%)	0% –(0.7%–4.4%)
12.0% (0.5%–44.6%)	–(4.3%–32.1%)	–(4.3%–32.1%)	88	59.5% (49.0%–69.1%)	34.5% (25.3%–44.9%)	6.1% (2.4%–13.4%)	–(0.8%–5.0%)	–(0.8%–5.0%)
30.0% (3.0%–83.3%)	0.0% –(5.2%–71.0%)	–(5.2%–71.0%)	53	73.6% (60.3%–83.7%)	23.6% (14.1%–36.7%)	1.4% –(0.8%–10.2%)	1.4% –(0.8%–10.2%)	–(1.3%–8.1%)
31.2% (22.6%–41.2%)	32.3% (23.6%–42.3%)	7.5% (3.5%–15.0%)	34	11.8% (4.1%–27.2%)	14.7% (6.0%–30.6%)	14.7% (6.0%–30.6%)	35.3% (21.4%–52.2%)	23.5% (12.20%–40.23%)
36.2% (27.2%–46.3%)	28.7% (20.5%–38.6%)	12.8% (7.3%–21.1%)	199	3.5% (1.6%–7.2%)	11.6% (7.8%–16.8%)	47.7% (40.9%–54.7%)	35.2% (28.9%–42.0%)	2.0% (0.60%–5.24%)
43.2% (33.3%–53.6%)	18.2% (11.4%–27.6%)	10.2% (5.3%–18.5%)	215	6.5% (3.8%–10.7%)	16.3% (11.9%–21.8%)	50.2% (43.6%–56.9%)	21.9% (16.8%–27.9%)	5.1% (2.78%–9.03%)
24.5% (17.1%–33.7%)	31.4% (23.2%–40.9%)	9.8% (5.2%–17.3%)	221	8.1% (5.1%–12.6%)	21.7% (16.8%–27.6%)	46.6% (40.1%–53.2%)	20.8% (16.0%–26.7%)	2.7% (1.11%–5.93%)
36.6% (26.3%–48.3%)	18.3% (10.9%–29.0%)	5.6% (1.8%–14.0%)	177	22.0% (16.5%–28.7%)	23.7% (18.0%–30.5%)	36.2% (29.4%–43.5%)	16.9% (12.1%–23.2%)	1.1% (0.05%–4.29%)
48.1% (30.7%–66.0%)	18.5% (7.7%–37.2%)	7.4% (1.0%–24.5%)	145	37.9% (30.4%–46.1%)	20.0% (14.3%–27.3%)	35.9% (28.5%–43.9%)	6.2% (3.1%–11.5%)	0% –(0.52%–3.10%)
23.1% (7.5%–50.9%)	7.7% –(0.7%–35.4%)	23.1% (7.5%–50.9%)	71	53.5% (42.0%–64.6%)	25.4% (16.6%–36.6%)	18.3% (10.9%–29.0%)	1.4% –(0.5%–8.3%)	1.4% –(0.48%–8.29%)
1.1% –(0.4%–6.4%)	3.2% (0.7%–9.5%)	0.0%	32	68.8% (51.3%–82.2%)	28.1% (15.4%–45.5%)	0.0% –(2.0%–12.7%)	3.1% –(0.8%–17.1%)	0.0%
5.5% (2.1%–12.5%)	2.2% (0.1%–8.1%)	0.0%	207	75.4% (69.0%–80.8%)	18.8% (14.1%–24.7%)	2.4% (0.9%–5.7%)	3.4% (1.5%–6.9%)	0.0%
9.4% (4.6%–17.7%)	0.0% –(0.9%–5.2%)	0.0%	206	77.7% (71.5%–82.8%)	19.4% (14.6%–25.4%)	2.9% (1.2%–6.4%)	0.0% –(0.4%–2.2%)	0.0%
2.9% (0.6%–8.7%)	1.0% –(0.4%–5.9%)	0.0%	226	87.6% (82.6%–91.3%)	10.2% (6.8%–14.9%)	2.2% (0.8%–5.2%)	0.0% –(0.3%–2.0%)	0.0%
2.9% (0.2%–10.6%)	0.0% –(1.0%–6.3%)	0.0%	176	94.3% (89.7%–97.0%)	5.7% (3.0%–10.3%)	0.0% –(0.4%–2.6%)	0.0% –(0.4%–2.6%)	0.0%
3.7% –(0.9%–19.8%)	0.0% –(2.3%–14.8%)	0.0%	143	99.3% (95.8%–100.3%)	0.7% –(0.3%–4.2%)	0.0% –(0.5%–3.1%)	0.0% –(0.5%–3.1%)	0.0%
0.0% –(3.6%–25.1%)	0.0% –(3.6%–25.1%)	0.0%	73	98.6% (91.9%–100.5%)	0.0% –(1.0%–6.0%)	1.4% –(0.5%–8.1%)	0.0% –(1.0%–6.0%)	0.0%

with progressively fewer women who engaged in such behaviors in older cohorts.

As the NHSLS reported on past year and lifetime behavior (but not behavior that occurred in the past 90 days), it is not possible to make direct comparisons between findings from that study and ours. However, similar or greater proportions of women in most age cohorts reported engaging in anal sex during the past 90 days as compared with women in the NHSLS study [8]. This may indicate that the proportion of women who have engaged in anal sex has increased since 1992. Alternatively, it may indicate that the proportion of women engaging in anal sex has not changed, but that the methods used for the NHSLS (e.g., interviews conducted by women who were mostly in their thirties and forties) resulted in women under-reporting anal intercourse in 1992 [35].

In addition, women who were interviewed for the NHSLS study were asked how often, during the past year, they had "had sex" [8]. As research since the time of the study has shown that people have varying definitions of having "had sex" [11,12], it is not possible to make direct comparisons between those rates and the frequencies of sex reported by women in our study. Our findings

demonstrate that many women masturbate, whether single or partnered, although solo masturbation appears to be more frequent among young, single women. Among all age groups, married women were the most likely to indicate that they have not masturbated at all in the past year but also the least likely to indicate no vaginal intercourse during the past year. In fact, married and partnered women reported more frequent vaginal intercourse during the past year than single women. These data are, of course, limited by the challenges inherent in assessing individuals' sexual behavior over an entire year. Findings are also limited by the types of sexual behavior assessed. The use of vibrators and dildos, for example, was not asked about in this study, although it has been assessed in another recent national probability sample in the United States [31,32,36], and women with same-sex partners may have particularly felt constrained by the few behaviors assessed, particularly those that were limited to male–female couples (i.e., penile–vaginal intercourse and penile–anal intercourse).

Recent oral sex with a male partner—both giving and receiving—were commonly reported by women, including more than half of partnered women younger than 50. Same-sex oral sex in the past 90 days was uncommonly reported by women, though more prevalent among 18- to 24-year olds than other age groups.

Anal intercourse was infrequently reported, with the vast majority of women reported having had no anal intercourse in the past year. However, a few women incorporate anal intercourse at a relatively high frequency suggesting the importance of additional research on the role of anal sex in heterosexual relationships.

Considered in the context of other reports from this study, an important finding is that many women in all age cohorts engage in a variety of solo and/or partnered sex. Sexual behavior may be influenced by a woman's perceived health status such that women who experience better health may have greater interest in sex, more opportunities for having sex or an easier ability to engage in sexual behavior. However, even women who rated their health as fair or poor reported recent solo and/or partnered sexual activities, information that may be helpful for patients who—because of one's own illness or that of a partner—may worry that their sexual life will be greatly impaired or will necessarily end.

The finding that health status is related to some sexual practices, such as vaginal intercourse, may be confounded by partnership status as being in a relationship has been linked with better health status as well as with more regular sex [8,22]. In addition, although individuals who are in better health may have greater interest in sex, or ability to have sex, it may also be that a more active sex life leads to more positive perceptions of health.

Healthcare providers and therapists who work with women on issues related to sexual function and pleasure may find that these data help to normalize female masturbation as well as sexual activity among older women, which some still consider taboo to discuss. Findings from the study also demonstrate the variety of sexual behaviors experienced by women alone or with their partner(s). Although vaginal intercourse remains the most prevalent behavior among women, masturbation and oral sex are also frequently experienced. Although fewer women reported anal intercourse, it was not rare and was more common among women who are young and partnered.

There were several strengths of this study. In addition to being a nationally representative probability survey, a primary strength is the wide age range included in the study, which allows for the examination of sexual behavior among many different age cohorts. We also asked very specific questions about sexual behavior, thus enhancing the validity of the data and making it unlikely that participants misunderstood what was being asked. In addition, given the Internet-based data collection, women may have felt more comfortable answering sensitive questions about their sexual behavior, particularly behaviors such as masturbation and anal intercourse, which may be considered taboo. By asking about sexual behaviors that occurred in the past 90 days, we were better able to examine the influences of health and relationship status on recent sexual behavior (rather than sexual behavior that occurred over the past year, for example).

However, given the expense and space limitations associated with conducting a study of this nature, we were limited in the number of questions we were able to ask. As was true for the NHSLS and NSHAP, lesbian and bisexual identified women were not oversampled and thus it is not possible to conduct in-depth analyses of behaviors among such women. The gender of respondents was previously collected by Knowledge Networks using established gender categories that correspond to those in the U.S. Census (e.g., being limited to male or female), thus it is not possible to identify transgendered individuals who may have

been included in the sample. The sample was also likely limited to those adults who were living in the community, thus excluding some women who may be homeless or who—particularly older women—may be hospitalized or living in an assisted care facility.

Conclusions

Findings from this study demonstrate that recent solo and partnered masturbation, vaginal intercourse, and oral sex are prevalent, and frequently engaged in, sexual behaviors, though the proportion of women who engage in these behaviors tends to peak in the 20s and decreases with age. Anal intercourse is more prevalent among women than previously demonstrated, but remains infrequently practiced by most women who have engaged in it. These data related to the sexual behavior of contemporary women provide important insights to clinicians whose clients may be curious about the extent to which others engage in similar behaviors and to STI and HIV outreach professionals who need to stay current on the variety and prevalence of human sexual behaviors.

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References

1 Mosher CN. What ought to be and what was: women's sexuality in the nineteenth century. Am Hist Rev 1974;79:1467–90.
2 Mosher CD. The Mosher survey: Sexual attitudes of 45 Victorian women. USA: Arno Press; 1980.
3 Dickinson RL, Beam L. A thousand marriages: A medical study of sex adjustment. Baltimore: Williams and Wilkins; 1932.
4 Dickinson RL, Beam L. The single woman: A medical study in sex education. Baltimore: Williams and Wilkins; 1934.
5 Kinsey AC, Pomeroy WB, Martin CE, Gebhard PH. Sexual behavior in the human female. Philadelphia: W.B. Saunders; 1953.
6 Tone A. Devices and desires: A history of contraceptives in America. New York: Hill and Wang; 2001.
7 Stein A. Sex and sensibility: Stories of a lesbian generation. Berkeley: University of California Press; 1997.
8 Laumann E, Gagnon JH, Michael RT, Michaels S. The social organization of sexuality: Sexual practices in the United States. Chicago: University of Chicago Press; 1994.
9 Laumann EO, Michael RT, Gagnon JH. A political history of the national sex survey of adults. Fam Plann Perspect 1994;26:34–8.
10 Remez L. Oral sex among adolescents: is it sex or is it abstinence? Fam Plann Perspect 2000;32:298–304.
11 Sanders SA, Reinisch JM. Would you say you "had sex" if . . . ? JAMA 1999;281:275–7.
12 Sanders SA, Hill B, Yarber WL, Graham CA, Crosby R, Milhausen RR. Misclassification bias: Diversity in conceptualizations about having "had sex". Sex Health 2010;7:31–4.
13 Herek G. Legal recognition of same-sex relationships in the United States. Am Psychol 2006;61:607–21.
14 McBride KR, Fortenberry JD. Heterosexual anal sexuality and anal sex behaviors: a review. J Sex Res 2010;47:123–36.
15 McFarlane M, Bull SS, Rietmeijer CA. The Internet as a newly emerging risk environment for sexually transmitted diseases. JAMA 2000;284:443–6.
16 Toomey K, Rothenberg R. Sex and cyberspace—Virtual networks leading to high risk sex. JAMA 2000;284:485–7.
17 Siegel K, Lekas HM. AIDS as a chronic illness: psychosocial implications. AIDS 2002;16(suppl 4):S69–76.
18 Charo AR. Politics, parents, and prophylaxis—Mandating HPV vaccination in the United States. JAMA 2007;356: 1905–8.
19 Vail-Smith K, White DM. Risk level, knowledge, and preventive behavior for human papillomaviruses among sexually active college women. J Am Coll Health 1992;40:227–30.
20 Lindau ST, Schumm LP, Laumann EO, Levinson W, O'Muircheartaigh CA, Waite LJ. A study of sexuality and health among older adults in the United States. N Engl J Med 2007;357:762.
21 Laumann EO, Paik A, Rosen AC. Sexual dysfunction in the United States: prevalence and predictors. JAMA 1999;281: 537–44.
22 Laumann EO, Das A, Waite LJ. Sexual dysfunction among older adults: prevalence and risk factors from a nationally representative U.S. probability sample of men and women 57–85 years of age. J Sex Med 2008;5:2300–11.

23 Bancroft J, Loftus J, Long JS. Distress about sex: a national survey of women in heterosexual relationships. Arch Sex Behav 2003;32:193–209.
24 Hayes RD, Bennett CM, Fairley CK, Dennerstein L. What can prevalence studies tell us about female sexual difficulty and dysfunction? J Sex Med 2006;3:589–95.
25 Current Population Survey December 2008. U.S. Census Bureau. 1994 – [cited June 9, 2010]. Available from: http://www.bls.census.gov/ferretftp.htm.
26 Validity of the survey of health and internet and knowledge network's panel and sampling. Stanford, CA: Stanford University; 2003.
27 Baker L, Wagner TH, Singer S, Bundorf MK. Use of the Internet and e-mail for health care information: Results from a national survey. JAMA 2003;289:2400–6.
28 Heiss F, McFadden D, Winter J. Who failed to enroll in Medicare Part D, and why? Early results. Health Aff (Millwood) 2006;25:344–54.
29 Holman EA, Silver RC, Poulin M, Andersen J, Gil-Rivas V, McIntosh DN. Terrorism, acute stress, and cardiovascular health: A 3-year national study following the September 11th attacks. Arch Gen Psychiatry 2008;65:73–80.
30 Silver RC, Holman EA, McIntosh DN, Poulin M, Gil-Rivas V. Nationwide longitudinal study of psychological responses to September 11. JAMA 2002;288:1235.
31 Herbenick D, Reece M, Sanders SA, Dodge B, Ghassemi A, Fortenberry JD. Prevalence and characteristics of vibrator use by women in the United States: Results from a nationally representative study. J Sex Med 2009;6:1857–66.
32 Reece M, Herbenick D, Sanders SA, Dodge B, Ghassemi A, Fortenberry JD. Prevalence and characteristics of vibrator use by men in the United States. J Sex Med 2009;6:1867–74.
33 DeSalvo KB, Bloser N, Reynolds K, He J, Muntner P. Mortality prediction with a single general self-rated health question: a meta-analysis. J Gen Intern Med 2005;20:267–75.
34 Idler EL, Benyamini Y. Self-rated health and mortality: a review of twenty-seven community studies. J Health Soc Behav 1997;38:21–37.
35 Turner CF, Miller HG, Rogers SM. Survey measurement of sexual behaviors: Problems and progress. In: Bancroft J, ed. Researching sexual behavior. Bloomington: Indiana University; 1997:37–60.
36 Herbenick D, Reece M, Sanders SA, Dodge B, Ghassemi A, Fortenberry JD. Women's vibrator use in sexual partnerships: Results from a nationally representative survey in the United States. J Sex Marital Ther 2010;36:49–65.

Sexual Behaviors, Relationships, and Perceived Health Among Adult Men in the United States: Results from a National Probability Sample

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ABSTRACT

Introduction. To provide a foundation for those who provide sexual health services and programs to men in the United States, the need for population-based data that describes men's sexual behaviors and their correlates remains.

Aims. The purpose of this study was to, in a national probability survey of men ages 18–94 years, assess the occurrence and frequency of sexual behaviors and their associations with relationship status and health status.

Methods. A national probability sample of 2,522 men aged 18 to 94 completed a cross-sectional survey about their sexual behaviors, relationship status, and health.

Main Outcome Measures. Relationship status; health status; experience of solo masturbation, partnered masturbation, giving oral sex, receiving oral sex, vaginal intercourse and anal intercourse, in the past 90 days; frequency of solo masturbation, vaginal intercourse and anal intercourse in the past year.

Results. Masturbation, oral intercourse, and vaginal intercourse are prevalent among men throughout most of their adult life, with both occurrence and frequency varying with age and as functions of relationship type and physical health status. Masturbation is prevalent and frequent across various stages of life and for both those with and without a relational partner, with fewer men with fair to poor health reporting recent masturbation. Patterns of giving oral sex to a female partner were similar to those for receiving oral sex. Vaginal intercourse in the past 90 days was more prevalent among men in their late 20s and 30s than in the other age groups, although being reported by approximately 50% of men in the sixth and seventh decades of life. Anal intercourse and sexual interactions with other men were less common than all other sexual behaviors.

Conclusion. Contemporary men in the United States engage in diverse solo and partnered sexual activities; however, sexual behavior is less common and more infrequent among older age cohorts. **Reece M, Herbenick D, Schick V, Sanders SA, Dodge B, and Fortenberry JD. Sexual behaviors, relationships, and perceived health among adult men in the United States: Results from a national probability sample. J Sex Med 2010;7(suppl 5):291–304.**

Key Words. Probability Sample; Sexual Behavior; Men; Relationships; Health

Introduction

In 1948, Alfred Kinsey and his team published data from what was the first large-scale and systematic study of sexual behavior among men in the United States [1]. At the time, little was known about what men (and women) did sexually. Kinsey wrote that he, as a biology professor at Indiana University, felt unable to answer—from a scientific perspective—the questions that his students asked about sexual behavior. As a result, Dr. Kinsey began contacting individuals through various social networks and began interviewing what would eventually be thousands of men and women. Kinsey described his work as "a fact-finding survey in which an attempt is being made to discover what people do sexually, and what factors account for differences in sexual behavior among individuals

and among various segments of the population." [1]

For decades, data from Kinsey's interviews with men, which were conducted in the 1930s and 1940s, represented much of what was known about male sexual behavior. It was not until the realities of the epidemics of the human immunodeficiency virus (HIV) and acquired immune deficiency syndrome (AIDS) revealed how little was known about sexual behavior and condom use in the United States that the first nationally representative probability survey of sex and sexuality-related behavior was conducted in 1992 [2,3]. Since 1992, there has only been one other probability sample of adult sexual behavior, conducted in 2004 among adults aged 57 to 84 years [4].

Some data on sexuality and sexuality-related behaviors (e.g., condom use) are available through a range of other national studies focused specifically on health (e.g., General Social Survey, National Household Survey of Drug Abuse, National Survey of Family Growth, Youth Risk Behavior Surveillance Survey, The National Longitudinal Study of Adolescent Health [Add Health]) [5–19]. Also, to facilitate the design of sexual health interventions responsive to the needs of unique populations, data have been available from numerous studies that were focused on specific subpopulations selected for their age, gender, sexual orientation, health status, sexual behaviors or sexual risk, or other sociodemographic characteristics (e.g., [20–30]). Although valuable, most of these studies have been conducted in response to sexual health problems such as unintended pregnancy and sexually-transmitted infections including HIV.

Among the many important influences on male sexual behavior since 1992 was the introduction of the first phosphodiesterase type 5 inhibitor (Sildenafil citrate) in 1998; an innovation that changed sexual behaviors in two important ways [4]. Perhaps most importantly, it made sexual intercourse possible for many men who had previously been unable to reliably attain or maintain an erection. Second, it inspired public, corporate, and scientific interest in the sexual lives of men, particularly those who were older and who had been scientifically understudied.

To provide a contemporary foundation for those who provide medical and public health services and programs to men in the United States, there remains a need for a comprehensive assessment of men's sexual behaviors and their correlates.

Aim

The purpose of this study, the National Survey of Sexual Health and Behavior (NSSHB), and in particular those analyses presented in this report, was to document the sexual behavior patterns of adult men (age over 18 years) in the United States and to assess the extent to which their sexual behaviors varied by the characteristics of their relationships and health status.

Methods

During March–May 2009, the NSSHB data were collected using a population-based cross-sectional survey of adolescents and adults in the United States via research panels of Knowledge Networks (Menlo Park, CA, USA). Research panels accessed through Knowledge Networks are based on a national probability sample established using both random digit dialing and an address-based sampling (ABS) frame. ABS involves the probability sampling of a frame of residential addresses in the United States derived from the U.S. Postal Service's Delivery Sequence File, a system that contains detailed information on every mail deliverable address in the United States. Collectively, the sampling frame from which participants are recruited covers approximately 98% of all U.S. households. Randomly selected addresses are recruited to the research panel through a series of mailings and subsequently by telephone follow-ups to nonresponders when possible. To further correct sources of sampling and non-sampling error, study samples are corrected with a post-stratification adjustment using demographic distributions from the most recent data available from the Current Population Survey, the monthly population survey conducted by the U.S. Bureau of the Census considered to be the standard for measuring demographic and other trends in the United States. These adjustments result in a panel base weight that was employed in a probability proportional to size (PPS) selection method for establishing the samples for this study. Population specific distributions for this study were based upon the December 2008 Current Population Survey [31].

Once the sample frame was established, all individuals within that frame received a recruitment message from Knowledge Networks that provided a brief description of the NSSHB and invited them to participate. Of 6,182 adults reviewing the study description, 5,045 (82%) consented to and partici-

pated. The data presented in this report are limited to the 2,522 adult men surveyed in the NSSHB.

All data were collected by Knowledge Networks via the Internet; participants in a given Knowledge Networks panel were provided with access to the Internet and hardware if needed. Researchers have used Knowledge Networks for multiple health-related studies, substantiating the validity of such methods for obtaining data from nationally representative samples of the U.S. population [32–38].

Main Outcome Measures

Sexual Behaviors

To assess sexual behaviors, participants were asked to describe the extent to which they had participated in a range of solo and partnered sexual behaviors during specific time periods (within the past month, within the past 3 months, within the past year, more than 1 year ago). To ensure the ability for comparison of behavioral patterns from this study with those provided in previous research, valid measures used in other nationally representative studies of specific sexual behaviors served as the foundation for behavioral measures used in this study [2–4,37,38]. Behaviors assessed included solo masturbation, partnered masturbation, receiving oral sex and giving oral sex (with measures specific to the gender of the participating partner for each behavior), vaginal intercourse, and anal intercourse (both insertive and receptive). This article includes summaries of sexual behaviors that occurred within the past 90 days. Men who reported having participated in a specific sexual behavior (masturbation, vaginal intercourse, anal intercourse) within the past year were subsequently asked to describe the frequency with which they had participated in that behavior on average during the past year (a few times per year, monthly, a few times per month, weekly, two to three times per week, four or more times per week).

Health Status

Health status was assessed by a single item that asked participants to rate their overall health through a single 5-response item (excellent, very good, good, fair, poor) that has been used across multiple studies of this nature [39,40].

Relationship Status

Participants were asked to describe their current relationship status (married, living with partner but not married, in a relationship but not living together, single but dating one or more people, or single, and not dating).

Data Analyses

During analyses, post-stratification data weights were used to reduce variance and minimize bias caused by nonsampling error in order to maximize the generalizablity of the sample characteristics to the population. Distributions for age, race, gender, Hispanic ethnicity, education, and U.S. census region were used in post-stratification adjustments. Rates of participation in sexual behaviors within the past 90 days, and frequency of participation in specific behaviors on average during the past year, with corresponding 95% confidence intervals were calculated using Adjusted Wald's methods, and are presented by relationship and health status, stratified by age. Relations between sexual behaviors, relationships, and health status were tested using a logistic regression model.

Results

Participant Characteristics

The sociodemographic, relationship, and health characteristics of participants are summarized in Table 1. These characteristics closely match those of men in the United States at the time study data were collected based upon population characteristics established by updates to the U.S. Census from the December 2008 Current Population Survey [31].

Masturbation

The rates for both solo and partnered masturbation by men are detailed by age according to relationship and health status in Table 2. Masturbation was a significant component of the sexual repertoire for men across all age groups, with rates of solo masturbation in the past 90 days being consistently above 60% among men through age 59 years, and with rates at approximately 50% through age 69. Masturbation rates were highest among those in the 25–39 year age groups, peaking at 95.5% of men who described themselves as single and dating and being above 80% for all unmarried men in this age category. The lowest rate of masturbation was observed among married men over 70 years of age (26.89%). Within the majority of age groups, partnered men were less likely to report masturbation than non-

Table 1 Weighted participant characteristics for total men's sample (N = 2,522)

Sample characteristics	%	N
Age (years)		
18–24	11.0	277
25–29	13.5	341
30–39	16.2	410
40–49	20.7	522
50–59	18.5	455
60–69	12.8	322
>70	7.3	184
Ethnicity		
White, non-Hispanic	58.8	1,735
Black, non-Hispanic	9.9	250
Hispanic	14.9	375
Other, non-Hispanic	6.4	161
Education		
Bachelors degree or higher	29.2	737
Some college	27.2	685
High school graduate	30.0	757
Less than high school	13.6	342
Sexual orientation (N = 2,521)		
Heterosexual	92.2	2,335
Bisexual	2.6	66
Homosexual	4.2	105
Other	1.0	25
Marital status		
Married	47.8	1,205
Never married	28.1	709
Divorced	11.0	278
Living together-not married	9.0	227
Separated	2.0	50
Widowed	2.1	53
Relationship status (N = 2,517)		
Single, not dating	23.2	584
Single, dating one or more person	9.0	227
In relationship, not living together	8.6	216
In relationship, living together	10.0	252
Married, living together	48.2	1,214
Married, not living together	0.9	23
Geographic region of United States		
Northeast	18.1	458
Midwest	21.9	552
South	36.5	922
West	23.4	591
MSA status		
Metropolitan area	83.4	2,105
Non-metropolitan area	16.6	418
Annual household income		
Less than $25,000	20.1	506
$25,000–$49,999	29.6	745
$50,000–$74,999	20.7	522
Over $75,000	29.7	749
Children under 18 in household		
No	74.5	1,878
Yes	25.5	644
Health status (N = 2,521)		
Excellent	14.1	355
Very good	41.0	1,034
Good	32.9	830
Fair	9.3	236
Poor	2.6	66

partnered men, however among partnered men rates of masturbation were close to or exceeded 60% (58.62–73.56%) through age 59 years, after which partnered men were less likely to report masturbation. Health status was not predictive of masturbation in the past 90 days with the exception of those over age 70 years for whom poor to fair health status was associated with lower rates of masturbation (17.65%) than for those with good to excellent health status (40.0%).

Masturbation with a sexual partner during the past 90 days was less common than solo masturbation across all age groups, with rates being consistently below 50% for all men. Partnered masturbation was more likely to be reported by partnered men than non-partnered men through age 69 years, with rates being lowest across all age groups among men who described themselves as single. Health status was not predictive of masturbation with a sexual partner, with the exception of men in the 60–69 year age category, for whom those with poor to fair health status reported more partnered masturbation (19.4%) than did those with good to excellent health status (11.1%).

Oral Sex

Rates for oral sex with female partners in the past 90 days (both giving to female partners and receiving from female partners) are presented in Table 3. Among all men, rates of receiving oral sex from a female partner were highest among men in their late 20s and 30s, and within those age groups highest among men who had a non-cohabitating relationship partner (80.7%). Those with the lowest rate of receiving oral sex were men over age 70 years who were not married but living with a partner (0.0%). Receiving oral sex was generally more common among men in their late 20s through their 40s than among younger and older men. Being partnered was predictive of having received oral sex in the past 90 days for all men through age 69 years.

The patterns of giving oral sex to a female partner were similar to those observed for receiving oral sex, with partnered men more likely to have reported giving oral sex than non-partnered men across all ages through 69 years and being generally higher across all relationship categories for men in their late 20s through 40s.

Vaginal Intercourse

Table 4 provides a summary of reported rates of vaginal intercourse, indicating, as with other sexual behaviors, that vaginal intercourse in the past 90 days was more prevalent among men in their late 20s and 30s than in the other age groups, although being reported by approximately 50% of men in the sixth and seventh decades of life.

Table 2 Men' weighted masturbation rates by relationship and health status, stratified by age

		Relationship status								Health Status		
	Total sample	Single	Single and dating	In relationship, not living together	Living together, not married	Married	Not partnered	Partnered	Partnered vs. not partnered†	Excellent to good	Fair to poor	Excellent to good vs fair to poor††
Age	% Engaged (Total N) (95% CI)	% Engaged in behavior past 90 days (Total N) (95% CI)					% Engaged in behavior past 90 days (N) (95% CI)		Adjusted odds ratio (95% CI)	% Engaged in behavior past 90 days (N) (95% CI)		Adjusted odds ratio (95% CI)
Masturbation alone												
18–24	66.5% (268)	80.2% (96)	58.7% (46)	67.1% (70)	56.3% (32)	41.7% (24)	77.2% (142)	59.5% (126)	0.52**	62.6% (257)	40.0% (10)	2.55
	(60.6%–71.9%)	(71.1%–87.0%)	(44.3%–71.7%)	(55.5%–77.0%)	(39.3%–71.8%)	(24.4%–61.2%)	(69.6%–83.4%)	(50.8%–67.7%)	(0.31–0.87)	(56.5%–68.3%)	(16.7%–68.8%)	(0.69–9.34)
25–29	77.0% (335)	84.4% (45)	96.6% (29)	87.5% (16)	84.8% (33)	70.8% (212)	89.2% (74)	73.6% (261)	0.39*	76.3% (321)	100.0% (13)	0.19
	(72.2%–81.2%)	(70.9%–92.6%)	(81.4%–100.8%)	(62.7%–97.8%)	(68.6%–93.8%)	(64.3%–76.5%)	(79.8%–94.7%)	(67.9%–78.6%)	(0.18–0.85)	(71.4%–80.7%)	(73.4%–103.8%)	(0.01–3.91)
30–39	71.1% (396)	77.4% (53)	75.7% (37)	87.5% (24)	64.7% (51)	68.8% (231)	76.7% (90)	69.6% (306)	0.74	70.5% (380)	81.3% (16)	0.53
	(66.4%–75.3%)	(64.3%–86.7%)	(59.7%–86.8%)	(68.2%–96.5%)	(50.9%–76.4%)	(62.6%–74.5%)	(66.9%–84.3%)	(64.2%–74.5%)	(0.43–1.27)	(65.8%–74.9%)	(56.2%–94.2%)	(0.13–2.07)
40–49	65.9% (499)	75.0% (116)	76.8% (56)	60.6% (33)	58.5% (53)	61.4% (241)	75.6% (172)	60.9% (327)	0.51**	64.8% (437)	72.6% (62)	0.81
	(61.6%–69.9%)	(66.4%–82.0%)	(64.1%–86.0%)	(43.6%–75.4%)	(45.1%–70.8%)	(55.1%–67.3%)	(68.6%–81.4%)	(55.5%–66.0%)	(0.34–0.78)	(60.2%–69.1%)	(60.3%–82.2%)	(0.44–1.49)
50–59	64.1% (454)	70.1% (154)	76.3% (38)	68.8% (32)	54.9% (51)	57.9% (178)	71.4% (192)	58.6% (261)	0.52**	65.2% (359)	59.1% (93)	1.54
	(59.6%–68.4%)	(62.5%–76.8%)	(60.6%–87.2%)	(51.3%–82.2%)	(41.4%–67.7%)	(50.5%–64.9%)	(64.6%–77.3%)	(52.6%–64.4%)	(0.35–0.79)	(60.1%–69.9%)	(49.0%–68.6%)	(0.94–2.50)
60–69	49.8% (317)	62.0% (71)	30.0% (10)	52.0% (25)	31.6% (19)	47.9% (192)	58.0% (81)	47.0% (236)	0.63	50.8% (248)	47.1% (70)	1.26
	–(2.9%–84.9%)	(50.3%–72.4%)	(10.3%–60.8%)	(33.5%–70.0%)	(15.2%–54.2%)	(41.0%–55.0%)	(47.1%–68.2%)	(40.8%–53.4%)	(0.38–1.06)	(44.6%–57.0%)	(35.9%–58.7%)	(0.74–2.17)
70+	35.8% (179)	48.5% (33)	57.1% (7)	64.3% (14)	40.0% (5)	26.9% (119)	50.0% (40)	31.2% (138)	0.450*	40.0% (145)	17.6% (34)	2.92*
	(29.1%–43.1%)	(32.5%–64.8%)	(25.0%–84.2%)	(38.6%–83.8%)	(11.6%–77.1%)	(19.7%–35.5%)	(35.2%–64.8%)	(24.0%–39.3%)	(0.22–0.93)	(32.4%–48.1%)	(8.0%–33.9%)	(1.15–7.38)
Partnered masturbation												
18–24	25.6% (262)	10.0% (90)	28.3% (46)	39.1% (69)	30.3% (33)	33.3% (24)	16.2% (136)	35.7% (126)	2.82***	25.3% (253)	40.0% (10)	0.63
	(20.7%–31.2%)	(5.1%–18.1%)	(17.2%–42.7%)	(28.5%–50.9%)	(17.2%–47.5%)	(17.8%–53.4%)	(10.9%–23.3%)	(27.9%–44.4%)	(1.57–5.04)	(20.3%–31.0%)	(16.7%–68.8%)	(0.16–2.46)
25–29	30.3% (335)	4.3% (46)	20.7% (29)	43.8% (16)	42.4% (33)	34.4% (212)	10.7% (75)	36.0% (261)	5.64***	30.3% (323)	30.8% (13)	0.37
	(25.6%–35.4%)	(0.4%–15.3%)	(9.5%–38.7%)	(23.1%–66.8%)	(27.2%–59.2%)	(28.4%–41.1%)	(5.3%–19.9%)	(30.4%–42.0%)	(2.41–13.18)	(25.6%–35.6%)	(12.4%–58.0%)	(0.09–1.50)
30–39	32.5% (398)	1.9% (53)	43.2% (37)	34.6% (26)	32.7% (52)	37.1% (229)	18.9% (90)	36.2% (307)	2.36**	32.7% (382)	31.3% (16)	0.86
	(28.1%–37.3%)	–(0.6%–10.9%)	(28.7%–59.1%)	(19.3%–53.9%)	(21.5%–46.3%)	(31.1%–43.5%)	(12.0%–28.3%)	(31.0%–41.7%)	(1.33–4.20)	(28.2%–37.6%)	(13.9%–55.9%)	(0.28–2.71)
40–49	26.2% (499)	10.3% (116)	23.2% (56)	35.3% (34)	40.7% (54)	30.0% (240)	14.5% (172)	32.3% (328)	2.73***	27.2% (437)	19.4% (62)	1.18
	(22.5%–30.2%)	(5.9%–17.4%)	(14.0%–35.9%)	(21.4%–52.2%)	(28.7%–54.0%)	(24.5%–36.1%)	(10.0%–20.6%)	(27.5%–37.6%)	(1.67–4.45)	(23.3%–31.6%)	(11.3%–31.0%)	(0.60–2.35)
50–59	20.0% (452)	9.7% (154)	42.1% (38)	33.3% (33)	29.4% (51)	19.1% (178)	16.1% (192)	22.9% (262)	1.65*	19.0% (357)	22.6% (93)	0.68
	(16.6%–23.9%)	(5.9%–15.5%)	(27.8%–57.8%)	(19.7%–50.5%)	(18.6%–43.1%)	(14.0%–25.5%)	(11.6%–22.0%)	(18.2%–28.4%)	(1.00–2.72)	(15.3%–23.5%)	(15.2%–32.1%)	(0.39–1.20)
60–69	13.0% (311)	2.9% (70)	30.0% (10)	4.0% (25)	15.8% (19)	17.0% (188)	6.3% (80)	15.5% (232)	3.35*	11.1% (243)	19.4% (67)	0.43*
	(9.7%–17.2%)	(0.2%–10.4%)	(10.3%–60.8%)	–(0.9%–21.1%)	(4.7%–38.4%)	(12.3%–23.1%)	(2.4%–14.1%)	(11.4%–20.8%)	(1.21–9.28)	(7.7%–15.7%)	(11.6%–30.6%)	(0.21–0.89)
70+	7.6% (171)	0.0% (30)	0.0% (7)	11.1% (9)	20.0% (5)	8.4% (119)	0.0% (37)	9.0% (133)	4.93	8.0% (137)	5.9% (34)	1.07
	(4.4%–12.7%)	–(2.1%–13.5%)	–(5.0%–40.4%)	–(0.2%–45.7%)	(2.0%–64.0%)	(4.5%–14.9%)	–(1.8%–11.2%)	(5.1%–15.2%)	(0.46–53.06)	(4.4%–13.9%)	(0.7%–20.1%)	(0.25–4.57)

*$P < 0.05$, **$P < 0.01$, ***$P < 0.001$.
†Adjusted odds ratios are based on a logistic regression including the health status as a covariate, estimated separately by age group.
††Adjusted odds ratios are based on a logistic regression including the partner status as a covariate, estimated separately by age group.
CI = confidence interval.

Table 3 Men's weighted oral sex (with female partner) rates by relationship and health status, stratified by age

		Relationship Status								Health Status		
	Total sample	Single	Single and dating	In relationship, not living together	Living together, not married	Married	Not partnered	Partnered	Partnered vs. not partnered†	Excellent to good	Fair to poor	Excellent to good vs fair to poor††
Age	% Engaged (Total N) (95% CI)	% Engaged in behavior past 90 days (Total N) (95% CI)					% Engaged in behavior past 90 days (N) (95% CI)		Adjusted odds ratio (95% CI)	% Engaged in behavior past 90 days (N) (95% CI)		Adjusted odds ratio (95% CI)
Received oral from female												
18–24	43.6% (265)	19.4% (93)	41.3% (46)	58.6% (70)	71.9% (32)	58.3% (24)	18.1% (139)	61.9% (126)	4.53***	44.07% (255)	60.00% (10)	0.61
	(37.8%–49.6%)	(12.5%–28.6%)	(28.3%–55.7%)	(46.9%–69.4%)	(54.5%–84.6%)	(38.8%–75.6%)	(12.6%–25.4%)	(53.2%–69.9%)	(2.69–7.64)	(38.11%–50.21%)	(31.16%–83.29%)	(0.15–2.42)
25–29	63.6% (332)	23.9% (46)	64.3% (28)	68.8% (16)	67.6% (34)	71.2% (208)	39.2% (74)	70.5% (258)	3.12***	65.63% (320)	7.69% (13)	12.42**
	(58.3%–68.6%)	(13.8%–30.1%)	(45.8%–79.4%)	(44.1%–86.1%)	(50.7%–81.0%)	(64.6%–76.9%)	(28.9%–50.6%)	(64.7%–75.8%)	(1.79–5.45)	(60.26%–70.62%)	–(0.74%–35.43%)	(1.66–92.82)
30–39	63.6% (398)	17.0% (53)	78.4% (37)	80.8% (26)	68.0% (50)	69.6% (230)	42.2% (90)	70.3% (306)	3.17***	64.23% (383)	46.67% (15)	1.48
	(58.8%–68.2%)	(9.0%–29.5%)	(62.6%–88.9%)	(61.7%–92.0%)	(54.1%–79.3%)	(63.3%–75.2%)	(32.5%–52.5%)	(64.9%–75.1%)	(1.94–5.16)	(59.31%–68.87%)	(24.80%–69.89%)	(0.51–4.31)
40–49	49.7% (501)	18.1% (116)	58.9% (56)	51.5% (33)	64.2% (53)	59.1% (242)	31.4% (172)	59.1% (328)	3.15***	51.03% (439)	41.94% (62)	1.09
	(45.3%–54.1%)	(12.1%–26.2%)	(45.9%–70.8%)	(35.2%–67.5%)	(50.7%–75.7%)	(52.8%–65.1%)	(24.9%–38.7%)	(53.7%–64.3%)	(2.12–4.69)	(46.36%–55.67%)	(30.47%–54.34%)	(0.62–1.94)
50–59	35.6% (454)	15.0% (153)	52.6% (38)	60.6% (33)	31.4% (51)	46.1% (180)	22.5% (191)	45.1% (264)	2.81***	36.77% (359)	30.85% (94)	1.01
	(31.3%–40.1%)	(10.2%–21.6%)	(37.3%–67.5%)	(43.6%–75.4%)	(20.3%–45.1%)	(39.0%–53.4%)	(17.1%–29.0%)	(39.2%–51.1%)	(1.83–4.30)	(31.94%–41.87%)	(22.39%–40.82%)	(0.61–1.69)
60–69	24.1% (312)	10.0% (70)	11.1% (9)	20.0% (25)	52.6% (19)	27.0% (189)	10.1% (79)	28.3% (233)	3.42**	23.08% (247)	28.36% (67)	0.65
	(19.7%–29.2%)	(4.6%–19.5%)	–(0.2%–45.7%)	(8.4%–39.6%)	(31.7%–72.7%)	(21.1%–33.7%)	(5.0%–19.0%)	(22.9%–34.4%)	(1.59–7.35)	(18.24%–28.74%)	(18.91%–40.15%)	(0.34–1.22)
70+	15.4% (177)	3.3% (30)	42.9% (7)	57.1% (14)	0.0% (5)	12.4% (121)	10.8% (37)	16.4% (140)	1.65	18.06% (144)	5.71% (35)	4.76
	(10.8%–21.5%)	–(0.8%–18.1%)	(15.8%–75.0%)	(32.5%–78.7%)	–(5.5%–48.9%)	(7.5%–19.6%)	(3.7%–25.3%)	(11.1%–23.5%)	(0.53–5.19)	(12.58%–25.19%)	(0.62%–19.57%)	(0.88–25.72)
Gave oral to female												
18–24	37.2% (265)	15.1% (93)	44.7% (47)	57.1% (70)	50.0% (32)	33.3% (24)	25.0% (140)	50.8% (126)	3.17***	37.80% (254)	20.00% (10)	2.75
	(31.6%–43.2%)	(9.1%–23.8%)	(31.4%–58.8%)	(45.5%–68.1%)	(33.6%–66.4%)	(17.8%–53.4%)	(18.5%–32.8%)	(42.2%–59.4%)	(1.88–5.34)	(32.05%–43.90%)	(4.59%–52.06%)	(0.56–13.62)
25–29	59.7% (332)	19.6% (46)	60.7% (28)	37.5% (16)	54.5% (33)	70.7% (208)	35.1% (74)	66.5% (257)	3.22***	61.13% (319)	23.08% (13)	3.22
	(54.3%–64.8%)	(10.4%–33.4%)	(42.4%–76.5%)	(18.4%–61.5%)	(38.0%–70.2%)	(64.1%–76.5%)	(25.2%–46.5%)	(60.6%–72.0%)	(1.85–5.60)	(55.68%–66.32%)	(7.50%–50.94%)	(0.79–13.16)
30–39	56.8% (399)	13.2% (53)	69.4% (36)	53.8% (26)	61.5% (52)	64.1% (231)	36.0% (89)	62.8% (309)	2.77–	58.07% (384)	25.00% (16)	3.37*
	(51.9%–61.6%)	(6.2%–25.2%)	(53.0%–82.1%)	(35.5%–71.3%)	(47.9%–73.6%)	(57.7%–70.0%)	(26.7%–46.3%)	(57.3%–68.0%)	(1.69–4.52)	(53.08%–62.91%)	(9.71%–49.97%)	(1.00–11.38)
40–49	45.7% (500)	15.5% (116)	44.6% (56)	57.6% (33)	66.0% (53)	54.1% (242)	25.0% (172)	56.4% (328)	3.92***	46.80% (438)	37.10% (62)	0.97
	(41.4%–50.1%)	(10.0%–23.3%)	(32.4%–57.6%)	(40.8%–72.8%)	(52.6%–77.4%)	(47.8%–60.3%)	(19.1%–32.0%)	(51.0%–61.7%)	(2.58–5.94)	(42.18%–51.48%)	(26.13%–49.57%)	(0.54–1.75)
50–59	31.6% (453)	9.8% (153)	44.7% (38)	53.1% (32)	35.3% (51)	42.5% (179)	16.8% (191)	42.4% (262)	3.93***	31.56% (358)	31.91% (94)	0.67
	(27.5%–36.0%)	(5.9%–15.6%)	(30.1%–60.3%)	(36.4%–69.1%)	(23.6%–49.1%)	(35.4%–49.8%)	(12.1%–22.7%)	(36.5%–48.4%)	(2.46–6.30)	(26.96%–36.56%)	(23.33%–41.92%)	(0.39–1.14)
60–69	21.0% (309)	7.4% (68)	22.2% (9)	16.0% (25)	47.4% (19)	23.5% (187)	9.1% (77)	24.7% (231)	3.02**	22.86% (245)	15.38% (65)	1.47
	(16.8%–25.9%)	(2.8%–16.5%)	(5.3%–55.7%)	(5.8%–35.3%)	(27.3%–68.3%)	(18.0%–30.1%)	(4.2%–17.9%)	(19.5%–30.6%)	(1.34–6.82)	(18.03%–28.53%)	(8.38%–26.25%)	(0.69–3.12)
70+	17.8% (177)	0.0% (30)	28.6% (7)	85.7% (14)	20.0% (5)	13.2% (121)	5.4% (37)	20.7% (140)	3.65	20.28% (143)	5.88% (34)	3.92
	(12.8%–24.1%)	–(2.1%–13.5%)	(7.6%–64.8%)	(58.8%–97.2%)	(2.0%–64.0%)	(8.2%–20.5%)	(0.6%–18.6%)	(14.8%–28.2%)	(0.94–14.21)	(14.46%–27.65%)	(0.65%–20.07%)	(0.92–16.76)

*$P < 0.05$, **$P < 0.01$, ***$P < 0.001$.
†Adjusted odds ratios are based on a logistic regression including the health status as a covariate, estimated separately by age group.
††Adjusted odds ratios are based on a logistic regression including the partner status as a covariate, estimated separately by age group.
CI = confidence interval.

Table 4 Men's weighted intercourse rates by relationship and health status, stratified by age

		Relationship status								Health status		
	Total sample	Single	Single and dating	In relationship, not living together	Living together, not married	Married	Not partnered	Partnered	Partnered vs. not partnered†	Excellent to good	Fair to poor	Excellent to good vs fair to poor††
Age	% Engaged (Total N) (95% CI)	% Engaged in behavior past 90 days (Total N) (95% CI)					% Engaged in behavior past 90 days (N) (95% CI)		Adjusted odds ratio (95% CI)	% Engaged in behavior past 90 days (N) (95% CI)		Adjusted odds ratio (95% CI)
Vaginal												
18–24	53.5% (268)	24.0% (96)	60.9% (46)	65.7% (70)	72.7% (33)	95.8% (24)	23.2% (142)	73.2% (127)	5.01***	51.62% (257)	70.00% (10)	0.56
	(47.5%–59.4%)	(16.5%–33.4%)	(46.4%–73.6%)	(54.0%–75.8%)	(55.6%–85.1%)	(78.1%–100.9%)	(17.0%–30.8%)	(64.9%–80.2%)	(2.96–8.46)	(45.53%–57.66%)	(39.23%–89.67%)	(0.13–2.39)
25–29	79.8% (327)	23.9% (46)	59.3% (27)	86.7% (15)	72.7% (33)	95.7% (207)	37.0% (73)	92.2% (255)	18.99***	81.53% (314)	38.46% (13)	1.76
	(75.1%–83.8%)	(13.8%–38.1%)	(40.7%–75.5%)	(60.9%–97.5%)	(55.6%–85.1%)	(91.8%–97.8%)	(26.8%–48.5%)	(88.1%–94.9%)	(9.68–37.28)	(76.85%–85.45%)	(17.60%–64.59%)	(0.44–7.00)
30–39	78.7% (394)	18.9% (53)	75.7% (37)	84.6% (26)	80.8% (52)	91.6% (226)	42.2% (90)	89.1% (304)	11.13***	79.68% (379)	56.25% (16)	1.55
	(74.4%–82.5%)	(10.4%–31.6%)	(59.7%–86.8%)	(65.9%–94.5%)	(67.9%–89.4%)	(87.2%–94.6%)	(32.5%–52.5%)	(85.1%–92.2%)	(6.36–19.47)	(75.33%–83.44%)	(33.15%–76.93%)	(0.46–5.23)
40–49	67.1% (504)	23.5% (115)	61.4% (57)	60.6% (33)	74.1% (54)	88.1% (244)	36.0% (172)	83.1% (331)	8.62***	69.00% (442)	53.23% (62)	1.11
	(62.9%–71.1%)	(16.6%–32.1%)	(48.4%–73.0%)	(43.6%–75.4%)	(61.0%–84.0%)	(83.4%–91.6%)	(29.2%–43.5%)	(78.7%–86.8%)	(5.60–13.26)	(64.54%–73.14%)	(40.98%–65.09%)	(0.60–2.06)
50–59	52.1% (458)	13.7% (153)	63.2% (38)	75.8% (33)	59.3% (54)	75.7% (181)	23.6% (191)	72.4% (268)	8.43***	54.82% (363)	42.11% (95)	0.97
	(47.5%–56.6%)	(9.1%–20.1%)	(47.2%–76.7%)	(58.7%–87.4%)	(46.0%–71.3%)	(68.9%–81.4%)	(18.1%–30.1%)	(66.7%–77.4%)	(5.43–13.08)	(49.68%–59.86%)	(32.67%–52.16%)	(0.57–1.66)
60–69	46.7% (314)	7.0% (71)	33.3% (9)	80.0% (25)	63.2% (19)	56.1% (189)	10.0% (80)	59.2% (233)	12.46***	52.44% (246)	26.47% (68)	2.98***
	(41.3%–52.2%)	(2.7%–15.8%)	(11.7%–64.9%)	(60.4%–91.6%)	(40.9%–81.0%)	(49.0%–63.0%)	(4.9%–18.7%)	(52.8%–65.3%)	(5.74–27.03)	(46.21%–58.59%)	(17.38%–38.08%)	(1.56–5.70)
70+	33.7% (177)	12.9% (31)	28.6% (7)	85.7% (14)	40.0% (5)	32.8% (119)	15.8% (38)	38.4% (138)	3.11*	39.16% (143)	11.76% (34)	5.14**
	(27.1%–41.0%)	(4.5%–29.5%)	(7.6%–64.8%)	(58.8%–97.2%)	(11.6%–77.1%)	(25.0%–41.6%)	(7.1%–30.8%)	(30.7%–46.7%)	(1.24–7.81)	(31.54%–47.35%)	(4.07%–27.22%)	(1.69–15.63)
Anal (insertive)												
18–24	5.9% (266)	1.1% (94)	0.0% (46)	7.1% (70)	18.8% (32)	12.5% (24)	0.7% (140)	11.1% (126)	11.32**	6.23% (257)	0.00% (10)	—
	(3.6%–9.5%)	–(0.4%–6.4%)	–(1.5%–9.2%)	(2.7%–16.0%)	(8.5%–35.7%)	(3.5%–31.8%)	–(0.3%–4.3%)	(6.6%–17.9%)	(2.14–59.76)	(3.80%–9.94%)	–(4.34%–32.09%)	—
25–29	15.9% (331)	2.2% (45)	20.7% (29)	6.7% (15)	21.2% (33)	17.8% (208)	9.5% (74)	17.6% (256)	1.68	16.40% (317)	0.00% (9)	5.79
	(12.3%–20.2%)	–(0.7%–12.6%)	(9.5%–38.7%)	–(0.8%–31.8%)	(10.4%–38.0%)	(13.2%–23.6%)	(4.4%–18.5%)	(13.4%–22.7%)	(0.73–3.84)	(12.71%–20.90%)	–(4.55%–34.46%)	(0.17–201.67)
30–39	13.8% (393)	1.9% (53)	35.1% (37)	11.5% (26)	30.8% (52)	9.7% (226)	15.6% (90)	13.5% (304)	0.88	13.76% (378)	27.27% (11)	0.80
	(10.7%–17.6%)	–(0.6%–10.9%)	(21.8%–51.3%)	(3.2%–29.8%)	(19.8%–44.3%)	(6.5%–14.4%)	(9.4%–24.6%)	(10.1%–17.8%)	(0.45–1.72)	(10.63%–17.61%)	(9.20%–57.11%)	(0.20–3.17)
40–49	13.2% (501)	7.8% (115)	17.9% (56)	33.3% (33)	18.9% (53)	10.7% (243)	11.1% (171)	14.3% (329)	1.17	14.32% (440)	7.32% (41)	3.05
	(10.5%–16.5%)	(4.0%–14.4%)	(9.8%–30.0%)	(19.7%–50.5%)	(10.4%–31.6%)	(7.4%–15.3%)	(7.2%–16.8%)	(10.9%–18.5%)	(0.66–2.08)	(11.34%–17.91%)	(1.83%–20.12%)	(0.93–10.02)
50–59	6.0% (451)	7.1% (155)	18.4% (38)	9.4% (32)	8.2% (49)	1.1% (176)	9.3% (193)	3.5% (257)	0.39*	5.90% (356)	6.58% (76)	1.13
	(4.1%–8.6%)	(3.9%–12.4%)	(8.9%–33.7%)	(2.5%–25.0%)	(2.7%–19.7%)	(0.0%–4.3%)	(5.9%–14.3%)	(1.8%–6.6%)	(0.17–0.88)	(3.85%–8.89%)	(2.50%–14.84%)	(0.44–2.95)
60–69	5.0% (312)	2.9% (70)	0.0% (10)	20.0% (25)	0.0% (19)	4.8% (188)	2.5% (80)	6.0% (232)	2.93	4.92% (244)	5.88% (51)	0.94
	(3.0%–8.1%)	(0.2%–10.4%)	–(4.3%–32.1%)	(8.4%–39.6%)	–(3.0%–19.8%)	(2.4%–9.0%)	(0.2%–9.2%)	(3.5%–10.0%)	(0.58–14.80)	(2.75%–8.48%)	(1.41%–16.54%)	(0.27–3.33)
70+	1.7% (174)	0.0% (31)	0.0% (7)	30.0% (10)	0.0% (5)	0.0% (121)	0.0% (38)	2.2% (136)	—	2.16% (139)	0.00% (32)	—
	(0.3%–5.1%)	–(2.1%–13.1%)	–(5.0%–40.4%)	(10.3%–60.8%)	–(5.5%–48.9%)	–(0.6%–3.7%)	–(1.8%–10.9%)	(0.5%–6.6%)	—	(0.45%–6.44%)	–(2.01%–12.73%)	—

*$P < 0.05$, **$P < 0.01$, ***$P < 0.001$.
†Adjusted odds ratios are based on a logistic regression including the health status as a covariate, estimated separately by age group.
††Adjusted odds ratios are based on a logistic regression including the partner status as a covariate, estimated separately by age group.
CI = confidence interval.

Through age 59, vaginal intercourse in the past 90 days was higher among married men than men in any other relationship category, with the highest rates of vaginal intercourse being observed among married men aged 18–24 (95.83%) and 25–29 years (95.65%). For men in these two age groups, rates of vaginal intercourse were similar for both single men (23.96% and 23.91%, respectively) and men who were single and dating (60.87% and 59.26%, respectively). Across all age groups, vaginal intercourse in the past 90 days was more common among partnered men. Health status was not predictive of the occurrence of vaginal intercourse for men through age 59 years. However, for men aged 60 years and over, those with excellent to good health status reported the occurrence of vaginal intercourse in the past 90 days at rates twice as high (or higher) than those with fair to poor health status.

Anal Intercourse

The occurrence of insertive anal intercourse was considerably less common than that of vaginal intercourse across all age groups (Table 4). Those in the age groups from 25 through 49 years reported rates more than twice as high (13.2%–15.9%) as the other age groups (1.7%–6.0%). Although partnership status was predictive of anal intercourse only among men in the youngest age category (18–24 years), with partnered men reporting more anal intercourse (11.1%) than nonpartnered men (0.7%), there were some observable differences when the occurrence of anal intercourse was compared across relationship categories. Among men from the late 20s (25–29 years) through 50s, anal intercourse was more common among men who had a relationship partner or were single but dating than those who were married or single. Among men aged 60 years and older, anal intercourse rates were generally low (and nonexistent in many cases) with the exception of men who had a relationship partner with whom they did not live, for which anal intercourse was reported by 20.0% of men in their 60s and for 30.0% of men aged 70 years and older.

Same Gender Behaviors

Sexual behavior with other men was less common than comparable behaviors with women, with the highest proportion of men reporting having received oral sex from a man in the past 90 days being those men in their 50s (7.1%). Other age groups were less likely to report receiving oral sex from a man, ranging from a low of <1% of men over age 70 years and 5.1% of men in their 40s. Giving oral sex to another man was also relatively less prevalent, with the highest rate of 7.1% among men in their 50s and the lowest rate being 1.3% of men in their 70s. Being the receptive partner in anal intercourse (measured as receiving a penis in one's anus) was the least frequently reported behavior in the past 90 days, most often reported by men in their 30s (2.4%) and 40s (2.8%) and least likely (<1%) to be reported by men in their 70s.

Frequency of Sexual Behaviors

Table 5 presents the frequency with which men, stratified by age, reported participation in specific sexual behaviors (solo masturbation, vaginal intercourse, and insertive anal intercourse), on average during a typical month over the past year. Table 6 presents a more in-depth analysis of these data by relationship and health status. Masturbation alone is the behavior for which there is the most sustainable pattern of frequent behavior over the first three decades of adulthood, with over 30% of men, through the 40s, reporting that they had masturbated alone on average more than two times per week during the past year, with masturbation frequency declining among each subsequent age cohort. Although masturbation frequency is somewhat similar among all men (regardless of relationship status), among married men in the youngest age category (18–24 years), vaginal intercourse was more frequent than masturbation. Among all men and across all categories of relationships, there is an observable decrease in the frequency of vaginal intercourse with increasing age. These data also suggest that anal intercourse, if a part of a man's sexual repertoire, is infrequent.

Discussion

Data from this study provide a foundation for understanding the contemporary rates of sexual behaviors among adult men in the United States, documenting that masturbation, oral intercourse, and vaginal intercourse are prevalent among men throughout most of their adult life. Several important trends become apparent as men age, and as functions of relationship type and physical health status. These data share some consistencies with those from the other two nationally representative studies of adult male sexual behavior, both of which were conducted within the past two decades [2–4]. However, some differences in the level of

Table 5 Frequency of men's sexual behaviors, stratified by age

Frequency of sexual behavior						
		Not in past year	A few times per year to monthly	A few times per month to weekly	2–3 times per week	≥4 times per week
Age	N	% Engaging in behavior (95% CI)				
Masturbation (solo)						
18–24	260	18.5% (14.2%–23.6%)	16.9% (12.8%–22.0%)	25.0% (20.1%–30.6%)	20.8% (16.3%–26.1%)	18.8% (14.5%–24.1%)
25–29	334	16.5% (12.9%–20.8%)	14.7% (11.3%–18.9%)	25.4% (21.1%–30.4%)	23.4% (19.1%–28.2%)	20.1% (16.1%–24.7%)
30–39	393	20.1% (16.4%–24.4%)	18.8% (15.3%–23.0%)	27.0% (22.8%–31.6%)	20.6% (16.9%–24.9%)	13.5% (10.4%–17.2%)
40–49	500	24.0% (20.5%–27.9%)	19.8% (16.5%–23.5%)	25.0% (21.4%–29.0%)	16.8% (13.8%–20.3%)	14.4% (11.6%–17.8%)
50–59	452	28.1% (24.1%–32.4%)	24.3% (20.6%–28.5%)	23.7% (20.0%–27.8%)	17.5% (14.2%–21.3%)	6.4% (4.5%–9.1%)
60–69	317	38.8% (33.6%–44.3%)	29.3% (24.6%–34.6%)	18.0% (14.1%–22.6%)	10.1% (7.2%–13.9%)	3.8% (2.1%–6.6%)
70+	179	53.6% (46.3%–60.8%)	23.5% (17.8%–30.2%)	14.0% (9.6%–19.9%)	7.3% (4.2%–12.1%)	1.7% (0.3%–5.0%)
Vaginal intercourse						
18–24	262	40.1% (34.3%–46.1%)	11.8% (8.4%–16.3%)	22.9% (18.2%–28.4%)	18.3% (14.1%–23.5%)	6.9% (4.3%–10.7%)
25–29	327	14.4% (11.0%–18.6%)	12.2% (9.1%–16.3%)	40.4% (35.2%–45.8%)	28.1% (23.5%–33.2%)	4.9% (3.0%–7.9%)
30–39	393	14.8% (11.6%–18.6%)	15.8% (12.5%–19.7%)	38.7% (34.0%–43.6%)	24.7% (20.7%–29.2%)	6.1% (4.1%–9.0%)
40–49	501	26.5% (22.9%–30.6%)	15.6% (12.6%–19.0%)	36.5% (32.4%–40.8%)	16.8% (13.7%–20.3%)	4.6% (3.0%–6.8%)
50–59	455	42.4% (38.0%–47.0%)	18.2% (15.0%–22.1%)	25.9% (22.1%–30.2%)	11.9% (9.2%–15.2%)	1.5% (0.7%–3.2%)
60–69	315	46.3% (40.9%–51.9%)	16.5% (12.8%–21.0%)	25.4% (20.9%–30.5%)	11.4% (8.3%–15.4%)	0.3% –(0.1%–2.0%)
70+	177	57.1% (49.7%–64.1%)	18.6% (13.6%–25.1%)	19.8% (14.5%–26.3%)	4.0% (1.8%–8.1%)	0.6% –(0.2%–3.5%)
Anal intercourse (insertive)						
18–24	266	89.1% (84.7%–92.3%)	7.5% (4.9%–11.4%)	2.6% (1.2%–5.4%)	0.4% –(0.2%–2.3%)	0.4% –(0.2%–2.3%)
25–29	332	73.2% (68.2%–77.7%)	22.0% (17.9%–26.8%)	2.4% (1.1%–4.8%)	1.2% (0.4%–3.2%)	1.2% (0.4%–3.2%)
30–39	393	75.6% (71.1%–79.6%)	21.4% (17.6%–25.7%)	2.3% (1.1%–4.4%)	0.3% –(0.1%–1.6%)	0.5% (0.0%–2.0%)
40–49	501	78.0% (74.2%–81.5%)	18.0% (14.8%–21.6%)	3.0% (1.8%–4.9%)	0.6% (0.1%–1.8%)	0.4% (0.0%–1.5%)
50–59	451	87.1% (83.7%–89.9%)	11.3% (8.7%–14.6%)	1.3% (0.5%–2.9%)	0.2% –(0.1%–1.4%)	0.0% –(0.2%–1.0%)
60–69	311	94.5% (91.4%–96.6%)	2.6% (1.2%–5.1%)	2.9% (1.4%–5.5%)	0.0% –(0.3%–1.5%)	0.0% –(0.3%–1.5%)
70+	173	97.7% (94.0%–99.3%)	2.3% (0.7%–6.0%)	0.0% –(0.4%–2.6%)	0.0% –(0.4%–2.6%)	0.0% –(0.4%–2.6%)

specificity between those studies and this one with regard to the measurement of sexual behaviors, and the limited nature of data it was possible to collect in this brief cross-sectional survey, present challenges to comparison.

An important finding in this study is that masturbation is a prevalent and frequent component of adult men's sexual behaviors, including men across various stages of life and those who are both with and without a relational partner. Most men through age 69 report having masturbated recently, and although it is the case that non-partnered men reported higher rates of masturbation than partnered men, the majority of partnered men (>58%) through age 59 years reported recent masturbation. For those providing sexual health counseling to couples, it may be important to acknowledge male masturbation as a prevalent and somewhat frequent behavior, even among those who are married or in relationships.

These rates of masturbation are comparable with those identified in the 1992 NHSLS [2,3] for men aged 18–60 years, both in terms of the proportion reporting masturbation (although mea-

Table 6 Weighted frequencies of men's sexual behaviors by relationship status, stratified by age

	Relationship status								
	Single						Partnered		
		Not in past year	A few times per year to monthly	A few times per month to weekly	2–3 times per week	≥4 times per week		Not in past year	A few times per year to monthly
Age	N	% Engaging in behavior (95% CI)					N	% Engaging in behavior (95% CI)	
Masturbation (solo)									
18–24	139	15.1% (10.0%–22.1%)	15.1% (10.0%–22.1%)	23.0% (16.8%–30.7%)	22.3% (16.1%–30.0%)	24.5% (18.0%–32.3%)	97	16.5% (10.3%–25.2%)	21.6% (14.5%–30.9%)
25–29	74	9.5% (4.4%–18.5%)	6.8% (2.6%–15.2%)	31.1% (21.7%–42.4%)	23.0% (14.8%–33.8%)	29.7% (20.5%–41.3%)	49	10.2% (4.0%–22.2%)	12.2% (5.4%–24.6%)
30–39	91	15.4% (9.3%–24.3%)	11.0% (5.9%–19.2%)	31.9% (23.2%–42.0%)	26.4% (18.4%–36.3%)	15.4% (9.3%–24.3%)	74	14.9% (8.3%–24.9%)	14.9% (8.3%–24.9%)
40–49	171	9.9% (6.2%–15.4%)	20.5% (15.1%–27.2%)	28.7% (22.4%–35.9%)	18.13% (13.0%–24.6%)	22.8% (17.1%–29.7%)	87	31.0% (22.3%–41.4%)	16.1% (9.7%–25.3%)
50–59	193	21.8% (16.5%–28.1%)	17.6% (12.9%–23.6%)	28.0% (22.1%–34.7%)	22.8% (17.4%–29.2%)	9.8% (6.3%–14.9%)	83	31.3% (22.3%–42.0%)	22.9% (15.1%–33.1%)
60–69	80	36.3% (26.6%–47.2%)	21.3% (13.6%–31.5%)	20.0% (12.6%–30.1%)	15.0% (8.6%–24.6%)	7.5% (3.2%–15.7%)	44	38.6% (25.7%–53.4%)	36.4% (23.7%–51.2%)
70+	40	42.5% (28.5%–57.8%)	25.0% (14.0%–40.4%)	22.5% (12.1%–37.7%)	7.5% (1.9%–20.6%)	2.5% –(3.7%–14.0%)	19	36.8% (19.0%–59.1%)	15.9% (4.7%–39.4%)
Vaginal intercourse									
18–24	137	56.9% (48.6%–64.9%)	13.9% (9.0%–20.7%)	19.0% (13.2%–26.4%)	8.0% (4.4%–13.9%)	2.2% (0.5%–6.5%)	100	26.0% (18.4%–35.4%)	8.0% (3.9%–15.2%)
25–29	73	46.6% (35.6%–67.9%)	21.9% (13.9%–32.8%)	27.1% (19.4%–30.6%)	4.1% (0.9%–11.9%)	0.0% –(1.0%–6.0%)	48	20.8% (11.5%–34.4%)	10.4% (4.1%–22.6%)
30–39	91	39.6% (30.1%–49.8%)	24.2% (16.5%–34.0%)	23.1% (15.6%–32.8%)	1.7% (3.5%–15.3%)	5.5% (2.1%–12.5%)	77	15.6% (9.0%–25.5%)	6.5% (2.5%–14.7%)
40–49	174	48.9% (41.5%–56.2%)	18.4% (13.3%–24.8%)	22.4% (16.8%–29.2%)	8.0% (4.8%–13.1%)	2.3% (0.7%–6.0%)	87	29.9% (21.2%–40.2%)	9.2% (4.5%–17.3%)
50–59	189	67.7% (60.8%–74.0%)	14.9% (10.4%–20.6%)	11.6% (7.8%–17.1%)	5.3% (2.8%–9.6%)	0.5% –(0.2%–3.2%)	85	34.1% (24.9%–44.7%)	10.6% (5.5%–19.1%)
60–69	81	86.4% (77.11–92.4%)	8.6% (4.0%–17.0%)	3.7% (0.8%–10.8%)	1.2% –(0.4%–7.3%)	0.0% –(0.9%–5.4%)	44	27.3% (16.2%–42.0%)	11.4% (4.5%–24.4%)
70+	38	81.6% (66.3%–91.1%)	5.3% (0.5%–18.2%)	13.2% (5.3%–27.8%)	0.0% –(1.8%–10.9%)	0.0% –(1.8%–10.9%)	19	26.3% (11.5%–49.1%)	10.5% (1.7%–32.6%)
Anal intercourse (insertive partner)									
18–24	141	93.6% (88.2%–96.8%)	4.3% –(3.1%–85.1%)	1.4% –(0.3%–99.2%)	0.0% –(0.1%–99.7%)	0.7% (0.0%–100.0%)	102	84.3% (75.9%–90.2%)	10.8% (6.0%–18.4%)
25–29	74	87.8% (78.3%–93.7%)	9.5% –(2.1%–87.0%)	1.4% –(0.6%–98.2%)	1.4% –(0.1%–99.7%)	0.0% –(0.1%–99.7%)	48	58.3% (44.3%–71.2%)	33.3% (21.6%–47.5%)
30–39	90	73.3% (63.3%–81.4%)	24.4% (0.2%–91.6%)	2.2% –(1.3%–95.5%)	0.0% –(0.1%–99.6%)	0.0% (0.0%–100.0%)	78	62.8% (51.7%–72.7%)	26.9% (18.3%–37.7%)
10–49	172	79.1% (72.4%–84.5%)	14.0% –(1.3%–89.0%)	4.7% –(0.7%–97.5%)	1.2% –(0.3%–99.1%)	1.2% –(0.1%–99.8%)	87	59.8% (49.3%–69.5%)	32.2% (23.3%–42.6%)
50–59	193	85.5% (70.8%–89.8%)	13.5% –(1.5%–88.2%)	1.0% –(0.8%–97.5%)	0.0% –(0.1%–90.8%)	0.0% (0.0%–100.0%)	82	78.0% (67.9%–95.7%)	17.1% (10.3%–26.8%)
60–69	80	97.5% (90.8%–99.8%)	2.5% –(3.4%–84.2%)	0.0% –(0.2%–99.5%)	0.0% (0.0%–100.0%)	0.0% (0.0%–100.0%)	44	88.6% (75.6%–95.5%)	2.3% –(0.7%–12.9%)
70+	38	97.4% (85.3%–100.7%)	2.6% –(3.4%–84.3%)	0.0% –(0.2%–99.5%)	0.0% (0.0%–100.0%)	0.0% (0.0%–100.0%)	14	78.6% (51.7%–93.2%)	21.4% (6.8%–48.3%)

CI = confidence interval.

sured within the past year in the NHSLS) and the frequency of masturbation. Additionally, masturbation rates among older men are comparable with those documented by Lindau [4]. However, her team found no relations between health and masturbation among the oldest men in the sample, whereas our data found that men with fair to poor health were less likely to report recent masturbation than those men in their age cohort with better physical health.

Our data also indicate that oral sex with female partners is a common behavior, with the number of men who reported giving oral sex to women being almost as high as the number of men who reported receiving oral sex from women. We were explicit with our measurement of both the nature of the activity (giving or receiving) and also with regard to the gender of the sexual partner for oral sex. As a result, these data may provide more specific insights into the nature of men's oral sex

Table 6 Continued

				Married				
A few times per month to weekly	2–3 times per week	≥4 times per week		Not in past year	A few times per year to monthly	A few times per month to weekly	2–3 times per week	≥4 times per week
			N	% Engaging in behavior (95% CI)				
26.8% (10.0%–36.4%)	20.6% (13.7%–29.8%)	14.4% (8.7%–22.7%)	23	52.2% (33.0%–70.8%)	8.7% (1.2%–28.0%)	30.4% (15.4%–51.1%)	8.7% (1.2%–28.0%)	0.0% –(2.6%–16.9%)
28.6% (17.8%–42.5%)	20.4% (11.3%–33.8%)	28.6% (11.8%–42.5%)	20	20.5% (15.5%–27.5%)	18.1% (13.4%–23.9%)	22.9% (17.7%–29.0%)	23.8% (18.5%–30.0%)	14.8% (10.6%–20.2%)
28.4% (19.3%–39.6%)	23.0% (14.8%–33.8%)	18.9% (11.5%–29.4%)	227	23.8% (18.7%–29.8%)	23.3% (18.3%–29.3%)	24.7% (19.5%–30.7%)	17.6% (13.2%–23.1%)	10.6% (7.2%–15.3%)
19.5% (12.5%–20.2%)	18.4% (11.5%–27.9%)	14.9% (8.8%–24.0%)	241	31.5% (26.0%–37.7%)	20.7% (16.1%–26.3%)	24.5% (19.5%–30.3%)	15.4% (11.3%–20.5%)	7.9% (5.0%–12.0%)
28.9% (20.2%–39.5%)	12.0% (6.5%–21.0%)	4.8% (1.5%–12.1%)	175	33.1% (26.6%–40.4%)	32.6% (26.1%–39.8%)	16.6% (11.7%–22.8%)	14.3% (9.8%–20.3%)	3.4% (1.4%–7.4%)
6.8% (1.7%–18.9%)	13.6% (6.0%–27.1%)	4.5% (0.4%–16.0%)	191	40.3% (33.6%–47.4%)	30.9% (24.8%–37.8%)	19.9% (14.8%–26.2%)	7.3% (4.3%–12.0%)	1.6% (0.3%–4.7%)
10.5% (1.7%–32.6%)	36.8% (19.0%–59.1%)	.0% –(3.0%–10.8%)	119	61.3% (52.4%–69.6%)	23.5% (16.8%–31.9%)	10.9% (5.4%–17.9%)	2.5% (0.5%–7.5%)	1.7% (0.1%–6.3%)
30.0% (21.9%–39.6%)	26.0% (18.4%–35.4%)	10.0% (5.3%–17.5%)	24	4.2% –(0.9%–21.9%)	12.5% (3.5%–31.8%)	16.7% (9.1%–36.5%)	45.8% (27.9%–64.9%)	20.8% (8.8%–40.9%)
36.4% (23.4%–49.6%)	27.1% (15.5%–41.1%)	6.3% (1.5%–17.5%)	205	1.6% (0.3%–4.4%)	9.3% (5.9%–14.1%)	46.3% (38.6%–53.2%)	37.1% (30.8%–43.9%)	5.9% (3.3%–10.0%)
32.5% (23.0%–43.6%)	39.0% (28.8%–50.1%)	6.5% (2.5%–14.7%)	224	4.5% (2.3%–8.1%)	15.6% (11.4%–21.0%)	47.3% (40.9%–63.9%)	26.8% (21.4%–33.0%)	5.8% (3.3%–9.8%)
24.1% (16.3%–34.2%)	25.3% (17.3%–35.4%)	11.5% (5.2%–20.1%)	211	9.1% (6.1%–13.5%)	16.2% (12.0%–21.4%)	51.0% (44.8%–57.3%)	19.9% (15.3%–25.4%)	3.7% (1.9%–7.0%)
31.8% (22.8%–42.3%)	18.8% (11.6%–28.5%)	4.7% (1.5%–11.9%)	180	20.6% (15.30%–27.1%)	25.0% (19.2%–31.8%)	38.3% (31.5%–45.5%)	15.0% (10.5%–21.0%)	1.1% (0.0%–4.2%)
20.5% (10.9%–34.7%)	38.6% (23.7%–53.4%)	2.3% –(3.7%–12.9%)	189	33.9% (27.5%–40.9%)	21.2% (15.9%–27.6%)	35.4% (29.0%–42.5%)	9.5% (6.0%–14.6%)	0.0% –(0.4%–2.4%)
63.2% (40.9%–81.0%)	0.0% –(3.0%–19.8%)	0.0% –(3.0%–19.8%)	120	54.2% (45.3%–62.8%)	24.2% (17.3%–32.6%)	15.0% (9.6%–22.6%)	5.8% (2.6%–11.8%)	0.8% –(0.3%–5.0%)
3.9% (1.2%–10.0%)	1.0% (0.4%–5.9%)	0.0% (0.7%–4.4%)	23	82.6% (62.3%–93.6%)	13.0% (3.7%–33.0%)	4.3% –(0.9%–22.7%)	0.0% –(2.6%–16.9%)	0.0% –(2.6%–16.9%)
8.3% (2.8%–20.1%)	0.0% –(1.4%–0.8%)	0.0% –(1.4%–8.8%)	208	71.6% (66.1%–77.3%)	24.0% (18.7%–30.3%)	1.0% (0.0%–3.7%)	1.4% (0.3%–4.4%)	1.9% (0.6%–5.0%)
6.4% (2.4%–14.5%)	1.3% –(0.5%–7.6%)	2.6% (0.2%–9.4%)	226	80.5% (74.9%–85.2%)	18.1% (13.6%–23.7%)	0.9% (0.0%–3.4%)	0.0% –(0.3%–2.0%)	0.4% –(0.2%–2.7%)
6.9% (2.9%–14.5%)	1.1% (0.4%–6.8%)	0.0% –(0.8%–5.1%)	243	83.5% (78.3%–87.7%)	16.0% (11.9%–21.2%)	0.4% –(0.2%–2.5%)	0.0% –(0.3%–1.9%)	0.0% –(0.3%–1.9%)
4.9% (1.5%–12.3%)	0.0% –(0.9%–5.4%)	0.0% –(0.9%–5.4%)	176	93.8% (89.0%–96.6%)	6.3% (3.4%–11.0%)	0.0% –(0.4%–2.6%)	0.0% –(0.4%–2.6%)	0.0% –(0.4%–2.6%)
9.1% (3.0%–21.7%)	0.0% –(1.5%–9.6%)	0.0% –(1.5%–9.6%)	188	94.1% (89.7%–96.8%)	2.7% (1.0%–6.2%)	3.2% (1.3%–6.9%)	0.0% –(0.4%–2.4%)	0.0% –(0.4%–2.4%)
0.0% –(3.6%–25.1%)	0.0% –(3.6%–25.1%)	0.0% –(3.6%–25.1%)	121	100.0% (96.3%–100.6%)	0.0% –(0.6%–3.7%)	0.0% –(0.6%–3.7%)	0.0% –(0.6%–3.7%)	0.0% –(0.6%–3.7%)

behaviors than those obtained in other nationally representative studies.

Vaginal intercourse is the most common partnered sexual behavior among men throughout much of the lifespan, although reported by more men at younger ages and with a progressive decline in rates and frequency beginning at around age 50. These data suggest that having a relationship partner is predictive of the occurrence of recent vaginal intercourse across all age groups, but that having a partner is a particularly important predictor among younger men. Insertive anal intercourse appears to have increased in all age groups when compared with the NHSLS data [2,3]. In fact, men in some age groups reported higher rates of insertive anal intercourse in the past three months than were reported by similar NHSLS age groups in the past year [2,3]. In this article we focused on insertive anal intercourse for the primary analyses. Given the nature of our

analyses by relationship status and health status, and that reports of receptive anal intercourse were infrequent, such analyses for receptive anal intercourse would have been less meaningful. However, in other reports from NSSHB [41], we provide more detailed summaries of receptive anal intercourse, which show that although being the receptive partner in anal intercourse is infrequent among men (reported as having occurred in their lifetime by 6.7% of all men ages 14–94), it does occur and remains among those behaviors for which more research would be meaningful. Additionally, as was recently advocated in an article by McBride and Fortenberry [42], we should also consider research that documents other non-penile or non-insertive anorectal behaviors of men, particularly those men whose behavioral repertoire is exclusively or primarily heterosexual. More research in this area could advance our understanding of these behaviors and their clinical implications.

Although no nationally representative sexual behavior study to date has oversampled men who identify as gay or bisexual, including ours, the findings of this study are consistent with those of Laumann [2,3] and Kinsey [1], in that the proportions of men who reported same gendered sexual interactions were higher than the proportions of men who identify their sexual orientation as gay or bisexual. As methods for assessing representative samples of gay and bisexual men (and women) advance, it will be beneficial to have comprehensive data on their sexual behaviors so that valid conceptualizations of variations in human sexual behavior across sexually diverse communities can be understood.

Although this is only the second nationally representative scientific study specifically focused on sexual behavior that included an expansive range of men across various ages of adulthood, and the second to collect such sexual behavior data from older men, its methods present both strengths and limitations. Strengths of this study include the expansive range of ages across the adult lifespan and the specificity with which behaviors were assessed. Additionally, these data were able to be collected with the advantages presented by advances in Internet research methods. Limitations include the restricted number of measures, with little detailed information on sexual motivations, and little on sexual dysfunctions. As with other nationally representative studies of adult sexual behavior, the methods of this study do not allow for an in-depth analysis of behaviors among men who identify as gay or bisexual and those without an established household, particularly those who were institutionalized or homeless at the time of the study. Lastly, this study sought to collect data on those sexual behaviors that are more commonly assessed by researchers (in order to provide for comparisons with past studies of this nature). Additionally, we assessed behaviors specifically for the extent to which they are more closely linked to the nation's health priorities for issues like HIV, other STI and pregnancy, resulting in the availability of contemporary rates of behavior that provide important foundations for health-related interventions. Therefore, we did not include measures of some other aspects of men's sexual repertoires such as the use of sexual toys. However, these data, when combined with other recent data from nationally representative [38,43] and other studies [44] focused specifically on men's use of vibrators, and which show that men's use of them is common, associated with other health promoting behaviors, and associated with improved sexual function and sexual satisfaction, collectively advance our contemporary understanding of the range of behaviors that constitute men's sexual lives.

Conclusions

These new data provide contemporary rates of sexual behavior among adult men in the United States, indicating that a range of sexual behaviors are prevalent and frequent across the lifespan, particularly masturbation and intercourse. These updated baseline rates of sexual behavior will be useful for those designing and delivering health-related interventions and other services to men and their sexual partners.

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References

1 Kinsey AC, Pomeroy WB, Martin CE. Sexual behavior in the human male. Philadelphia: W.B. Saunders; 1948.
2 Laumann E, Gagnon JH, Michael RT, Michaels S. The social organization of sexuality: Sexual practices in the United States. Chicago: University of Chicago Press; 1994.
3 Laumann EO, Michael RT, Gagnon JH. A political history of the national sex survey of adults. Fam Plann Perspect 1994;26:34–8.
4 Lindau ST, Schumm LP, Laumann EO, Levinson W, O'Muircheartaigh CA, Waite LJ. A study of sexuality and health among older adults in the United States. N Engl J Med 2007; 357:762.
5 Albarracin D, Durantini MR, Earl A. Empirical and theoretical conclusions of an analysis of outcomes of HIV-prevention interventions. Curr Dir Psychol Sci 2006;15:73–8.
6 Koyama A, Corliss HL, Santelli JS. Global lessons on healthy adolescent sexual development. Curr Opin Pediatr 2009;21: 444–9.
7 Wu P, Katic BJ, Liu X, Fan B, Fuller CJ. Mental health service use among suicidal adolescents: Findings from a U.S. national community survey. Psychiatr Serv 2010;61:17–24.
8 Everett SA, Warren CW, Santelli JS, Kann L, Collins JL, Kolbe LJ. Use of birth control pills, condoms, and withdrawal among U.S. high school students. J Adolescent Health 2000; 27:112–8.
9 Santelli JS, Lindberg LD, Abma J, McNeely CS, Resnick M. Adolescent sexual behavior: Estimates and trends from four nationally representative surveys. Fam Plann Perspect 2000; 32:156–94.
10 Anderson JE, Santelli J, Gilbert BC. Adolescent dual use of condoms and hormonal contraception. Sex Transm Dis 2003;30:719–22.
11 Santelli J, Carter M, Orr M, Dittus P. Trends in sexual risk behaviors, by nonsexual risk behavior involvement, U.S. high school students, 1991–2007. J Adolescent Health 2009;44: 372–9.
12 Anderson JE. Condom use and HIV risk among US adults. Am J Public Health 2003;93:912–4.
13 Catania JA, Canchola J, Binson D, Dolcini MM, Paul JP, Fisher L, Choi KH, Pollack L, Chang J, Yarber W, Heiman JR, Coates T. National trends in condom use among at-risk heterosexuals in the United States. J Acq Immun Def Synd 2001;27:176.
14 Anderson JE, Mosher WD, Chandra A. Measuring HIV risk in the U.S. population aged 15–44: Results from Cycle 6 of the National Survey of Family Growth. Adv Data 2006(377);1–27.
15 Sieving RE, Beuhring T, Resnick MD, Bearinger LH, Shew M, Ireland M, Blum RW. Development of adolescent self-report measures from the National Longitudinal Study of Adolescent Heath. J Adolescent Health 2001;28:73–81.
16 Kann L, Kinchen SA, Williams BI, Ross JG, Lowry R, Grunbaum JA, Kolbe LJ. Youth risk behavior surveillance—United States, 1999. MMWR CDC Surveill Summ 2000;49:1–32.
17 Catania JA, Coates TJ, Stall R, Turner H, Peterson J, Hearst N, Dolcini MM, Hudes E, Gagnon J, Wiley J, Groves R. Prevalence of AIDS-related risk factors and condom use in the United States. Science 1992;258:1101–6.
18 Waite LJ, Laumann EO, Das A, Schumm LP. Sexuality: Measures of partnerships, practices, attitudes, and problems in the National Social Life, Health, and Aging Study. J Gerontol B Psychol Sci Soc Sci 2009;64(Suppl 1):i56–66.
19 Choi KH, Catania JA, Dolcini MM. Extramarital sex and HIV risk behavior among US adults: Results from the National AIDS Behavioral Survey. Am J Public Health 1994;84:2003–7.
20 Centers for Disease Control and Prevention (CDC). Trends in HIV-related risk behaviors among high school students—United States, 1991–2005. MMWR Morb Mortal Wkly Rep 2006;55:851–4.
21 Buhi ER, Marhefka SL, Hoban MT. The state of the union: Sexual health disparities in a national sample of US college students. J Am Coll Health 2010;58:337–46.
22 Rhodes SD, McCoy TP, Wilkin AM, Wolfson M. Behavioral risk disparities in a random sample of self-identifying gay and non-gay male university students. J Homosex 2009;56:1083–100.
23 Malebranche D. Black men who have sex with men and the HIV epidemic: Next steps for public health. Am J Public Health 2003;93:862–5.
24 Muñoz-Laboy M, Dodge B. Bisexual Latino men and HIV and sexually transmitted infections risk: An exploratory analysis. Am J Public Health 2007;97:1102–6.
25 Chu SY, Peterman TA, Doll LS, Buehler JW, Curran JW. AIDS in bisexual men in the United States: Epidemiology and transmission to women. Am J Public Health 1992;82: 220–4.
26 Tangpricha V. Transsexuals and sexual health. J Sex Med 2009;6:762–74.
27 Vail-Smith K, White DM. Risk level, knowledge, and preventive behavior for human papillomaviruses among sexually active college women. J Am Coll Health 1992;40:227–30.
28 Kalichman SC, Cain D, Knetch J, Hill J. Patterns of sexual risk behavior change among sexually transmitted infection clinic patients. Arch Sex Behav 2005;34:307–19.
29 Rosen RC, Shifren JL, Monz BU, Odom DM, Russo PA, Johannes CB. Correlates of sexually related personal distress in women with low sexual desire. J Sex Med 2009;6:1549–60.
30 Eberhard J, Ståhl O, Cohn-Cedermark G, Cavallin-Ståhl E, Giwercman Y, Rylander L, Eberhard-Gran M, Kvist U, Fugl-Meyer KS, Giwercman A. Sexual function in men treated for testicular cancer. J Sex Med 2009;6:1979–89.
31 Current Population Survey December 2008. U.S. Census Bureau. 1994 – [cited June 9, 2010]. Available from: http://www.bls.census.gov/ferretftp.htm (accessed June 9, 2010).
32 Validity of the survey of health and internet and knowledge network's panel and sampling. Stanford, CA: Stanford University; 2003.

33 Baker L, Wagner TH, Singer S, Bundorf MK. Use of the internet and e-mail for health care information: Results from a national survey. JAMA 2003;289:2400–6.
34 Heiss F, McFadden D, Winter J. Who failed to enroll in Medicare Part D, and why? Early results. Health Aff (Millwood) 2006;25:344–54.
35 Holman EA, Silver RC, Poulin M, Andersen J, Gil-Rivas V, McIntosh DN. Terrorism, acute stress, and cardiovascular health: A 3-year national study following the September 11th attacks. Arch Gen Psychiatry 2008;65:73–80.
36 Silver RC, Holman EA, McIntosh DN, Poulin M, Gil-Rivas V. Nationwide longitudinal study of psychological responses to September 11. JAMA 2002;288:1235.
37 Herbenick D, Reece M, Sanders SA, Dodge B, Ghassemi A, Fortenberry JD. Prevalence and characteristics of vibrator use by women in the United States: Results from a nationally representative study. J Sex Med 2009;6:1857–66.
38 Reece M, Herbenick D, Sanders SA, Dodge B, Ghassemi A, Fortenberry JD. Prevalence and characteristics of vibrator use by men in the United States. J Sex Med 2009;6:1867–74.
39 DeSalvo KB, Bloser N, Reynolds K, He J, Muntner P. Mortality prediction with a single general self-rated health question: A meta-analysis. J Gen Intern Med 2005;20:267–75.
40 Idler EL, Benyamini Y. Self-rated health and mortality: A review of twenty-seven community studies. J Health Soc Behav 1997;38:21–37.
41 Herbenick D, Reece M, Schick V, Sanders SA, Dodge B, Fortenberry JD. Sexual behavior in the United States: Results from a national probability sample of men and women ages 14 to 94. J Sex Med 2010;7(suppl 5):255–65.
42 McBride KR, Fortenberry JD. Heterosexual anal sexuality and anal sex behaviors: A review. J Sex Res 2010;47:123–36.
43 Reece M, Herbenick D, Sanders S, Dodge B, Ghassemi A, Fortenberry JD. Vibrator use among heterosexual men varies by relationship status: Results from a nationally representative study in the United States. J Sex Marital Ther. (in press).
44 Reece M, Rosenberger J, Schick V, Herbenick D, Dodge B, Novak DS. Characteristics of vibrator use by gay and bisexually identified men in the United States. J Sex Med DOI: 10.1111/j.1743-6109.2010.01873.x.

Sexual Behaviors and Condom Use at Last Vaginal Intercourse: A National Sample of Adolescents Ages 14 to 17 Years

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ABSTRACT

Introduction. Data on adolescents' sexual and condom use behaviors provides an empirical basis for a range of social, educational, clinical, and public health endeavors.

Aims. This study has two purposes: to describe the recent and lifetime prevalence of a variety of sexual behaviors; and, to describe factors associated with condom use at last penile–vaginal intercourse.

Methods. Data included those from male (N = 414) and female (N = 406) adolescents (ages 14–17 years) from a nationally representative probability sample. Survey items addressed occurrence (past 90 days, past year, lifetime) of solo masturbation, partnered masturbation, oral sex given to a partner, oral sex received from a partner, vaginal intercourse, and anal intercourse. Participants reporting partnered sexual behaviors in the past year completed additional items about condom use, location of sex, partner characteristics, other sexual behaviors, and alcohol or marijuana use at the most recent sexual event.

Main Outcome Measures. Adjusted rates (by gender) of sexual behaviors, and characteristics of most recent vaginal sex event as a function of condom use/non-use.

Results. Lifetime prevalence of solo masturbation was common for males (80%) and females (48%). Lifetime prevalence of penile–vaginal sex increased with each year of age for both adolescent men and women; however, penile–vaginal sex within the previous 90 days was much less frequently reported. Rates of condom use for penile–vaginal sex were 80% for males and 69% for females. Lifetime anal sex rates were 4.7% for males and 5.5% for females.

Conclusion. Sexual behavior among adolescents was more prevalent and diverse in older adolescent cohorts. Condom use for penile–vaginal intercourse was reported for a majority of events. **Fortenberry JD, Schick V, Herbenick D, Sanders SA, Dodge B, and Reece M. Sexual behaviors and condom use at last vaginal intercourse: A national sample of adolescents ages 14 to 17 years. J Sex Med 2010;7(suppl 5):305–314.**

Key Words. Adolescents; Sexual Behavior; Condom Use

Introduction

Sexual behavior during adolescence is a topic of marked importance to parents, to schools and communities, to health professionals, to public health officials, and to policy makers. The importance of adolescents' sexual behavior is deeply rooted in social, cultural, and religious prescriptions for "appropriate" sexual behavior [1]. However, rates of unintended pregnancy, sexually transmitted infections (STIs), and infection with the human immunodeficiency virus (HIV) provide a rationale for public health surveillance of sexual behavior of adolescents in order to inform health policy and practice [2].

Contemporary adolescents entered adolescence during a period of relative political and social conservatism, with national emphasis on abstinence-only-until-marriage as a foundation philosophy of sexuality education [3,4]. By contrast, topics such

as the continued world-wide epidemics of STI/HIV and mass marketing of a human papillomavirus vaccine meant exposure to a large social focus on sexual risk and prevention [5,6]. Evolution of a variety of social media sources meant that exposure to sexuality, to sexual information, and to sexual images has substantially affected sexual attitudes and behaviors for this contemporary generation of adolescents [7]. These changes emphasize the importance of additional data to supplement that drawn from other national surveys such as The National Survey of Family Growth (NSFG) and the Youth Risk Behavior Survey (YRBS) [8,9].

The objective of this research, then, was to obtain data on contemporary adolescents' sexual behaviors, including condom use at most recent vaginal intercourse. We used an age range that begins at age 14 and ends at age 17 to focus on the development of sexual behaviors prior to the increased autonomy and legal majority associated with age 18. Our national sample was recruited to reflect the socio-demographic characteristics of the United States as of December 2008.

Methods

These data are from the National Survey of Sexual Health and Behavior (NSSHB), which included the collection of data during March–May 2009, using a population-based cross-sectional survey of 820 adolescents and 5045 adults aged 14–94 years. This article is limited to analyses of the adolescents aged 14–17 from the NSSHB. Adolescent participants were recruited via research panels of Knowledge Networks (Menlo Park, CA, USA). Research panels accessed through Knowledge Networks were established based on random digit dialing methods and address based sampling, with periodic adjustments to account for cell phone trends and demographic shifts in the U.S. All data were collected by Knowledge Networks via the Internet; all participants in a given Knowledge Networks panel are provided with access to the Internet and hardware if needed. Data obtained via Knowledge Networks have been used in other health-related studies, substantiating the validity of such methods for obtaining data from nationally representative samples of the U.S. population [10]. Population specific distributions for this study were based upon data from the December 2008 Current Population Survey (CPS) [11].

Recruitment included parents/guardians of potential adolescent participants as well as adolescents. A total of 2172 parents/guardians reviewed a description of the study (including the study instrument) and 62% (N = 1,347) consented to allow their child to be invited via e-mail to participate. Of 1347 adolescents contacted via e-mail, 831(62%) responded, and 820 (37% overall participation rate) consented to participate. All study protocols were approved by the Institutional Review Board of Indiana University-Bloomington.

Main Outcome Measures

Demographic Data

Data regarding gender, age, race/ethnicity, region of residence, and family income were obtained from Knowledge Networks' participant files.

Sexual Behaviors

Sexual behaviors were assessed by items describing solo and partnered sexual behaviors (past 90 days, past year, lifetime). Nine sexual behaviors were specifically addressed: solo masturbation ("I masturbated alone [stimulated your body for sexual pleasure] whether or not you had an orgasm"); partnered masturbation ("I masturbated with another person"); given oral sex—female partner ("I gave oral sex to a female [I gave head]"); given oral sex—male partner ("I gave oral sex to a male [I gave head]"); received oral sex—female partner ("A female gave me oral sex [gave me head]"); received oral sex—male partner ("A male gave me oral sex [gave me head]"); penile–vaginal intercourse ("I had vaginal intercourse [penis in vagina]"); receptive anal intercourse ("someone put their penis into my anus [butt]"); insertive anal intercourse ("I put my penis into someone's anus [butt]"). All items except that for insertive anal intercourse were asked of all participants. Because of small cell sizes for same-sex partners, oral sex items were recoded to reflect given or received oral sex, regardless of partner gender. All sexual behavior measures were pre-tested with 10 adolescents who suggested clarifying language for items presented to adolescents (e.g. "gave head" or "butt" [terms identified in brackets shown earlier]). A summative measure—Any Partnered Activity—indicated participants with at least one report of penile–vaginal, received or given oral, or anal sex during a given interval. This variable reflects the extent to which adolescent sexual activity is comprised by more than just penile–vaginal intercourse.

Characteristics of Most Recent Sexual Event

Participants reporting at least one partnered sexual event within the past year responded to additional questions about their most recent partnered sexual event. Each sexual behavior—given oral sex, received oral sex, penile–vaginal intercourse, anal intercourse—was examined independently although many events contained reports of two or more behaviors. *Condom use* was a single no/yes question asking if a condom was used at any point during the event. *Relationship Status of Event Partner* was coded as boyfriend/girlfriend or other (casual/dating partner, friend or new acquaintance). *Location* of the sexual encounter was categorized as participant's home, sex partner's home, a friend's home, hotel/motel, and other (a public space, e.g. restroom, park, woods, beach). *Knowledge of Partner's Sexual History* was assessed by asking "whether this partner had had sex (vaginal, oral, or anal sex) with people other than yourself within the 6 months before you two engaged in sexual activities together." The response options included knowing their partner did not have previous partners, knowing that their partner did have previous partners, or, being unsure about their partner's previous partners.

Hormonal Contraceptive Use was classified as hormonal use (birth control pill, contraceptive ring, or birth control patch; birth control shot or implant) or none. *Alcohol use* was assessed by asking participants to indicate whether they, their partner, or both of them were drinking alcohol prior to or during the most recent event. *Marijuana use* was assessed by asking participants to indicate whether they, their partner, or both of them were using marijuana prior to or during the most recent event. Both alcohol use and marijuana use were recoded to no use vs. any use (by one or both partners).

Data Analysis

Separate analyses were conducted for adolescent men and women. All analyses were conducted using SPSS version 16.0 (SPSS Inc., Chicago, IL, USA). Post-stratification data weights were used during all analyses in order to maximize the generalizablity of the sample characteristics to the population. Post-stratification adjustments were based upon December, 2008 CPS (http://www.bls.census.gov/cps_ftp.html) [11]. Data on national distributions for age, race, gender, Hispanic ethnicity, education and location within the U.S. Descriptive statistics were used to calculate the percentage of condom use at most recent penile–vaginal intercourse as a function of sociodemographic variables, partner relationship, and event characteristics. Approximate 95% percent confidence intervals were calculated around the percentages using adjusted Wald methods.

Results

Characteristics of the Sample

Sociodemographic description of the 414 adolescent male and 406 adolescent female participants is in Table 1. Distributions by age, race/ethnicity, and geographic region of residence reflect that of U.S. adolescents at the time of the survey. For example, the 2008 U.S. CPS reported 23.11% of 14-year-old males and 22.88% of 14-year-old females (compared with 22.8% and 22.9% for 14-year-old males and females in our study). The U.S. population of black, non-Hispanic males aged 14–17 was 14.67%, compared with 13.4% in our study.

Sexual Behaviors

Gender- and age-specific rates of solo masturbation, partnered masturbation, oral sex—given, oral sex—received, penile–vaginal intercourse, anal intercourse, and any partnered sexual behavior are shown in Table 2. These data highlight the developmental and gendered aspects of sexual behavior during adolescence. First, the prevalence of recent (past 90 days) solo masturbation is high (43% of males and 37% of females) even among 14-year-olds. The proportion of each subsequent age group of males reporting recent masturbation increases (to about two-thirds of 17-year-old males). However, the proportion of females reporting recent masturbation remains stable (about one-third of each age) in all age groups.

Second, rates of recent oral sex (both given and received) are relatively low for 14-year-olds (4.3% with female partners for young men and 6.6% with male partners for young women) but both generally increase in successive age groups. Females generally report higher rates than males of given oral sex, although a slightly higher proportion of 17-year-old males report giving oral sex than do females. Rates of receiving oral sex were higher for males than females, except among 14-year-olds.

Third, across all age groups, 20.5% of males and 22.6% of females reported lifetime penile–vaginal sexual experience. For males, these proportions change sharply between ages 14 and 15 years, with 2.2% of 14-year-olds and 17.3% of 15-year-

Table 1 Weighted participant characteristics for total adolescent sample (N = 820) and by gender

	Total sample		Males (N = 414)		Females (N = 406)	
Sample characteristics	%	N	%	N	%	N
Age (in years)						
14	22.8	187	22.8	94	22.9	93
15	23.9	196	23.9	99	23.9	97
16	27.7	227	27.4	113	28.1	114
17	25.5	209	25.9	107	25.1	102
Ethnicity						
White	60.5	494	61.3	253	59.6	241
Black, non-Hispanic	14.0	114	13.4	55	14.6	59
Hispanic	18.4	150	18.6	77	18.2	74
Other, non-Hispanic	7.2	59	6.7	28	7.6	31
Education						
Grade 6–7	4.5	37	5.4	22	3.6	15
Grade 8–9	43.0	351	45.1	186	40.9	165
Grade 10–12	48.1	392	44.7	184	51.5	209
Graduated or GED*	4.1	34	4.4	18	3.9	16
Not in school	0.2	1	0.4	1	0.0	0
Sexual orientation						
Heterosexual	93.3	765	96.1	398	90.5	367
Bisexual	1.0	8	1.5	6	8.4	34
Homosexual	4.9	40	1.8	7	0.2	1
Other	0.8	6	0.6	2	0.9	3
Relationship status						
Have girlfriend	19.5	159	37.1	154	1.4	6
Have boyfriend	18.2	148	1.7	7	35.1	142
Hanging out	8.5	69	7.9	33	9.1	37
Romantically/sexually						
None	53.9	440	53.3	221	54.4	219
Geographic region of the United States						
Northeast	18.5	151	18.7	78	18.2	74
Midwest	22.8	187	23.0	95	22.7	92
South	35.2	289	35.0	145	35.4	143
West	23.5	192	23.2	96	23.7	96
MSA status*						
Metropolitan area	16.5	135	84.0	348	82.9	336
Non-metropolitan area	83.4	684	16.0	66	17.1	69
Annual household income*						
Less than $25,000	12.7	104	12.6	52	12.8	52
$25,000–$49,999	21.7	178	20.8	86	22.6	92
$50,000–$74,999	20.9	171	20.8	86	21.0	85
Over $75,000	44.7	367	45.8	190	43.6	177
Grades in school						
Mostly A	39.0	319	32.6	135	45.6	184
Mostly B	39.4	322	38.7	160	40.1	162
Mostly C or lower	21.6	176	28.7	118	14.3	58

*Income based on family income reported by parent or guardian. GED = General Educational Development; MSA = Metropolitan Statistical Area.

olds reporting any lifetime penile–vaginal intercourse. A sharp increase is also seen from age 16 (20.4%) to age 17 years (40%). For females, the largest increase in proportion reporting any lifetime penile vaginal intercourse was between ages 15 and 16 years, with 12.5% of 15-year-olds and 32.1% of 16-year-olds reporting any lifetime penile–vaginal intercourse. Table 2 also shows that past year and lifetime experience with penile–vaginal intercourse among 14-year-olds is quite similar for both males and females. This suggests that most of these early experiences were recent, at least within the previous year.

Fourth, rates of lifetime anal intercourse were generally low (overall, 4.7% for males and 5.5% for females). Age-related increases in proportions reporting anal intercourse experience—as seen for oral sex and penile–vaginal intercourse—were not apparent.

Finally, rates of any partnered sexual behavior mirror but are somewhat higher than rates of penile–vaginal intercourse alone. This is true for all age groups except for 14-year-old women whose rate of penile–vaginal and rate of any partnered sexual behavior (in past 90 days and lifetime) are almost identical.

Table 2 Weighted rates of adolescent sexual behaviors stratified by age and gender (N = 820)

	Males					Females				
Age (N)	14 (94)	15 (99)	16 (113)	17 (107)	Total 14–17 (414)	14 (93)	15 (97)	16 (114)	17 (102)	Total 14–17 (406)
Sexual behaviors	% Engaged in Behavior (95% CI)					% Engaged in Behavior (95% CI)				
Solo masturbation										
90 days	42.9 (33.4–53.0)	57.6 (47.8–66.9)	61.1 (51.9–69.6)	67.6 (58.2–75.7)	57.8 (53.0–62.5)	36.7 (27.6–46.9)	33.0 (24.4–42.9)	37.5 (29.1–46.7)	36.4 (27.7–46.1)	35.9 (31.4–40.7)
Year	52.7 (42.7–62.5)	70.7 (61.1–78.8)	75.2 (66.5–82.3)	73.3 (64.2–80.8)	68.6 (64.0–72.9)	42.2 (32.7–52.4)	38.1 (29.1–48.1)	42.0 (33.3–51.2)	48.0 (38.6–57.6)	42.6 (37.9–47.5)
Lifetime	62.6 (52.5–71.7)	72.7 (63.2–80.5)	78.1 (69.6–84.8)	80.0 (71.4–86.5)	73.8 (69.4–77.8)	43.3 (33.7–53.4)	43.3 (33.9–53.2)	47.3 (38.4–56.4)	58.0 (48.3–67.1)	48.1 (43.3–53.0)
Partnered masturbation										
90 days	1.1 –(0.4–6.4)	6.1 (2.6–12.9)	11.5 (6.7–18.8)	12.1 (7.1–19.8)	7.9 (5.6–10.9)	6.7 (2.9–13.9)	3.1 (0.7–9.1)	13.3 (8.1–20.9)	19.0 (12.5–27.8)	10.8 (8.1–14.2)
Year	2.1 (0.1–7.9)	8.1 (4.0–15.4)	15.0 (9.5–22.8)	17.2 (11.1–25.5)	10.9 (8.2–14.3)	10.0 (5.2–18.0)	5.2 (2.0–11.9)	15.0 (9.5–22.8)	24.0 (16.7–33.2)	13.8 (10.8–17.5)
Lifetime	3.2 (0.7–9.4)	8.1 (4.0–15.4)	21.2 (14.6–29.7)	19.2 (12.8–27.8)	13.4 (10.4–17.0)	11.1 (6.0–19.3)	7.2 (3.3–14.4)	15.0 (9.5–22.8)	26.0 (18.4–35.3)	15.0 (11.8–18.8)
Gave oral sex‡										
90 days	4.3 (1.4–10.8)	9.2 (4.7–16.7)	8.0 (4.1–14.7)	24.8 (17.5–33.8)	11.7 (8.9–15.2)	6.6 (2.8–13.8)	11.3 (6.3–19.3)	21.2 (14.6–29.6)	20.0 (13.3–28.9)	15.2 (12.0–19.0)
Year	4.3 (1.4–10.8)	11.2 (6.2–19.1)	8.8 (4.7–15.6)	27.9 (20.2–37.1)	13.2 (10.3–16.8)	7.7 (3.6–15.2)	16.5 (10.3–25.2)	22.1 (15.4–30.6)	26.0 (18.4–35.3)	18.5 (15.0–22.6)
Lifetime	4.3 (1.4–10.8)	11.2 (6.2–19.1)	9.7 (5.3–16.7)	31.4 (23.4–40.7)	14.4 (11.3–18.1)	7.7 (3.6–15.2)	18.6 (12.0–27.6)	28.3 (20.8–37.2)	30.0 (21.9–39.5)	21.7 (18.0–26.0)
Received oral sex‡										
90 days	4.3 (1.4–10.8)	17.2 (10.9–25.9)	16.8 (10.9–24.8)	29.5 (21.7–38.8)	17.3 (13.9–21.3)	6.6 (2.8–13.8)	4.1 (1.3–10.4)	16.8 (11.0–24.8)	24.0 (16.7–33.2)	13.2 (10.2–16.9)
Year	4.3 (1.4–10.8)	18.2 (11.7–27.0)	26.5 (19.2–35.3)	35.6 (27.2–45.0)	21.8 (18.1–26.0)	11.0 (5.9–19.1)	9.3 (4.8–16.9)	21.2 (14.6–29.6)	26.0 (18.4–35.3)	17.2 (13.8–21.2)
Lifetime	5.3 (2.0–12.1)	20.0 (13.2–29.0)	28.3 (20.8–37.2)	41.0 (32.1–50.5)	24.3 (20.4–28.7)	11.0 (5.9–19.1)	9.3 (4.8–16.9)	24.8 (17.7–33.5)	27.0 (19.3–36.4)	18.5 (15.0–22.6)

Table 2 Continued

	Males					Females				
Age (N)	14 (94)	15 (99)	16 (113)	17 (107)	Total 14–17 (414)	14 (93)	15 (97)	16 (114)	17 (102)	Total 14–17 (406)
Sexual behaviors	% Engaged in Behavior (95% CI)					% Engaged in Behavior (95% CI)				
Vaginal intercourse										
90 day	1.1 –(0.4–6.4)	15.2 (9.3–23.7)	10.6 (6.0–17.8)	26.9 (19.4–36.0)	13.7 (10.7–17.4)	8.8 (4.3–16.5)	6.3 (2.7–13.2)	22.3 (15.6–30.8)	25.0 (17.6–34.3)	16.0 (12.7–19.9)
Year	2.2 (0.2–8.0)	16.2 (10.1–24.8)	20.4 (13.9–28.8)	40.0 (31.2–49.5)	20.2 (16.6–24.3)	12.1 (6.8–20.4)	9.4 (4.9–17.0)	28.3 (20.8–37.2)	31.0 (22.8–40.6)	20.8 (17.1–25.0)
Lifetime	2.2 (0.2–8.0)	17.3 (11.0–26.0)	20.4 (13.9–28.8)	40.0 (31.2–49.5)	20.5 (16.9–24.7)	12.2 (6.9–20.5)	12.5 (7.2–20.7)	32.1 (24.2–41.2)	31.0 (22.8–40.6)	22.6 (18.8–26.9)
Anal intercourse*										
90 days	1.1 –(0.4–6.4)	3.1 (0.7–9.0)	2.7 (0.6–7.9)	0.0 –(0.7–4.2)	1.7 (0.8–3.5)	6.6 (2.8–13.8)	0.0 –(0.8–4.6)	2.7 (0.6–7.9)	0.0 –(0.7–4.4)	2.3 (1.2–4.3)
Year	1.1 –(0.4–6.4)	5.1 (1.9–11.6)	6.2 (2.8–12.5)	4.8 (1.8–10.9)	4.4 (2.8–6.9)	6.6 (2.8–13.8)	1.0 –(0.4–6.1)	5.4 (2.3–11.4)	4.0 (1.3–10.1)	4.3 (2.7–6.8)
Lifetime	2.2 (0.2–8.0)	5.1 (1.9–11.6)	6.2 (2.8–12.5)	4.8 (1.8–10.9)	4.7 (3.0–7.2)	7.7 (3.6–15.2)	1.0 –(0.4–6.1)	7.1 (3.5–13.5)	6.0 (2.5–12.6)	5.5 (3.6–8.2)
Any partnered sexual behavior†										
90 days	4.3 (1.4–10.8)	19.0 (12.4–27.9)	25.7 (18.5–34.5)	37.1 (28.5–46.6)	22.1 (18.4–26.4)	8.9 (4.4–16.6)	13.4 (7.9–21.7)	30.1 (22.4–39.1)	36.0 (27.3–45.7)	22.8 (19.0–27.1)
Year	5.3 (2.0–12.1)	20.2 (13.4–29.2)	33.3 (25.3–42.4)	47.6 (38.4–57.0)	27.4 (23.3–31.9)	15.6 (9.5–24.4)	20.6 (13.7–29.8)	35.4 (27.2–44.5)	39.0 (30.1–48.7)	28.3 (24.1–32.9)
Lifetime	6.4 (2.7–13.5)	21.2 (14.2–30.3)	37.2 (28.8–46.4)	49.1 (39.8–58.4)	27.6 (23.5–32.1)	13.3 (7.7–21.8)	21.6 (14.5–30.9)	38.6 (30.2–47.8)	40.0 (31.0–49.7)	29.2 (25.0–33.8)

*Anal intercourse rates for males are for acts in which they were the insertive partner. Anal intercourse rates for females are for acts in which they are the receptive partner.
†Partnered behavior includes any acts including partnered masturbation, oral sex (heterosexual), vaginal intercourse, or anal intercourse (heterosexual).
‡Oral sex rates (giving and receiving) are based on oral sex with opposite gender partner.

Characteristics of Most Recent Sexual Event

Overall, 26% of young men (108/414; Table 3) reported at least one partnered sexual event in the past year. Penile–vaginal intercourse (56/108 sexual events; 52%) and received oral sex (47/108 sexual events; 44%) were most commonly reported behaviors for males (Table 3). Condom use for penile–vaginal intercourse was reported for 80.4% of events, and was high even if other sexual behaviors were also reported. A substantial proportion of males reported receiving oral sex (48.9%) with a partner other than a boyfriend/girlfriend. About 7% (7/108) recent events included insertive/receptive anal intercourse: 2/7 events involved a male partner. Alcohol was associated with 8.8% of penile–vaginal intercourse events, and marijuana was associated with 16.6% of events.

Among females, 30.3% (123/406) reported at least one partnered sexual event in the past year (Table 4). Penile–vaginal intercourse (55/123 events; 45%) and given oral sex (40/123 events; 33%) were most commonly reported by females (Table 4). Condom use at last penile–vaginal intercourse was reported by about 69% of females, and 50% reported hormonal contraceptive use. More than two-thirds of females reported their most recent partner as a boyfriend/girlfriend for received oral sex, given oral sex, and penile–vaginal intercourse. Partner's home was the most common location for penile–vaginal intercourse.

Discussion

Data from this national sample demonstrate the extent to which sexual behavior in adolescence changes in the short time-span from age 14 to age 17. Some sexual behaviors—penile–vaginal intercourse, for example—have marked increases in prevalence with just one year increase in age. However, solo masturbation—not penile–vaginal intercourse—is the most characteristic sexual behavior of adolescence. Even when taken together, partnered sexual behaviors are reported by fewer than 50% of our adolescent participants even at age 17 and are less prevalent—within the past 90 days, within the past year, lifetime—than solo masturbation. One use of data such as these is to demonstrate the distortions introduced by our society's intense insistence on characterizing adolescents as "virgins" or "non-virgins" and "sexually active" or "not sexually active" [12].

Our data also confirm previous observations that an adolescent's sexual experience does not necessarily indicate ongoing sexual activity [13]. For example, 40% of 17-year-old males reported penile–vaginal intercourse in the past year, but only 27% reported vaginal intercourse in the past 90 days.

We found rates of oral sex to be comparable with those reported in other national surveys that collect data on adolescent sexual behavior. For example, data from 2002 NSFG showed a lifetime prevalence of 44% of males (ages 15–17) reported oral sex with a female partner and 42% of females (ages 15–17) reported oral sex with a male partner [14,15]. Our summed rates of received- and give-oral sex closely match these levels. The prevalence of oral sex experience increases with age. For 14-year-olds, less than 6% of males and 11% or less of females reported these behaviors. Among 17-year-olds, almost 1/3 report experience with these sexual behaviors.

Rates of penile–vaginal intercourse reported in our study differ from those reported in the 2009 YRBS, where 46.1% of 9th- to 12th-grade males, and 45.7% of females reported lifetime sexual intercourse [9]. Several methodological differences may explain these differences. First, approximately 25% of our sample was in 8th grade or lower, and therefore includes a larger sample of adolescents with lower rates of penile–vaginal intercourse experience. Likewise, classification by grade instead of age means that YRBS data includes persons 18 years of age and older who are more likely to have lifetime penile–vaginal sexual experience.

A more detailed look at factors associated with condom use at last vaginal intercourse showed that, in general, condom use among adolescents has become a commonplace behavior. For example, in 1988, condom use at last vaginal sex among 17-year-old young men was 53% [16]. In the 2009 YRBS, condom use at last intercourse among 12th grade males was 65.0% [9]. Condom use in our sample was even higher: 80% of males reported condom use at last penile–vaginal sex.

These data expand our current understanding of adolescent sexual behavior and provide an important detailed supplement to existing data. Substantively, we addressed a range of sexual behaviors that included both solo and partnered sexual activity. Such data allow a more complete and nuanced view of adolescent sexual behavior than that drawn from more limited assessments of behaviors. By focusing on partner gender during last partnered sex, we showed that same-sex partners are by no means absent in adolescents' sexual experience. Methodologically, we used an Internet approach to

Table 3 Male's weighted event characteristics by behaviors during the last sexual event (N = 108)

	Sexual behavior during last partnered event‡							
	Gave oral		Receive oral		Penile–vaginal intercourse		Anal intercourse (insertive/receptive)	
	No	Yes	No	Yes	No	Yes	No	Yes
Event characteristics	% (95% CI)							
Partner gender								
Male	1.2	7.7	1.6	4.3	—	—	1.0	28.6
	–(0.4–7.2)	(1.0–25.3)	–(0.5–9.6)	(0.4–15.0)	—	—	–(0.4–5.9)	(7.6–64.8)
Female	98.8	92.3	98.4	95.7	—	100.0	99.0	71.4
	(92.8–100.4)	(74.7–99.0)	(90.4–100.5)	(85.0–99.6)	—	—	(94.1–100.4)	(35.2–92.4)
Condom use†								
	75.0	88.9	77.3	80.6	—	80.4	80.4	71.4
	(64.6–83.2)	(70.7–97.1)	(65.2–86.1)	(66.9–89.6)	—	(68.0–88.8)	(71.5–87.0)	(35.2–92.4)
Relationship status of event partner								
Boyfriend/girlfriend	65.4	66.7	75.8	51.1	73.1	58.9	66.7	42.9
	(54.6–74.8)	(47.4–81.7)	(63.6–84.9)	(37.2–64.7)	(59.6–83.3)	(45.9–70.8)	(57.0–75.1)	(15.8–75.0)
Someone other than boyfriend/girlfriend	34.6	33.3	24.2	48.9	26.9	41.1	33.3	57.1
	(25.2–45.4)	(18.3–52.6)	(15.1–36.4)	(35.3–62.8)	(16.7–40.4)	(29.2–54.1)	(24.9–43.0)	(25.0–84.2)
Location of event								
Participant's home	34.6	34.6	40.0	27.7	35.3	33.9	36.0	14.3
	(25.2–45.4)	(19.3–53.9)	(28.6–52.5)	(16.8–41.9)	(23.7–48.9)	(22.9–47.0)	(27.3–45.7)	(0.5–53.3)
Partner's home	22.2	50.0	26.7	31.9	27.5	30.4	26.0	71.4
	(14.5–32.4)	(32.1–67.9)	(17.1–39.0)	(20.3–46.2)	(17.1–40.9)	(19.8–43.4)	(18.4–35.4)	(35.2–92.4)
Other (e.g., friend's home, car, woods)	43.2	15.4	33.3	40.4	37.3	35.7	38.0	14.3
	(33.0–54.0)	(5.5–34.1)	(22.8–45.9)	(27.6–54.7)	(25.4–50.9)	(24.4–48.8)	(29.1–47.8)	(0.5–53.3)
Knowledge of partner's prior sexual history								
Known other partners	21.0	37.0	16.4	35.4	15.4	33.9	21.6	71.4
	(13.5–31.1)	(21.2–56.2)	(9.0–27.8)	(23.3–49.8)	(7.7–27.8)	(22.9–47.0)	(14.6–30.6)	(35.2–92.4)
Known no other partner history	55.6	48.1	63.9	41.7	63.5	46.4	55.9	28.6
	(44.8–65.8)	(30.5–66.3)	(51.4–74.9)	(28.7–55.9)	(49.8–75.2)	(34.0–59.3)	(46.2–65.2)	(7.6–64.8)
Unknown partner history	23.5	14.8	19.7	22.9	21.2	19.6	22.5	0.0
	(15.5–33.8)	(5.2–33.5)	(11.5–31.5)	(13.1–36.9)	(12.1–34.2)	(11.2–32.0)	(15.4–31.7)	–(5.0–40.4)
Hormonal contraceptive use†								
	55.6	15.4	42.1	45.2	—	44.9	45.7	25.0
	(44.8–65.8)	(5.5–34.1)	(30.5–54.6)	(31.8–59.2)	—	(32.6–57.8)	(36.3–55.3)	(5.7–62.0)
Alcohol use								
	3.7	7.4	1.6	8.5	0.0	8.8	3.9	14.3
	(0.8–10.7)	(0.9–24.9)	–(0.5–9.6)	(2.8–20.5)	–(1.3–8.2)	(3.4–19.5)	(1.2–10.0)	(0.5–53.3)
Marijuana use								
	8.6	7.4	9.7	6.4	0.0	16.1	7.8	14.3
	(4.0–17.0)	(0.9–24.9)	(4.1–20.0)	(1.6–17.8)	–(1.3–8.2)	(8.5–28.0)	(3.8–15.0)	(0.5–53.3)

*$P \leq 0.05$, **$P \leq 0.01$, ***$P \leq 0.005$, ****$P \leq 0.001$.
‡Participants were included if they engaged in the behavior during their last sexual encounter. Participants who engaged in several behaviors are included all appropriate categories.
†Reported only for participants who engaged in penile-vaginal intercourse at last event.
CI = confidence interval.

Table 4 Female's weighted event characteristics by behaviors during the last sexual event (N = 123)

	Sexual behavior during last partnered event‡							
	Gave oral		Receive oral		Penile–vaginal intercourse		Anal intercourse (insertive/receptive)	
	No	Yes	No	Yes	No	Yes	No	Yes
Event characteristics	% (95% CI)							
Partner gender								
Male	94.0	92.7	95.9	85.2	—	100.0	94.0	100.0
	(86.3–97.7)	(79.7–98.2)	(89.5–98.7)	(66.5–94.8)	—	—	(88.0–97.3)	(51.1–105.5)
Female	6.0	7.3	4.1	14.8	—	—	6.0	0.0
	(2.3–13.7)	(1.8–20.3)	(1.3–10.5)	(5.2–33.5)	—	—	(2.7–12.0)	–(5.5–48.9)
Condom use†								
	81.3	50.0	69.2	66.7	—	69.1	72.0	40.0
	(71.4–88.3)	(35.2–64.8)	(59.4–77.6)	(47.4–81.7)	—	(55.9–79.8)	(63.3–79.3)	(11.6–77.1)
Relationship status of event partner								
Boyfriend/girlfriend	53.0	70.7	54.6	76.9	50.0	70.9	58.5	80.0
	(42.4–63.4)	(55.2–82.6)	(44.7–64.2)	(57.6–89.3)	(38.4–61.6)	(57.8–81.3)	(49.4–67.0)	(36.0–98.0)
Someone other than boyfriend/girlfriend	47.0	29.3	45.4	23.1	50.0	29.1	41.5	20.0
	(36.6–57.6)	(17.4–44.8)	(35.8–55.3)	(10.7–42.4)	(38.4–61.6)	(18.7–42.2)	(33.0–50.6)	(2.0–64.0)
Location of event								
Participant's home	30.4	23.1	28.3	26.9	30.2	25.5	28.9	20.0
	(21.5–41.0)	(12.5–38.3)	(20.2–38.0)	(13.5–46.3)	(20.5–41.9)	(15.7–38.4)	(21.5–37.7)	(2.0–64.0)
Partner's home	39.2	48.7	43.5	38.5	23.8	63.6	41.2	60.0
	(29.4–50.0)	(34.0–63.6)	(34.0–53.4)	(22.4–57.5)	(15.2–35.3)	(50.4–75.1)	(32.8–50.3)	(22.9–88.4)
Other (e.g., friend's home, car, woods)	30.4	28.2	28.3	34.6	46.0	10.9	29.8	20.0
	(21.5–41.0)	(16.5–43.7)	(20.2–38.0)	(19.3–53.9)	(34.7–57.8)	(4.7–22.2)	(22.3–38.6)	(2.0–64.0)
Knowledge of partner's prior sexual history								
Known other partners	19.3	20.0	19.8	19.2	20.9	18.2	20.5	16.7
	(12.1–29.1)	(10.2–35.0)	(13.0–28.9)	(8.0–38.3)	(12.8–32.1)	(10.0–30.5)	(14.2–28.7)	(0.6–61.7)
Known no other partner history	38.6	62.5	38.5	73.1	37.3	56.4	43.6	83.3
	(28.8–49.3)	(47.0–75.8)	(29.5–48.5)	(53.7–86.5)	(26.8–49.2)	(43.3–68.6)	(35.0–52.6)	(38.3–99.4)
Unknown partner history	42.2	17.5	41.7	7.7	41.8	25.5	35.9	0.0
	(32.1–52.9)	(8.4–32.3)	(32.4–51.6)	(1.0–25.3)	(30.8–53.7)	(15.7–38.4)	(27.8–44.9)	–(5.5–48.9)
Hormonal contraceptive use								
	46.9	55.0	54.1	37.5	—	50.0	44.7	83.3
	(36.5–57.5)	(39.8–69.3)	(44.2–63.6)	(21.6–56.6)	—	(37.2–62.8)	(36.0–53.7)	(38.3–99.4)
Alcohol use								
	7.2	20.0	11.5	11.5	8.8	16.4	12.0	0.0
	(3.1–15.2)	(10.2–35.0)	(6.4–19.5)	(3.2–29.8)	(3.8–18.3)	(8.6–28.5)	(7.2–19.2)	–(5.5–48.9)
Marijuana use								
	8.4	17.5	9.3	18.5	5.9	16.4	11.1	0.0
	(3.9–16.7)	(8.4–32.3)	(4.8–16.9)	(7.6–37.6)	(1.9–14.6)	(8.6–28.5)	(6.5–18.2)	–(5.5–48.9)

*$P \leq 0.05$, **$P \leq 0.01$, ***$P \leq 0.005$, ****$P \leq 0.001$.
†Reported only for participants who engaged in penile-vaginal intercourse at last event.
‡Participants were included if they engaged in the behavior during their last sexual encounter. Participants who engaged in several behaviors are included all appropriate categories.
CI = confidence interval.

recruit a diverse national sample of adolescents. The comparability—and key differences—of our data to that obtained in larger studies of adolescent health and risk behavior suggests potential use of smaller, focused, regular surveys of trends in adolescent sexual behavior. However, a limitation of this approach is a sample size too small to produce stable confidence intervals around our point estimates for subgroups.

Conclusions

The picture of adolescent sexual behavior that emerges from our data is one that is more complex than generally considered, but somewhat less pervasive. At any given time point, most adolescents are not engaging in any sexual behavior, with the possible exception of masturbation. However, from the perspective of prevention of adverse health consequences of sexual activity that does occur, condom use appears to have become a normative behavior for many adolescents.

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References

1 Koyama A, Corliss HL, Santelli JS. Global lessons on healthy adolescent sexual development. Curr Opin Pediatr 2009; 21:444–9.
2 Centers for Disease Control and Prevention (CDC). Trends in HIV-related risk behaviors among high school students—United States, 1991–2005. MMWR 2006;55:851–4.
3 Ott MA, Santelli JS. Abstinence and abstinence-only education. Curr Opin Obstet Gynecol 2007;19:446–52.
4 Santelli JS. Medical accuracy in sexuality education: Ideology and the scientific process. Am J Public Health 2008;98:1786–92.
5 Romer D, Sznitman S, DiClemente R, Salazar LF, Vanable PA, Carey MP, Hennessy M, Brown LK, Valois RF, Stanton BF, Fortune T, Juzang I. Mass media as an HIV-prevention strategy: Using culturally sensitive messages to reduce HIV-associated sexual behavior of at-risk African American youth. Am J Public Health 2009;99:2150–9.
6 Kelly BJ, Leader AE, Mittermaier DJ, Hornik RC, Cappella JN. The HPV vaccine and the media: How has the topic been covered and what are the effects on knowledge about the virus and cervical cancer? Patient Educ Couns 2009;77:308–13.
7 Hennessy M, Bleakley A, Fishbein M, Jordan A. Estimating the longitudinal association between adolescent sexual behavior and exposure to sexual media content. J Sex Res 2009; 46:586–96.
8 Groves RM, Mosher WD, Lepkowski JM, Kirgis NG. Planning and development of the continuous National Survey of Family Growth. Vital Health Stat 1 2009;48:1–64.
9 Centers for Disease Control and Prevention. Youth risk behavior surveillance—United States, 2009. MMWR 2010;59:1–142.
10 Baker L, Wagner TH, Singer S, Bundorf MK. Use of the internet and e-mail health care information: Results from a national survey. JAMA 2003;289:2400–6.
11 Current Population Survey December 2008. U.S. Census Bureau. 1994—[cited June 9, 2010]. Available from: http://www.bls.census.gov/ferretftp.htm.
12 Fortenberry JD. Beyond validity and reliability: Meaning-in-context of adolescents' self-reports of sexual behavior. J Adol Health 2009;44:199–200.
13 Aral SO, Cates W, Jr. The multiple dimensions of sexual behavior as risk factor for sexually transmitted disease: The sexually experienced are not necessarily sexually active. Sex Transm Dis 1989;16:173–7.
14 Lindberg LD, Jones R, Santelli JS. Noncoital sexual activities among adolescents. Adol Health 2008;43:231–8.
15 Santelli J, Carter M, Orr M, Dittus P. Trends in sexual risk behaviors, by nonsexual risk behavior involvement, U.S. high school students, 1991–2007. J Adol Health 2009;44:372–9.
16 Pleck JH, Sonenstein FL, Ku L. Changes in adolescent males' use of and attitudes toward condoms, 1988–1991. Fam Plann Perspect 1993;25:106–9.

Sexual Behaviors, Condom Use, and Sexual Health of Americans Over 50: Implications for Sexual Health Promotion for Older Adults

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ABSTRACT

Introduction. In the contemporary U.S., men and women are living longer and healthier lives. As such, many people spend greater portions of their lives as sexually active individuals. Yet, little is known about the myriad of ways that older adults experience their sexual lives.

Aim. This study sought to assess the context and frequency of sexual behaviors, condom use, sexual pleasure, and sexual experience of men and women over age 50.

Methods. Information regarding the sexual experiences of a nationally representative sample of men and women over age 50 within the past year was examined.

Main Outcome Measures. Sexual behavior over the past year was assessed in relation to several situational and contextual characteristics (e.g., event location, type of partner, health status, condom use). Participants were also asked about their experience (i.e., pleasure, arousal, pain, lubrication/erectile difficulties, and orgasm) during their most recent partnered sexual event. Bivariate or ordinal logistic regression models were used to investigate the relationship of age, health and partner status to sexual frequency and experience.

Results. Although sizable proportions (20–30%) of both men and women remained sexually active well into their 80s age was related to a lower likelihood of solo and most partnered sexual behaviors. When controlling for age, relationship status, and health remained significant predictors of select sexual behaviors. The participant's evaluation of their most recent sexual experience in terms of arousal, erectile difficulty, and orgasm all declined with age. Health status was related to men's evaluation of the experience. Relationship status was the most consistent predictor of women's evaluation of the experience. Condom use rates remained low for participants across age groups.

Conclusion. Many older adults continue be sexually active well into advanced age (80+). Thus, providers need to be attentive to the diverse sexual health needs of older adults. **Schick V, Herbenick D, Reece M, Sanders SA, Dodge B, Middlestadt SE, and Fortenberry JD. Sexual behaviors, condom use, and sexual health of Americans over 50: Implications for sexual health promotion for older adults. J Sex Med 2010;7(suppl 5):315–329.**

Key Words. Older Adults; Aging; Condoms; Sexual Health; Sexual Behavior; Sexual Experiences of Men and Women over Age 50 Years

Introduction

In the contemporary U.S., men and women are healthier and more active at older ages than previous generations [1,2]. Thus, people spend greater portions of their lives as sexually active individuals, engaging in varying amounts of solo and/or partnered sex [1,2]. Although advancing age is marked by hormonal, physical, social, psychological, and physiological changes that may

affect sexual function [1], the ways that people experience sex in older age has changed markedly because of the availability of medical products (such as prescription medications for erectile function) [3,4], an expanded range of sexual enhancement products (such as vibrators and lubricants), and consumer marketing messages that shape expectations for sex and relationships in advanced age [5,6]. Each of these advances expands opportunities for the sexual lives of men and women or, alternatively, may increase pressure to be sexual in ways that older adults were not expected to be in earlier generations [7].

In spite of these evolving realities and expectations, systematic research about the sexual behavior of older adults in the United States is fairly recent, having begun following suggestions in the 1990s that scientists should study sexual behavior of the elderly given the risk of HIV/AIDS [8–11]. Many national studies of sexual behaviors have not surveyed individuals older than their 50s or 60s or, sample sizes of older adults have been too small to be representative of older men and women in the general population. The few large-scale national probability studies of the sexual lives of older adults have often focused on condom use and sexual risk (e.g., HIV/AIDS) [8,12–14] or have been exclusive to one gender [15].

As men and women age they may experience prominent lifestyle changes marked by fluctuations in their employment, health and/or relationship status. Thus, although adults may be sexually active or experience sexual problems at any age, compared with studies of younger adults, these constructs tend to have a greater influence on the sexual behavior of older men and women [16–18]. In particular, relationship status can function in nuanced ways for many older men and women as they find themselves in new partnerships following divorce, illness, or death of their previous partners [1]. Relationship status has been shown to be particularly relevant for women [19] who are less likely to have sexual partners in older age as compared with their male counterparts [2,20].

Although several studies have examined the "risk" of having certain sexual problems, the limited information about the range of sexual behaviors and experiences of older adults has impeded the ability of researchers/practitioners to differentiate between normative progressions in sexual experience and "dysfunctions" as related to orgasm, erections, or vaginal dryness [2,21,22]. Specifically, little is known about the myriad of ways that older people experience their sexual lives, such as the range of sexual behaviors they may engage in at any one event, the proportion of individuals who engage in same-sex sexual behaviors or the extent to which they find sex to be pleasurable.

Aims

The purpose of this study was to assess, in a subsample of a nationally representative probability sample, the sexual behaviors, condom use, sexual pleasure, and sexual experience as reported by adults aged 50 or older, and examine the situational characteristics of these sexual experiences.

Methods

Data presented are from the National Survey of Sexual Health and Behavior (NSSHB), conducted during early 2009. NSSHB data were collected using a population-based cross-sectional survey of adolescents and adults in the United States via research panels of Knowledge Networks (Menlo Park, CA, USA). Research panels accessed through Knowledge Networks are based on a national probability sample established using both random digit dialing (RDD) and an address-based sampling (ABS) frame. ABS involves the probability sampling of a frame of residential addresses in the United States derived from the U.S. Postal Service's Delivery Sequence File, which contains detailed information on every mail deliverable address in the United States. Collectively, the sampling frame from which participants are recruited covers approximately 98% of all U.S. households. Randomly selected households are recruited to panels through a series of mailings and subsequently by telephone follow-ups to nonresponders when possible. Once an individual agrees to be in a panel of Knowledge Networks, they are provided with access to the Internet and computer hardware if needed, and data collection by Knowledge Networks occurs via the Internet. Multiple health-related studies have substantiated the validity of such methods for obtaining data from nationally representative samples of the U.S. population [5,6,23–26].

For the NSSHB, to further correct sources of sampling and nonsampling error, study samples were corrected with post-stratification adjustments using demographic distributions from the most recent data available (at the time of the study) from the Current Population Survey (CPS), the monthly population survey conducted by the U.S.

Bureau of the Census considered to be the standard for measuring demographic and other trends in the U.S. These adjustments result in a panel base weight that was employed in a probability-proportional-to-size selection method for establishing the samples for this study. Population specific distributions for this study were based upon data from the December 2008 CPS [27].

Once the sample frame for this study was established, all adult individuals within that frame received a recruitment message from Knowledge Networks that provided a brief description of the NSSHB and invited them to participate. Of 6,182 adults (≥18 years), 5,045 (82%) consented to and participated in the study. Adults were defined as "older" and included in the present study if they were over the age of 50 (972 men, 1,001 women). The age criterion was defined as 50+ in order to ease comparisons with similar studies [2,12–13,15–17,20,22] and because it exceeds the criteria set through the AARP [18]. All study protocols were approved by the Institutional Review Board of the primary authors' academic institution.

Main Outcome Measures

Sociodemographic Characteristics

Table 1 presents summaries of participants' Sociodemographic characteristics.

Past Year Sexual Behaviors

Sexual behavior was assessed by asking participants if (within the past month, 3 months, year, more than 1 year) they had engaged in sexual behaviors (solo masturbation, frottage, receiving oral sex, giving oral sex, vaginal intercourse, and insertive/receptive anal intercourse). Participants who reported having participated in solo masturbation or penile–vaginal intercourse within the past year were asked to rate the frequency with which they had participated in that behavior on average during the past year: (i) a few times per year; (ii) about once a month; (iii) a few times per month; (iv) about once per week; (v) two to three times per week; (vi) almost every day; or (vii) more than once per day.

Health Status

Participants were asked to report their overall health on a Likert-type item ranging from excellent to poor [29]. The variables were collapsed into groups based on their theoretical similarity in order to allow for meaningful comparisons across groups when cell sizes were small. For these analyses, this measure was dichotomized into good (excellent, very good, good) and poor (fair, poor) health. Additionally, participants were asked to characterize their current relationship status as: (1) single and not dating; (2) single and dating/hanging out with someone; (3) in a relationship but not living together; (4) living together but not married; (5) married and living together; or (6) married but not living together. These categories were dichotomized by designating all single participants (1 and 2) into the "single" category and all participants in a relationship (3 to 5) into the "relationship" category.

Most Recent Partnered Sexual Event

Characteristics of the Event

Participants who reported engaging in a partnered sexual event within the past year were asked about details of the event. Questions related to the context of the event asked about the location (at home, my sex partner's home, a friend's home, car/truck/van, hotel/motel, a public space or car/truck, sex or swinger's club, other) and the sexual acts that occurred during the event including frottage (e.g., dry sex or humping), giving oral sex, receiving oral sex, penile–vaginal intercourse, and anal sex.

Partner and Event Characteristics

Regarding their most recent sexual event, participants reported the gender of their partner (male or female) and relationship to the partner (spouse/domestic partner, boyfriend/girlfriend or significant other, casual dating partner or someone they are hanging out with, friend, someone they just met, someone who offered payment or something in return for the sexual activity, other). When dichotomized, spouse/domestic partner and boyfriend/girlfriend were designated as one category (relationship sexual partner) whereas the remainder of the categories were collapsed into another category (nonrelationship sexual partner). Participants were also asked about their partner's sexual history within the past 6 months (known to have had other partners, not known to have had other partners other partners, known to have not had other partners) and their own and their partner's sexually transmitted infection (STI) status at the time of the event (no known STI, unknown STI, known STI). Lifetime behavior of STI/HIV testing (within the past year, tested over a year ago and never tested) and diagnosis history (never, within their lifetime) were also assessed.

Table 1 Weighed participant characteristics for all adults (N = 1,974) over 50 in the NSSHB

	Men (N = 972)		Women (N = 1,002)	
Sample characteristics	%	N	%	N
Age				
50–59	48.0	466	45.1	452
60–69	33.1	322	34.2	342
≥70	18.9	184	20.7	207
Ethnicity				
White, non-Hispanic	74.3	722	74.3	744
Black, non-Hispanic	10.9	106	11.8	118
Hispanic	9.1	89	8.2	82
Other, non-Hispanic	5.7	55	5.7	58
Education				
Less than high school	16.2	158	15.6	156
High school graduate	32.4	315	34.1	341
Some college	23.3	226	28.9	289
Bachelors degree or higher	28.1	274	21.5	215
Sexual orientation				
Heterosexual	91.2	886	95.1	952
Bisexual	5.3	52	0.9	9
Homosexual	1.8	18	1.1	11
Asexual	1.0	9	1.6	16
Other	0.7	7	1.4	14
Marital status				
Married	51.9	505	41.6	416
Never married	5.1	50	16.9	170
Divorced	18.5	179	21.8	218
Living together–not married	2.5	24	3.2	32
Separated	15.9	154	12.0	120
Widowed	6.1	59	4.6	46
Relationship status				
Single, not dating	26.8	260	41.3	414
Single, dating one or more person	5.6	55	5.1	51
In relationship, not living together	7.3	71	6.3	63
In relationship, living together	8.2	79	5.1	51
Married, living together	50.7	493	39.5	396
Married, not living together	1.3	13	2.7	27
Geographic region of United States				
Northeast	18.3	178	23.2	232
Midwest	23.4	228	21.4	214
South	35.7	347	36.2	363
West	22.6	219	19.2	192
Metropolitan Statistical Area (MSA) status				
Metropolitan area	18.8	182	20.7	207
Nonmetropolitan area	81.2	790	79.3	794
Annual household income				
Less than $25,000	25.3	246	32.5	326
$25,000–$49,999	31.4	306	32.0	320
$50,000–74,999	19.6	190	17.5	175
Over $75,000	23.7	231	18.0	180
Children under 18 in household				
No	91.0	885	91.9	920
Yes	9.0	88	8.1	81
Working status				
Working-paid employee	35.9	350	36.3	364
Self-employed	10.7	104	6.2	62
Not currently working	53.4	519	57.5	575
Health status				
Excellent	9.0	88	7.9	79
Very good	33.6	326	37.2	371
Good	36.9	359	36.6	365
Fair	16.7	162	14.7	146
Poor	3.8	36	3.6	36

Participants were asked about any alcohol use by themselves or their partner. Finally, men were asked to report whether they used any medications to help attain or maintain an erection during the sexual event.

Experience of the Event

The participant's perception of the event was evaluated through several items regarding perceptions of pleasure, arousal, orgasm (own and partner's) along with any pain or lubrication/erectile difficulties experienced during the event. Pleasure, arousal, pain, and lubrication difficulties were assessed using a 5-point Likert-type scale from "not at all" to "extremely" (items presented in Table 5). Orgasm was assessed via a trichotomous response option (orgasm, no orgasm, unsure).

Analysis

All analyses were conducted using SPSS version 17.0 (SPSS Inc., Chicago, IL, USA). Post-stratification data weights were utilized throughout the analyses in order to maximize the generalizablity of the sample characteristics to the population [30]. Post-stratification adjustments were based upon current U.S. Census data on national distributions for age, race, gender, Hispanic ethnicity, education and location within the United States. The analyses were conducted individually for men and women. Descriptive statistics were used to report frequencies of sexual behavior over the past year. Participants who reported partnered sexual behavior within the past year were asked a series of questions regarding the context and experience of their last sexual event. Descriptive statistics were employed to assess these rates as well as the characteristics of participants who reported penile–vaginal intercourse at last event, segregated by age and condom usage. Approximate 95% percent confidence intervals were calculated around the percentages using adjusted Wald methods [28]. The relationship between age, partner status and health on the less prevalent sexual behaviors (i.e., frottage, oral sex, and anal intercourse) were tested with a bivariate logistic regression model. An ordinal logistic regression model was constructed to assess the relationship of age, partner status and health on frequency rates for masturbation and penile–vaginal intercourse. Analyses were duplicated for the participant's evaluation of their last sexual experience utilizing a bivariate logistic regression model for dichotomous outcomes (participant and partner orgasm) and an ordinal logistic regression model for pleasure, arousal, erection/lubrication difficulty and pain. All ordinal logistic regression models were run with a complementary log-log link because of the uneven distribution of the responses skewed towards reports of a more positive experience.

Results

Characteristics of the Sample

After utilizing post-stratification weights, the characteristics of the sample closely matched those available through the most recent U.S. Census data [27]. Participants ranged in age from 50 to 107 when the sample was unweighted. However, once weighted, the upper age range was 94, with both men ($M = 61.74$; $SD = 9.00$) and women ($M = 62.16$; $SD = 8.90$) reporting a median age of 60. Reported health status varied with most participants reporting that they were in good health. Additional Sociodemographic characteristics, including relationship status, are presented in Table 1.

Sexual Behaviors in the Past Year

Sexual behavior rates over the past year are presented separately for men and women in Table 2. Most men (63.46%, $N = 601$) and approximately half of the women (46.73%, $N = 443$) reported masturbating within the past year. Masturbation rates for men and women were similar to rates of other behaviors with 65.5% ($N = 627$) of men and 45.1% ($N = 437$) of women reporting frottage, oral sex, penile–vaginal intercourse, or anal intercourse within the past year. Of the men and women who reported engaging in penile–vaginal intercourse, 66.7 % ($N = 339$) of men and 67.7% ($N = 271$) reported engaging in penile–vaginal intercourse a few times per month or more frequently.

Logistic regression models of sexual behaviors as a function of age, health status, current relationship status, erectile medication (men only) and work status (frequency items only) are presented in Table 2. For men, after controlling for other variables, the odds ratio for giving oral sex and anal intercourse decreased 8% per year of age. Compared with participants with good health, participants with poor health reported a higher frequency of solo and frottage. Relationship status was related to both solo masturbation and penile–vaginal intercourse, but in opposite directions, with single participants (compared with partnered participants) reporting a higher frequency of solo

Table 2 Weighted sexual activity within the past year, stratified by age and gender

		Men						
		50–59	60–69	70–79	80+	Age by sexual frequency†	Health by sexual frequency‡	Relationship by sexual frequency§
Sexual activity within the past year	All respondents (N = 972)	% Frequency of behavior in past year (N) 95% CI				Adjusted odds ratio†† (95% CI)	Adjusted odds ratio†† (95% CI)	Adjusted odds ratio†† (95% CI)
Masturbation						0.97**** (0.95–0.98)	1.57*** (1.15–2.14)	1.60**** (1.22–2.09)
Not in past year	36.5% (346) (33.5%–39.7%)	28.1% (127) (24.1%–32.4%)	38.8% (123) (33.6%–44.3%)	45.8% (60) (37.5%–54.3%)	76.6% (36) (62.6%–86.6%)			
A few times per year	25.8% (244) (23.1%–28.6%)	24.3% (110) (20.6%–28.5%)	29.3% (93) (24.6%–34.6%)	26.7% (35) (19.9%–34.9%)	12.8% (6) (5.6%–25.5%)			
A few times per month	20.0% (189) (17.5%–22.6%)	23.7% (107) (20.0%–27.8%)	18.0% (57) (14.1%–22.6%)	16.0% (21) (10.7%–23.3%)	8.5% (4) (2.8%–20.5%)			
2 or 3 times per week	13.2% (125) (11.2%–15.5%)	17.5% (79) (14.2%–21.3%)	10.1% (32) (7.2%–13.9%)	9.9% (13) (5.8%–16.4%)	2.1% (1) –(0.7%–12.1%)			
4 or more times per week	4.5% (43) (3.4%–6.1%)	6.4% (29) (5.0%–8.2%)	3.8% (12) (2.7%–5.2%)	1.5% (2) (0.9%–2.5%)	0.0% (0) –(1.5%–9.0%)			
Partnered masturbation						0.95*** (0.92–0.97)	2.15*** (1.28–3.60)	1.20 (0.74–1.93)
None	78.4% (732) (75.6%–80.9%)	72.1% (325) (67.7%–76.0%)	83.0% (258) (78.4%–86.7%)	85.7% (108) (78.5%–90.9%)	89.1% (41) (76.5%–95.7%)			
Within the past year	21.6% (202) (19.1%–24.4%)	27.9% (126) (24.0%–32.3%)	17.0% (53) (13.3%–21.6%)	14.3% (18) (9.1%–21.5%)	10.9% (5) (4.3%–23.5%)			
Gave oral sex‡‡						0.94*** (0.92–0.97)	0.71 (0.42–1.18)	0.94 (0.59–1.51)
None	62.9% (591) (59.7%–65.9%)	55.9% (254) (51.3%–60.4%)	65.7% (203) (60.2%–70.8%)	74.8% (98) (66.7%–81.5%)	78.3% (36) (64.2%–87.9%)			
Within the past year	37.1% (349) (34.1%–40.3%)	44.1% (200) (39.6%–48.7%)	34.3% (106) (29.2%–39.8%)	25.2% (33) (18.5%–33.3%)	21.7% (10) (12.1%–35.8%)			
Received oral sex‡‡						0.92*** (0.90–0.95)	1.37 (0.80–2.35)	0.68 (0.42–1.11)
None	60.7% (572) (57.5%–63.7%)	51.5% (234) (47.0%–56.1%)	62.5% (195) (57.0%–67.7%)	79.4% (104) (71.6%–85.5%)	84.8% (39) (71.5%–92.7%)			
Within the past year	39.3% (371) (36.3%–42.5%)	48.5% (220) (43.9%–53.0%)	37.5% (117) (32.3%–43.0%)	20.6% (27) (14.5%–28.4%)	15.2% (7) (7.3%–28.5%)			
Penile–vaginal intercourse (PVI)						0.99 (0.97–1.00)	0.83 (0.61–1.14)	0.41**** (0.31–0.55)
Not in past year	46.4% (440) (43.3%–49.6%)	42.4% (193) (38.0%–47.0%)	46.3% (146) (40.9%–51.9%)	53.8% (70) (45.3%–62.2%)	64.6% (31) (50.4%–76.6%)			
A few times per year	17.8% (169) (15.5%–20.4%)	18.2% (83) (15.0%–22.1%)	16.5% (52) (12.8%–21.0%)	20.0% (26) (14.0%–27.7%)	16.7% (8) (8.4%–29.8%)			
A few times per month	24.6% (233) (21.9%–27.4%)	25.9% (118) (22.1%–30.2%)	25.4% (80) (20.9%–30.5%)	20.0% (26) (14.0%–27.7%)	18.8% (9) (10.0%–32.2%)			
2 or 3 times per week	10.2% (97) (8.5%–12.3%)	11.9% (54) (9.2%–15.2%)	11.4% (36) (8.3%–15.4%)	5.4% (7) (2.4%–10.9%)	0.0% (0) –(1.4%–8.8%)			
4 or more times per week	0.9% (9) (0.5%–1.8%)	1.5% (7) (0.7%–3.2%)	0.3% (1) –(0.1%–2.0%)	0.8% (1) –(0.3%–4.7%)	0.0% (0) –(1.4%–8.8%)			
Anal intercourse§§						0.92**** (0.87–0.96)	1.07 (0.53–2.17)	1.77 (0.96–3.26)
None	92.3% (864) (90.4%–93.9%)	88.7% (400) (85.4%–91.3%)	94.2% (294) (91.0%–96.4%)	97.6% (123) (92.9%–99.5%)	100.0% (47) (91.0%–101.5%)			
Within the past year	7.7% (72) (6.1%–9.6%)	11.3% (51) (8.7%–14.6%)	5.8% (18) (3.6%–9.0%)	2.4% (3) (0.5%–7.1%)	0.0% (0) –(1.5%–9.0%)			

*$P \leq 0.05$, **$P \leq 0.01$, ***$P \leq 0.005$, ****$P \leq 0.001$.
†Age was entered into the model as a continuous variable. Significant odds ratios under 1 indicate a decrease in behavior as a function of age. Significant odds ratios over 1 indicate an increase in behavior as a function of age.
‡Good health was entered into the model as the referent category. Significant odds under 1 indicate that poor health is related to a decrease in the frequency of the behavior. Significant odds ratios over 1 indicate that poor health is related to an increase in the frequency of behavior.
§A partnered relationship status was coded as the referent. Significant odds under 1 indicate that being single is related to a decrease in the frequency of the behavior. Significant odds over 1 indicate that being single is related to an increase in the frequency of behavior.
¶Adjusted odds ratios are based on a ordinal or bivariate logistic regression model including age, health, relationship with their last sexual partner and work status (masturbation and PVI frequency only).
††Adjusted odds ratios are based on a ordinal or bivariate logistic regression model including age, health, relationship with their last sexual partner, erectile medication use, and work status (masturbation and PVI frequency only).
‡‡Oral sex rates are reported for behavior with a partner of the opposite gender.
§§Anal intercourse indicates receptive intercourse for female participants and insertive intercourse for male participants.
CI = confidence interval.

masturbation and a lower frequency of penile–vaginal intercourse.

For women also, older age was related to a decline in all sexual behaviors: 5% per year of age for penile–vaginal intercourse; 7% per year for both oral sexual behaviors. Additionally, poor health was related to a lower frequency in received oral sex, given oral sex, and penile–vaginal inter-

	Women						
	50–59	60–69	70–79	80+	Age by sexual frequency†	Health by sexual frequency‡	Relationship by sexual frequency§
All respondents (N = 1,001)	% Frequency of behavior in past year (N) 95% CI				Adjusted odds ratio¶ (95% CI)	Adjusted odds ratio¶ (95% CI)	Adjusted odds ratio¶ (95% CI)
					0.97**** (0.95–0.98)	0.88 (0.68–1.14)	1.26* (1.04–1.53)
53.3% (505) (50.1%–56.4%)	46.2% (199) (41.5%–50.9%)	54.0% (177) (48.6%–59.3%)	64.0% (89) (55.8%–71.5%)	80.0% (40) (66.8%–88.9%)			
34.3% (325) (31.3%–37.4%)	36.7% (158) (32.2%–41.3%)	35.7% (117) (30.7%–41.0%)	30.2% (42) (23.2%–38.3%)	16.0% (8) (8.1%–28.8%)			
10.7% (101) (8.8%–12.8%)	13.9% (60) (11.0%–17.5%)	9.8% (32) (7.0%–13.5%)	5.0% (7) (2.3%–10.2%)	4.0% (2) (0.3%–14.2%)			
1.3% (12) (0.7%–2.2%)	2.6% (11) (1.4%–4.6%)	0.3% (1) –(0.1%–1.9%)	0.0% (0) –(0.5%–3.2)	0.0% (0) –(1.4%–8.5%)			
0.5% (5) (0.2%–1.3%)	0.7% (3) (0.3%–1.5%)	0.3% (1) –(0.1%–1.95%)	0.7% (1) (0.3%–1.5%)	0.0% (0) –(1.4%–8.5%)			
					0.95** (0.92–0.97)	0.81 (0.46–1.43)	0.19**** (0.11–0.31)
86.4% (810) (84.0%–88.4%)	82.3% (353) (78.4%–85.6%)	86.9% (279) (82.8%–90.2%)	92.8% (128) (87.0%–96.2%)	100.0% (50) (91.5%–101.4%)			
13.6% (128) (11.6%–16.0%)	17.7% (76) (14.4%–21.6%)	13.1% (42) (9.8%–17.2%)	7.2% (10) (3.8%–13.0%)	0.0% (0) –(1.4%–8.5%)			
					0.93**** (0.90–0.95)	0.33**** (0.19–0.58)	0.13**** (0.09–0.19)
74.2% (697) (71.3%–76.9%)	63.8% (272) (59.2%–68.3%)	76.6% (246) (71.7%–80.9%)	92.2% (130) (86.4%–95.7%)	96.1% (49) (86.0%–99.7%)			
25.8% (242) (23.1%–28.7%)	36.2% (154) (31.7%–40.8%)	23.4% (75) (19.1%–28.3%)	7.8% (11) (4.3%–13.6%)	3.9% (2) (0.3%–14.0%)			
					0.93**** (0.91–0.95)	0.25**** (0.14–0.45)	0.16**** (0.11–0.24)
74.4% (701) (71.5%–77.1%)	65.8% (281) (61.2%–70.2%)	75.2% (243) (70.2%–79.6%)	90.7% (127) (84.6%–94.6%)	96.2% (50) (86.3%–99.7%)			
25.6% (241) (22.9%–28.5%)	34.2% (146) (29.8%–38.8%)	24.8% (80) (20.4%–29.8%)	9.3% (13) (5.4%–15.4%)	3.8% (2) (0.3%–13.7%)			
					0.95**** (0.94–0.96)	0.42**** (0.30–0.61)	0.11**** (0.08–0.15)
58.0% (553) (54.9%–61.1%)	49.0% (212) (44.3%–53.7%)	58.1% (190) (52.7%–63.3%)	73.2% (104) (65.4%–79.9%)	92.2% (47) (81.0%–97.4%)			
13.5% (129) (11.5%–15.9%)	15.2% (66) (12.2%–18.9%)	13.1% (43) (9.9%–17.3%)	13.4% (19) (8.7%–20.0%)	2.0% (1) –(0.6%–11.3%)			
20.3% (193) (17.8%–22.9%)	23.6% (102) (19.8%–27.8%)	22.6% (74) (18.4%–27.5%)	10.6% (15) (6.4%–16.8%)	3.9% (2) (0.3%–14.0%)			
6.8% (65) (5.4%–8.6%)	10.9% (47) (8.2%–14.2%)	5.2% (17) (3.2%–8.2%)	0.0% (0) –(0.5%–3.2%)	2.0% (1) –(0.6%–11.3%)			
1.4% (13) (0.8%–2.3%)	1.4% (6) (0.6%–3.1%)	0.9% (3) (0.2%–2.8%)	2.8% (4) (0.9%–7.3%)	0.0% (0) –(1.4%–8.4%)			
					0.93*** (0.89–0.98)	0.34 (0.10–1.19)	0.43* (0.22–0.96)
95.9% (906) (94.4%–97.0%)	94.4% (404) (91.8%–96.2%)	96.0% (312) (93.2%–97.7%)	98.6% (141) (94.7%–99.9%)	100.0% (49) (91.3%–101.4%)			
4.1% (39) (3.0%–5.6%)	5.6% (24) (3.8%–8.2%)	4.0% (13) (2.3%–6.8%)	1.4% (2) (0.1%–5.3%)	0.0% (0) –(1.4%–8.7%)			

course. As with men, single women reported a higher frequency of masturbation and a lower frequency of all other behaviors than their partnered counterparts.

Sexual Behaviors during the Last Partnered Sexual Event

The majority of men and women reporting any partnered sexual event in the past year reported that penile–vaginal sex occurred during their most recent sexual event (Table 3). Sexual patterns related to the location of the last event were similar for men and women with most participants reporting that the sexual act occurred within their own home. Although the highest percentage of men and women reported that their last sexual partner was a relationship partner, a substantial minority of participants reported sex with a friend, new acquaintance or for transactional purposes. Although most participants reported a sex partner of the other sex, 9% of men and 2% of women reported a same-sex partner during their most recent sexual event. Almost a quarter of the men (23.5%, N = 92) and over 13% of women (N = 32) reported alcohol intake by themselves or their partner prior to the last event. Erectile medication

Table 3 Weighted description of the most recent sexual event (within the past year), stratified by age

	Men					Women				
		50–59	60–69	70–79	80+		50–59	60–69	70–79	80+
Most recent partnered sexual event	All respondents (N = 393)	% endorsed items (N) 95% CI				All respondents (N = 236)	% endorsed items (N) 95% CI			
Sexual behaviors										
Frottage	23.2% (91) (20.2%–26.4%)	20.6% (43) (16.8%–24.9%)	27.6% (34%) (22.2%–33.8%)	25.0% (11) (15.3%–37.9%)	17.6% (3) (6.1%–39.7%)	18.6% (44) (15.1%–22.8%)	19.4% (25) (14.7%–25.1%)	19.3% (16) (13.5%–26.8%)	14.3% (3) (5.2%–31.7%)	0.0% (0) –(52%–71.0%)
Gave oral sex	35.9% (141) (32.4%–39.5%)	41.6% (87) (36.8%–46.6%)	30.1% (37) (24.5%–36.3%)	27.3% (12) (17.2%–40.3%)	29.4% (5) (13.9%–51.6%)	33.8% (80) (29.2%–38.6%)	35.7% (46) (29.6%–42.2%)	34.5% (29) (27.0%–42.9%)	23.8% (5) (11.7%–42.0%)	0.0% (0) –(5.2%–71.0%)
Received oral sex	39.8% (156) (36.2%–43.5%)	45.0% (94) (40.1%–50.0%)	43.9% (54) (37.6%–50.4%)	13.6% (6) (6.6%–25.4%)	12.5% (2) (2.9%–34.1%)	23.6% (56) (19.7%–28.1%)	24.0% (31) (18.9%–30.1%)	23.8% (20) (17.4%–31.7%)	23.8% (5) (11.7%–42.0%)	0.0% (0) –(5.2%–71.0%)
Penile–vaginal sex	73.0% (286) (69.5%–76.1%)	73.7% (154) (69.1%–77.8%)	78.0% (96) (72.2%–82.9%)	59.1% (26) (45.9%–71.1%)	62.5% (10) (40.9%–80.1%)	86.0% (203) (82.2%–89.1%)	89.1% (115) (84.3%–92.7%)	84.3% (70) (77.2%–89.6%)	76.2% (16) (58.0%–88.3%)	66.7% (2) (15.4%–96.0%)
Anal intercourse	4.6% (18) (3.2%–6.4%)	4.8% (10) (3.0%–7.4%)	6.5% (8) (3.9%–10.5%)	0.0% (0) –(1.3%–7.8%)	0.0% (0) –(2.9%–19.0%)	1.7% (4) (0.7%–3.6%)	3.1% (4) (1.4%–6.4%)	0.0% (0) –(0.6%–3.3%)	0.0% (0) –(2.2%–13.9%)	0.0% (0) –(5.2%–71.0%)
Location										
Own home	74.8% (294) (70.3%–78.9%)	77.6% (163) (71.5%–82.8%)	75.6% (93) (67.3%–82.4%)	59.1% (26) (44.4%–72.3%)	75.0% (12) (50.0%–90.3%)	85.4% (199) (80.3%–89.4%)	82.8% (106) (75.3%–88.4%)	90.4% (75) (81.9%–95.3%)	85.0% (17) (63.1%–95.6%)	50.0% (1) (9.5%–90.5%)
Partner's home	15.8% (62) (12.5%–19.7%)	11.9% (25) (8.1%–17.0%)	18.7% (23) (12.7%–26.6%)	25.0% (11) (14.4%–39.6%)	18.8% (3) (5.8%–43.8%)	9.4% (22) (6.3%–13.9%)	10.9% (14) (6.5%–17.6%)	8.4% (7) (3.9%–16.7%)	0.0% (0) –(2.9%–19.0%)	50.0% (1) (9.5%–90.5%)
Public (outside, car, etc)	2.8% (11) (1.5%–5.0%)	1.9% (4) (0.6%–5.0%)	3.3% (4) (1.0%–8.3%)	6.8% (3) (1.7%–18.9%)	0.0% (0) –(3.3%–22.7%)	3.0% (7) (1.3%–6.2%)	3.1% (4) (1.0%–8.0%)	0.0% (0) –(0.9%–5.3%)	15.0% (3) (4.4%–36.9%)	0.0% (0) –(5.2%–71.0%)
Hotel/motel	2.3% (9) (1.1%–4.4%)	4.3% (9) (2.2%–8.1%)	0.0% (0) –(0.6%–3.6%)	0.0% (0) –(1.5%–9.6%)	0.0% (0) –(3.3%–22.7%)	0.4% (1) –(0.2%–2.6%)	0.0% (0) –(0.6%–3.5%)	1.2% (1) –(0.4%–7.2%)	0.0% (0) –(2.9%–19.0%)	0.0% (0) –(5.2%–71.0%)
Sex club	2.0% (8) (1.0%–4.0%)	2.4% (5) (0.9%–5.6%)	1.6% (2) (0.1%–6.1%)	2.3% (1) –(0.7%–12.9%)	0.0% (0) –(3.3%–22.7%)	0.0% (0) –(0.3%–2.0%)	0.0% (0) –(0.6%–3.5%)	0.0% (0) –(0.9%–5.3%)	0.0% (0) –(2.9%–19.0%)	0.0% (0) –(5.2%–71.0%)
Other	2.3% (9) (1.1%–4.4%)	1.9% (4) (0.6%–5.0%)	0.8% (1) –(0.3%–4.9%)	6.8% (3) (1.7%–18.9%)	6.3% (1) –(0.9%–30.3%)	1.7% (4) (0.5%–4.5%)	3.1% (4) (1.0%–8.0%)	0.0% (0) –(0.9%–5.3%)	0.0% (0) –(2.9%–19.0%)	0.0% (0) –(5.2%–71.0%)
Partner type										
Relationship partner	57.2% (211) (52.1%–62.1%)	51.8% (101) (44.8%–58.7%)	66.1% (76) (57.0%–74.1%)	64.3% (27) (49.1%–77.1%)	41.2% (7) (21.6%–64.0%)	63.6% (147) (57.3%–69.6%)	55.6% (70) (46.8%–63.9%)	71.6% (58) (60.9%–80.3%)	81.0% (17) (59.4%–92.9%)	66.7% (2) (20.2%–94.4%)
Casual/dating partner	16.3% (60) (12.8%–20.4%)	13.8% (27) (9.6%–19.4%)	16.5% (19) (10.8%–24.5%)	16.7% (7) (8.0%–30.9%)	41.2% (7) (21.6%–64.0%)	21.1% (51) (17.2%–27.9%)	26.2% (33) (19.3%–34.5%)	21.0% (17) (13.4%–31.2%)	4.8% (1) –(0.9%–24.4%)	0.0% (0) –(5.6%–61.7%)
Friend	11.7% (43) (8.7%–15.4%)	16.9% (33) (12.3%–22.9%)	6.1% (7) (2.8%–12.2%)	2.4% (1) –(0.7%–13.4%)	11.8% (2) (2.0%–35.6%)	6.1% (14) (3.6%–10.0%)	9.5% (12) (5.4%–16.0%)	0.0% (0) –(0.9%–5.4%)	9.5% (2) (1.4%–30.1%)	0.0% (0) –(5.6%–61.7%)
New acquaintance	10.8% (40) (8.0%–14.5%)	11.3% (22) (7.5%–16.6%)	10.4% (12) (5.9%–17.5%)	11.9% (5) (4.7%–25.5%)	5.9% (1) –(0.9%–28.9%)	7.4% (17) (4.6%–11.5%)	7.1% (9) (3.6%–13.2%)	7.4% (6) (3.1%–15.5%)	4.8% (1) –(0.9%–24.4%)	33.3% (1) (5.6%–79.8%)
Transactional	4.1% (15) (2.4%–6.7%)	6.2% (12) (3.5%–10.5%)	0.9% (1) –(0.3%–5.2%)	4.8% (2) (0.5%–16.6%)	0.0% (0) –(3.2%–21.6%)	0.9% (2) (0.0%–3.3%)	1.6% (2) (0.1%–6.0%)	0.0% (0) –(0.9%–5.4%)	0.0% (0) –(2.8%–18.2)	0.0% (0) –(5.6%–61.7%)
Partner gender										
Other	91.1% (357) (88.4%–93.2%)	87.1% (182) (82.8%–90.5%)	95.9% (118) (91.7%–98.2%)	93.2% (41) (83.3%–97.8%)	100.0% (16) (81.0%–102.9%)	98.3% (232) (95.8%–99.4%)	99.2% (128) (95.8%–100.2%)	97.6% (81) (91.7%–99.7%)	95.2% (20) (75.6%–100.9%)	100.0% (3) (38.3%–105.6%)
Same	8.9% (35) (6.8%–11.6%)	12.9% (27) (9.5%–17.2%)	4.1% (5) (1.8%–8.3%)	6.8% (3) (2.2%–16.7%)	0.0% (0) –(2.9%–19.0%)	1.7% (4) (0.6%–4.2%)	0.8% (1) –(0.2%–4.2%)	2.4% (2) (0.3%–8.3%)	4.6% (1) –(0.9%–24.4)	0.0% (0) –(5.6%–61.7%)
Alcohol use										
Participant or partner use	23.5% (92) (20.1%–27.2%)	34.4% (72) (29.3%–40.0%)	11.4% (14) (7.4%–17.0%)	11.4% (5) (5.2%–22.2%)	6.3% (1) –(0.3%–26.9%)	13.6% (32) (9.9%–18.2%)	16.3% (21) (11.2%–23.1%)	13.3% (11) (7.7%–21.7%)	0.0% (0) –(2.8%–18.2%)	0.0% (0) –(5.6%–61.7%)
Erectile medication use										
Used during event	16.9% (66) (14.0%–20.3%)	7.7% (1.6) (5.2%–11.4%)	30.1% (37) (23.7%–37.3%)	22.7% (10) (13.8%–35.0%)	18.8% (3) (6.7%–40.9%)	— —	— —	— —	— —	— —

was used by 17% of men during their most recent sexual event.

Several sexual health indicators are presented in Table 4 for participants (122 men and 80 women) who engaged in penile–vaginal intercourse within the past year and met at least one of the following criteria: (i) reported more than one sexual partner over the past year; (ii) defined their relationship status as single; (iii) stated that their most recent sexual partner was someone other than a primary relationship partner; or (iv) reported that their current relationship was under 1 year. About 20% of men and 24% of women reported condom use during the last sexual event. Condom use rates fluctuated as a function of partner type with the highest percentage of men reporting condom use with a transactional partner and women with a friend. Although sexually active, the majority of men (64.4%) and women (68.9%) reported that they had not received an STI test within the past year. Despite low testing rates, over 5% of the participants reported their most recent penile–vaginal intercourse partner (within the past year) had an STI at the time of the event.

Evaluation of the Sexual Experience during the Last Partnered Sexual Event

Participants who engaged in partnered sexual behavior within the previous year were asked about several aspects of their sexual experience (Table 5). Overall, the sexual experience for both men and women was relatively positive with the majority of participants indicating high rates of arousal and pleasure and limited erectile/ lubrication difficulty or pain. Age, health, sexual partner relationship, and the use of erectile medication (for men) were entered into separate logistic regression models predicting sexual pleasure, sexual arousal, erectile difficulty (men) or lubrication difficulty (women), pain, participant orgasm, and partner orgasm. For men, age was related to a significant decline in arousal and orgasm. Further, men who reported poor health indicated increased pain and erectile difficulties. Although rates of overall pain for men were low, men reported less pain when their last sexual partner was a nonrelationship partner. In contrast, men who reported that their last sexual encounter occurred with a nonrelationship partner were less likely to report an orgasm (80% of men) than men whose last sexual encounter occurred with a relationship partner (90.8% of men). For women, lubrication and orgasm were the only two components that decreased as a function of age. Similarly, after accounting for the other variables in the model, women's evaluation of their last sexual experience did not vary as a function of health status. However, a woman's relationship with her last sexual partner predicted several components of her sexual experience. Women whose last sexual partner was a nonrelationship partner reported higher arousal and less lubrication difficulty ($P < 0.05$). Similarly, a higher percentage of women reported having an orgasm during their last sexual encounter when their partner was a nonrelationship partner (81% of women) as compared with a relationship partner (58% of women).

Discussion

Findings from this subsample of the NSSHB, including men and women aged 50 and older; provide important insights into the sexual lives of older adults living in the US. Our data demonstrate that sizable proportions of older men and women engage in solo masturbation, though mostly at low frequencies, and that many people engage in partnered sexual activities including frottage, oral sex, and vaginal intercourse. In contrast to other studies which have suggested declines in the frequency of sexual behavior over time for older men and women [2,19], age was unrelated to the frequency of penile–vaginal intercourse for men in the present study.

As many older men and women experience partner loss because of divorce, death, or serious illness (e.g., requiring hospitalization or full time care in a nursing setting), it is not unusual for individuals to have new sexual partners later in life. Even for couples for whom pregnancy risk is not a concern, infection risk may be. Therefore, it is encouraging that rates of condom use were higher in situations that posed an increased potential for risk (e.g., an unknown partner history or STI/HIV status). However, overall, condom usage rates remained low with approximately 2/3 of men and women reporting that they did not use a condom during their last sexual encounter regardless of the situational characteristics. Therefore, although some messages about sexual safety may have reached this population, it suggests a continuing role for health-care providers, public health professionals, and gerontologists to play in educating older adults about condom use and HIV/STI risk reduction [31].

Consistent with other studies, older women were more likely to experience difficulties with

Table 4 Weighted description of the most recent sexual event within the past year and HIV/STI testing and diagnosis history for at risk adults, stratified by age

	Men						
	All respondents (N = 122)	50–59	60–69	70–79	80+	Condom use at last event	
Sexual health of at risk adults[†]	% Endorsed each item (N) (95% CI)					No condom used	Condom used
Condom use past intercourse							
Used a condom	20.0% (24) (13.6%–28.3%)	24.3% (17) (15.6%–35.8%)	17.1% (6) (7.3%–34.2%)	0.0% (0) –(4.8%–37.2%)	14.3% (1) (0.5%–53.3%)	— —	— —
Partner type							
Relationship partner	12.3% (14) (7.3%–19.7%)	13.2% (9) (6.9%–23.5%)	9.7% (3) (2.6%–25.7%)	25.0% (2) (6.3%–59.9%)	0.0% (0) –(5.0%–40.4%)	100.0% (14) (96.1%–100.7%)	0.0% (0) –(0.7%–3.9%)
Casual/dating partner	43.9% (50) (35.1%–53.0%)	33.8% (23) (23.7%–45.7%)	51.6% (16) (34.8%–68.0%)	62.5% (5) (30.4%–86.5%)	85.7% (6) (46.7%–99.5%)	91.5% (43) (84.8%–95.5%)	8.5% (4) (4.5%–15.2%)
Friend	21.1% (24) (14.5%–29.5%)	26.5% (18) (17.4%–38.1%)	16.1% (5) (6.6%–33.1%)	12.5% (1) (0.1%–49.2%)	0.0% (0) –(5.0%–40.4%)	76.0% (19) (67.4%–83.0%)	24.0% (6) (17.0%–32.6%)
New acquaintance	20.2% (23) (13.8%–28.5%)	22.1% (15) (13.7%–33.4%)	22.6% (7) (11.1%–40.1%)	0.0% (0) –(4.8%–37.2%)	14.3% (1) (0.5%–53.3%)	69.6% (16) (60.6%–77.3%)	30.4% (7) (22.7%–39.4%)
Transactional	2.6% (3) (0.6%–7.8%)	4.4% (3) (1.0%–12.7%)	0.0% (0) –(2.1%–13.1%)	0.0% (0) –(4.8%–37.2%)	0.0% (0) –(5.0%–40.4%)	33.3% (1) (25.3%–42.4%)	66.7% (2) (57.6%–74.7%)
Partner history-6 months							
Known other partners	17.2% (21) (11.3%–25.3%)	19.2% (14) (11.4%–30.2%)	14.7% (5) (5.7%–31.5%)	25.0% (2) (6.3%–59.9%)	0.0% (0) –(5.0%–40.4%)	70.0% (14) (61.0%–77.7%)	30.0% (6) (22.3%–39.0%)
Known no other partner history	60.7% (74) (51.5%–69.1%)	56.2% (41) (44.4%–67.3%)	64.7% (22) (47.1%–79.1%)	75.0% (6) (40.1%–93.7%)	71.4% (5) (35.2%–92.4%)	90.3% (65) (83.3%–94.6%)	9.7% (7) (5.4%–16.7%)
Unknown partner history	22.1% (27) (15.4%–30.6%)	24.7% (18) (15.9%–36.2%)	20.6% (7) (9.7%–38.0%)	0.0% (0) –(4.8%–37.2%)	28.6% (2) (7.6%–64.8%)	61.5% (16) (52.4%–70.0%)	38.5% (10) 30.0%–47.6%)
Participant known STI free							
No known STI	92.6% (113) (86.1%–96.3%)	91.7% (66) (82.3%–96.5%)	91.4% (32) (75.6%–98.1%)	100.0% (8) (62.8%–104.8%)	100.0% (7) (59.6%–105.0%)	82.6% (90) (74.5%–88.5%)	17.4% (19) (11.5%–25.5%)
Known STI	3.3% (4) (0.9%–8.7%)	2.8% (2) (0.1%–10.5%)	5.7% (2) (0.4%–20.8%)	0.0% (0) –(4.8%–37.2%)	0.0% (0) –(5.0%–40.4%)	50.0% (2) (41.0%–59.0%)	50.0% (2) (41.0%–59.0%)
Unknown STI status	4.1% (5) (1.4%–9.7%)	5.6% (4) (1.7%–14.2%)	2.9% (1) –(1.0%–17.1%)	0.0% (0) –(4.8%–37.2%)	0.0% (0) –(5.0%–40.4%)	50.0% (3) (41.0%–59.0%)	50.0% (3) (41.0%–59.0%)
Partner known STI free							
No known STI	74.2% (89) (65.4%–81.4%)	65.3% (47) (53.4%–75.5%)	91.2% (31) (75.3%–97.9%)	71.4% (5) (37.2%–91.7%)	85.7% (6) (46.7%–99.5%)	81.6% (71) (73.4%–87.7%)	18.4% (46) (12.3%–26.6%)
Known STI	7.5% (9) (3.7%–14.0%)	12.5% (9) (6.4%–22.6%)	0.0% (0) –(2.1%–13.1%)	0.0% (0) –(4.8%–37.2%)	0.0% (0) –(5.0%–40.4%)	77.8% (7) (69.3%–84.5%)	22.2% (2) (15.5%–30.7%)
Unknown STI status	18.3% (22) (12.2%–26.5%)	22.2% (16) (13.9%–33.5%)	8.8% (3) (2.1%–24.7%)	28.6% (2) (8.3%–62.8%)	14.3% (1) (0.5%–53.3%)	78.3% (18) (69.8%–84.9%)	21.7% (5) (15.1%–30.2%)
HIV testing							
Within past year	29.8% (34) (22.2%–38.8%)	23.2% (16) (14.7%–34.6%)	21.9% (7) (10.6%–39.3%)	100.0% (6) (62.8%–104.8%)	71.4% (5) (35.2%–92.4%)	93.8% (30) (87%–97.1%)	6.3% (2) (2.9%–12.5%)
Over a year	31.6% (36) (23.7%–40.6%)	37.7% (26) (27.1%–49.6%)	28.1% (9) (15.2%–45.8%)	0.0% (0) –(4.8%–37.2%)	14.3% (1) (0.5%–53.3%)	68% (24) (59.5%–76.4%)	31.4% (11) (23.6%–40.5%)
Never	38.6% (44) (30.2%–47.8%)	39.1% (27) (28.4%–51.0%)	50.0% (16) (33.4%–66.6%)	0.0% (0) –(4.8%–37.2%)	14.3% (1) (0.5%–53.3%)	84.4% (38) (76.6%–90.1%)	15.6% (7) (9.9%–23.4%)
STI testing							
Within past year	35.6% (37) (27.4%–44.7%)	33.9% (21) (23.7%–45.7%)	17.2% (5) (7.4%–34.3%)	100.0% (6) (62.8%–104.8%)	71.4% (5) (35.2%–92.4%)	85.7% (30) (78.0%–91.1%)	14.3% (5) (8.9%–22.0%)
Over a year	25.0% (26) (17.9%–33.7%)	25.8% (16) (16.8%–37.4%)	31.0% (9) (17.5%–48.8%)	0.0% (0) –(4.8%–37.2%)	14.3% (1) (0.5%–53.3%)	69.2% (18) (60.2%–77.0%)	30.8% (8) (23.0%–39.8%)
Never	39.4% (41) (30.9%–48.6%)	40.3% (25) (29.5%–52.2%)	51.7% (15) (34.9%–68.1%)	0.0% (0) –(4.8%–37.2%)	14.3% (1) (0.5%–53.3%)	85.0% (34) (77.2%–90.5%)	15.0% (6) (9.5%–22.8%)
STI diagnosis							
Lifetime	19.2% (23) (12.9%–27.4%)	20.8% (15) (12.8%–32.0%)	23.5% (8) (11.8%–41.1%)	0.0% (0) –(4.8%–37.2%)	0.0% (0) –(5.01%–40.4%)	78.3% (18) (69.8%–84.9%)	21.7% (5) (15.1%–30.2%)

[†]Participants were included in the analyses if they had engaged in penile–vaginal intercourse within the past year and met at least one of the following criteria: (1) Reported more than one sexual partner over the past year (2) Defined their relationship status as single (3) Stated that their most recent sexual partner was someone other than a primary relationship partner (4) Reported that their current relationship was under 1 year.
CI = confidence interval; STI = sexually transmitted infection.

arousal and lubrication, which are often but not always related. Women were also more likely to report orgasm if their most recent sexual event was with someone who was not a relationship partner, a finding that echoes data from 40- to 80-year-old women in the Global Study of Sexual Attitudes and Behaviors [32]. Although speculative, one reason for this finding may be that many newly divorced or widowed women find the experience of a new partner arousing, heightening lubrication and orgasm. Alternatively, it is possible that the women who seek out new sexual

Women						
All respondents (N = 81)	50–59	60–69	70–79	80+	Condom use at last event	
		% Endorsed each item (N) (95% CI)			No condom used	Condom used
24.4% (20) (16.1%–35.1%)	23.6% (13) (14.2%–36.6%)	28.0% (7) (13.2%–49.7%)	0.0% (0) –(3.9%–83.3%)	0.0% (0) –(3.9%–83.3%)	— —	— —
10.4% (8) (5.1%–19.4%)	9.3% (5) (3.6%–20.3%)	14.3% (3) (4.1%–35.5%)	0.0% (0) –(3.9%–83.3%)	0.0% (0) –(3.9%–83.3%)	88.9% (8) (79.7%–94.4%)	11.1% (1) (5.6%–20.3%)
58.4% (45) (47.3%–68.8%)	55.6% (33) (42.4%–68.0%)	66.7% (14) (45.2%–83.0%)	100.0% (1) (16.7%–103.9%)	0.0% (0) –(3.9%–83.3%)	75.6% (64) (64.8%–83.9%)	24.4% (11) (16.1%–35.2%)
11.7% (9) (6.1%–21.0%)	16.7% (9) (8.8%–29.0%)	0.0% (0) –(2.8%–18.2%)	0.0% (0) –(3.9%–83.3%)	0.0% (0) –(3.9%–83.3%)	55.6% (5) (44.5%–66.1%)	44.4% (4) (33.9%–55.5%)
16.9% (13) (10.0%–26.9%)	14.8% (8) (7.4%–26.9%)	19.0% (4) (7.1%–40.6%)	0.0% (0) –(3.9%–83.3%)	100.0% (1) (16.7%–103.9%)	69.2% (9) (58.2%–78.5%)	30.8% (4) (21.5%–41.8%)
2.6% (2) (0.2%–9.5%)	3.7% (2) (0.3%–13.3%)	0.0% (0) –(2.8%–18.2%)	0.0% (0) –(3.9%–83.3%)	0.0% (0) –(3.9%–83.3%)	100.0% (2) (94.3%–100.9%)	0.0% (0) –(0.9%–5.7%)
25.3% (20) (16.9%–36.1%)	18.9% (10) (10.5%–31.4%)	41.7% (10) (23.5%–62.4%)	0.0% (0) –(3.9%–83.3%)	0.0% (0) –(3.9%–83.3%)	76.2% (16) (65.6%–84.4%)	23.8% (5) (15.6%–34.5%)
63.6% (50) (52.2%–73.2%)	66.0% (35) (52.7%–77.3%)	54.2% (13) (33.9%–73.1%)	100.0% (1) (16.7%–103.9%)	100.0% (1) (16.7%–103.9%)	74.0% (37) (63.2%–82.6%)	26.0% (13) (17.4%–36.8%)
11.4% (9) (5.8%–20.6%)	15.1% (8) (7.6%–27.2%)	4.2% (1) –(1.2%–23.7%)	0.0% (0) –(3.9%–83.3%)	0.0% (0) –(3.9%–83.3%)	70.0% (7) (59.0%–79.1%)	30.0% (3) (20.9%–41.0%)
92.6% (75) (84.2%–96.9%)	94.5% (52) (84.4%–98.7%)	87.5% (21) (66.5%–96.9%)	100.0% (1) (16.7%–103.9%)	100.0% (1) (16.7%–103.9%)	73.0% (54) (62.1%–81.7%)	27.0% (20) (18.3%–37.9%)
3.7% (3) (0.8%–11.0%)	1.8% (1) –(0.6%–10.6%)	8.3% (2) (0.8%–28.7%)	0.0% (0) –(3.9%–83.3%)	0.0% (0) –(3.9%–83.3%)	100.0% (3) (94.3%–100.9%)	0.0% (0) –(0.9%–5.7%)
3.7% (3) (0.8%–11.0%)	3.6% (2) (0.3%–13.2%)	4.2% (1) –(1.2%–23.7%)	0.0% (0) –(3.9%–83.3%)	0.0% (0) –(3.9%–83.3%)	100.0% (3) (94.3%–100.9%)	0.0% (0) –(0.9%–5.7%)
90.2% (65) (69.9%–87.7%)	78.2% (43) (65.4%–87.3%)	83.3% (20) (61.9%–94.4%)	100.0% (1) (16.7%–103.9%)	100.0% (1) (16.7%–103.9%)	75.0% (48) (64.2%–83.4%)	25.0% (16) (16.6%–35.8%)
4.9% (4) (1.5%–12.7%)	3.6% (2) (0.3%–13.2%)	8.3% (2) (0.8%–28.7%)	0.0% (0) –(3.9%–83.3%)	0.0% (0) –(3.9%–83.3%)	100.0% (4) (94.3%–100.9%)	0.0% (0) –(0.9%–5.7%)
14.8% (12) (8.4%–24.6%)	18.2% (10) (9.9%–30.7%)	8.3% (2) (0.8%–28.7%)	0.0% (0) –(3.9%–83.3%)	0.0% (0) –(3.9%–83.3%)	75.0% (9) (64.2%–83.4%)	25.0% (3) (16.6%–35.8%)
27.3% (21) (18.5%–38.2%)	26.0% (13) (16.1%–39.1%)	28.0% (7) (13.2%–49.7%)	0.0% (0) –(3.9%–83.3%)	100.0% (1) (16.7%–103.9%)	75.0% (15) (64.2%–83.4%)	25.0% (5) (16.6%–35.8%)
40.3% (31) (30.0%–51.4%)	44.0% (22) (31.6%–57.2%)	36.0% (9) (19.1%–57.3%)	0.0% (0) –(3.9%–83.3%)	0.0% (0) –(3.9%–83.3%)	71.0% (22) (60.0%–80.0%)	29.0% (9) (20.0%–40.0%)
32.5% (25) (23.0%–43.6%)	30.0% (15) (19.4%–43.3%)	36.0% (9) (19.1%–57.3%)	100.0% (1) (16.7%–103.9%)	0.0% (0) –(3.9%–83.3%)	88.0% (22) (78.7%–93.7%)	12.0% (3) (6.3%–21.3%)
31.1% (23) (21.8%–42.1%)	30.6% (15) (19.9%–43.9%)	29.2% (7) (14.0%–50.8%)	0% (0) –(3.9%–83.3%)	100.0% (1) (16.7%–103.9%)	73.9% (17) (63.1%–82.5%)	26.1% (6) (17.5%–36.9%)
40.5% (30) (30.3%–51.7%)	42.9% (21) (30.6%–56.1%)	37.5% (9) (20.2%–58.7%)	0% (0) –(3.9%–83.3%)	0.0% (0) –(3.9%–83.3%)	80.0% (24) (69.6%–87.5%)	20.0% (6) (12.5%–30.4%)
28.4% (21) (19.5%–39.3%)	26.5% (13) (16.5%–39.7%)	33.3% (8) (17.0%–54.8%)	0% (0) –(3.9%–83.3%)	0.0% (0) –(3.9%–83.3%)	71.4% (15) (60.5%–80.4%)	28.6% (6) (19.6%–39.5%)
24.1% (19) (15.8%–34.8%)	30.2% (16) (19.5%–43.5%)	12.5% (3) (3.1%–33.5%)	0.0% (0) –(3.9%–83.3%)	0.0% (0) –(3.9%–83.3%)	74.7% (59) (63.9%–83.1%)	25.3% (20) (16.9%–36.1%)

partners are more likely to be aroused by the prospect of partnered sexual behavior than women who may feel compelled to engage in sexual activities with their relationship partner for various other reasons. Compared with men, more women also reported that their most recent experience of sex included genital pain. As studies of women with vulvodynia, dyspareunia, and those who have undergone treatment for cancer have shown, many women continue to be sexually active—alone or with a partner—in spite of experiencing pain in connection with sex. Although it is unclear from this study why women engage in painful sex it is possible that they are motivated by the sexual intimacy or sexual pleasure that they may experience despite (or because of) the pain. The experiences of these women warrant further study [33,34].

Table 5 Weighted experience of the last sexual event by age, health and last sexual partner, stratified by age and gender

	Men							
Experience during most recent partnered sexual event	All respondents (N = 394)	50–59	60–69	70–79	80+	Age by sexual experience†	Health by sexual experience‡	Relationship by sexual experience§
	% Endorsed Experience Category (N) (95% CI)					Adjusted odds ratio†† (95% CI)	Adjusted odds ratio†† (95% CI)	Adjusted odds ratio†† (95% CI)
Pleasure						1.01 (0.99–1.22)	1.26 (0.91–1.73)	1.16 (0.89–1.51)
Extremely	43.1% (170) (38.3%–48.1%)	41.0% (86) (34.5%–47.7%)	52.0% (64) (43.4%–60.7%)	29.5% (13) (18.1%–44.3%)	41.2% (7) (21.6%–64.0%)			
Quite a bit	34.5% (136) (30.0%–39.3%)	38.1% (80) (31.8%–44.8%)	28.5% (35) (21.2%–37.0%)	38.4% (16) (23.7%–51.2%)	29.4% (5) (13.0%–53.4%)			
Moderately	17.5% (69) (14.1%–21.6%)	18.1% (38) (13.4%–23.9%)	15.4% (19) (10.0%–23.0%)	18.2% (8) (9.2%–32.2%)	23.5% (4) (9.0%–47.8%)			
A little	4.8% (19) (3.1%–7.5%)	2.9% (6) (1.2%–6.2%)	4.1% (5) (1.5%–9.4%)	15.9% (7) (7.6%–29.7%)	5.9% (1) –(0.9%–28.9%)			
Not at all	—	—	—	—	—			
Arousal						1.02* (1.00–1.03)	1.28 (0.93–1.76)	0.99 (0.76–1.30)
Extremely	41.6% (164) (36.9%–46.6%)	41.0% (86) (34.5%–47.7%)	48.8% (60) (40.1%–57.5%)	25.0% (11) (14.4%–39.6%)	41.2% (7) (21.6%–64.0%)			
Quite a bit	33.5% (132) (29.0%–38.3%)	36.2% (76) (20.0%–42.9%)	25.2% (31) (18.3%–33.6%)	45.5% (20) (31.7%–59.9%)	29.4% (5) (13.0%–53.4%)			
Moderately	21.3% (84) (17.6%–25.6%)	21.9% (46) (16.8%–28.0%)	22.0% (27) (15.5%–30.1%)	18.2% (8) (9.2%–32.2%)	17.6% (3) (5.4%–41.8%)			
A little	3.6% (14) (2.1%–5.9%)	1.0% (2) (0.0%–3.6%)	4.1% (5) (1.5%–9.4%)	11.4% (5) (4.5%–24.4%)	11.8% (2) (2.0%–35.6%)			
Not at all	—	—	—	—	—			
Erection/lubrication difficulty						1.06**** (1.04–1.08)	2.98**** (2.11–4.20)	0.86 (0.63–1.18)
Not difficult	58.7% (230) (53.7%–63.4%)	69.9% (146) (63.3%–75.7%)	52.0% (64) (43.3%–60.7%)	34.1% (15) (21.8%–48.9%)	31.3% (5) (14.3%–55.1%)			
Some difficulty	22.2% (87) (18.4%–26.6%)	18.2% (38) (13.5%–24.0%)	29.3% (36) (21.9%–37.9%)	18.2% (8) (9.2%–32.2%)	31.3% (5) (14.3%–55.1%)			
Moderate	10.5% (41) (7.8%–13.9%)	8.1% (17) (5.1%–12.7%)	10.6% (13) (6.2%–17.4%)	20.5% (9) (10.9%–34.7%)	12.5% (2) (2.4%–36.4%)			
Quite	3.8% (15) (2.3%–6.3%)	1.9% (4) (0.6%–5.0%)	4.1% (5) (1.5%–9.4%)	11.4% (5) (4.5%–24.4%)	6.3% (1) –(0.7%–29.4%)			
Very	4.8% (19) (3.1%–7.5%)	1.9% (4) (0.6%–5.0%)	4.1% (5) (1.5%–9.4%)	15.9% (7) (7.6%–29.7%)	18.8% (3) (6.0%–43.0%)			
Pain						1.04 (0.97–1.12)	5.27** (1.56–17.74)	0.14* (0.02–0.95)
Not painful	95.8% (277) (93.3%–97.5%)	97.5% (154) (94.2%–99.0%)	92.6% (88) (86.4%–96.2%)	96.2% (25) (85.0%–99.9%)	100.0% (10) (78.4%–103.2%)			
Somewhat painful	3.8% (11) (2.3%–6.2%)	1.9% (3) (0.6%–5.0%)	7.4% (7) (3.8%–13.6%)	3.8% (1) (0.1%–15.0%)	0.0% (0) –(3.2%–21.6%)			
Moderately painful	0.3% (1) –(0.1%–1.7%)	0.6% (1) –(0.1%–3.2%)	0.0% (0) –(0.6%–3.6%)	0.0% (0) –(1.5%–9.6%)	0.0% (0) –(3.2%–21.6%)			
Quite painful	—	—	—	—	—			
Very painful	—	—	—	—	—			
Participant orgasm						1.05** (1.01–1.08)	1.32 (0.66–2.64)	2.58**** (1.40–4.75)
Orgasm	86.9% (332) (83.2%–89.9%)	91.0% (179) (86.3%–94.2%)	69.8% (111) (61.1%–77.2%)	75.0% (30) (60.4%–85.6%)	85.8% (12) (61.8%–96.6%)			
No orgasm	13.1% (55) (10.1%–16.8%)	9.0% (27) (5.8%–13.7%)	30.2% (11) (22.8%–38.9%)	25.0% (13) (14.4%–39.6%)	14.2% (4) (3.4%–38.2%)			
Partner orgasm						1.05** (1.00–1.07)	1.37 (0.68–2.75)	0.96 (0.53–1.74)
Orgasm	83.2% (278) (79.2%–86.6%)	87.1% (155) (81.8%–91.0%)	79.1% (87) (71.0%–85.4%)	75.0% (27) (60.4%–85.6%)	90.0% (9) (66.4%–98.9%)			
No orgasm	16.8% (56) (13.4%–20.8%)	12.9% (23) (9.0%–18.2%)	20.9% (23) (14.6%–29.0%)	25.0% (9) (14.4%–39.6%)	10.0% (1) (1.1%–33.6%)			

*$P \leq 0.05$, **$P \leq 0.01$, ***$P \leq 0.005$, ****$P \leq 0.001$.
†Age was entered into the model as a continuous variable. Significant odds ratios under 1 indicate a more positive experience as a function of age. Significant odds ratios over 1 indicate a less positive experience as a function of age.
‡"Good" health was entered into the model as the referent category. Significant odds under 1 indicate that poor health is related to a more positive experience. Significant odds over 1 indicate that poor health is related to a less positive experience.
§Engaging in a sexual act with a relationship partner was entered into the model as the referent. Significant odds under 1 indicate that engaging in a sexual act with a nonrelationship partner is related to a more positive experience. Significant odds over 1 indicate that engaging in a sexual act with a nonrelationship partner is related to a less positive experience.
¶Adjusted odds ratios are based on an ordinal or bivariate logistic regression model including age, health, and relationship with their last sexual partner.
††Adjusted odds ratios are based on an ordinal or bivariate logistic regression model including age, health, relationship with their last sexual partner and erectile medication use.
CI = confidence interval.

Women							
All respondent (N = 236)	50–59	60–69	70–79	80+	Age by sexual experience[†]	Health by sexual experience[‡]	Relationship by sexual experience[§]
% (N) endorsed experience category (95% CI)					Adjusted odds ratio[¶] (95% CI)	Adjusted odds ratio[¶] (95% CI)	Adjusted odds ratio[¶] (95% CI)
					1.01 (0.99–1.04)	1.25 (0.77–2.04)	0.77 (0.55–1.08)
29.1% (67) (23.6%–35.4%)	29.4% (37) (22.0%–38.0%)	29.3% (24) (20.5%–39.9%)	25.0% (5) (10.8%–47.2%)	50.0% (1) (9.5%–90.5%)			
39.1% (90) (33.0%–45.6%)	39.7% (50) (31.5%–48.5%)	36.6% (30) (27.0%–47.4%)	45.0% (9) (25.9%–65.8%)	50.0% (1) (9.5%–90.5%)			
20.0% (46) (15.3%–25.7%)	19.8% (25) (13.7%–27.8%)	18.3% (15) (11.3%–28.1%)	30.0% (6) (14.3%–52.1%)	0.0% (0) –(5.2%–71.0%)			
10.4% (24) (7.0%–15.1%)	8.7% (11) (4.8%–15.2%)	15.9% (13) (9.4%–25.4%)	0.0% (0) –(2.9%–19.0%)	0.0% (0) –(5.2%–71.0%)			
1.3% (3) (0.3%–4.0%)	2.4% (3) (0.5%–7.2%)	0.0% (0) –(0.9%–5.4%)	0.0% (0) –(2.9%–19.0%)	0.0% (0) –(5.2%–71.0%)			
					1.02 (1.00–1.04)	1.49 (0.93–2.40)	0.71* (0.51–1.00)
27.7% (64) (22.3%–33.9%)	28.3% (36) (21.1%–36.9%)	27.7% (23) (19.1%–38.3%)	21.1% (4) (8.2%–43.3%)	50.0% (1) (9.5%–90.5%)			
36.4% (84) (30.4%–42.8%)	37.8% (48) (29.7%–46.6%)	36.1% (30) (26.6%–47.0%)	31.6% (6) (15.5%–53.6%)	0.0% (0) –(5.2%–71.0%)			
20.3% (47) (15.6%–26.1%)	20.5% (26) (14.2%–28.5%)	16.9% (14) (10.2%–26.5%)	31.6% (6) (15.5%–53.6%)	50.0% (1) (9.5%–90.5%)			
13.4% (31) (9.5%–18.5%)	11.0% (14) (6.5%–17.9%)	16.9% (14) (10.2%–26.5%)	15.8% (3) (4.9%–37.7%)	0.0% (0) –(5.2%–71.0%)			
2.2% (5) –(4.8%–50.7%)	2.4% (3) –(4.9%–63.2%)	2.4% (2) –(4.6%–72.0%)	0.0% (0) (0.0%–100.0%)	0.0% (0) (0.0%–100.0%)			
					1.03* (1.01–1.06)	1.61 (0.92–2.81)	0.62* (0.41–0.95)
43.8% (89) (37.5%–50.3%)	51.7% (60) (43.0%–60.4%)	34.8% (24) (25.3%–45.6%)	18.8% (3) (6.7%–40.9%)	100.0% (2) (29.0%–105.2%)			
38.4% (78) (32.3%–44.9%)	28.4% (33) (21.2%–37.0%)	55.1% (38) (44.3%–65.4%)	43.8% (7) (24.8%–64.7%)	0.0% (0) –(5.2%–71.0%)			
8.9% (18) (5.8%–13.3%)	10.3% (12) (6.0%–17.1%)	5.8% (4) (2.1%–13.4%)	12.5% (2) (2.9%–34.1%)	0.0% (0) –(5.2%–71.0%)			
6.9% (14) (4.2%–11.0%)	6.9% (8) (3.4%–13.0%)	2.9% (2) (0.4%–9.6%)	25.0% (4) (10.9%–47.2%)	0.0% (0) –(5.2%–71.0%)			
2.0% (4) (0.7%–4.9%)	2.6% (3) (0.6%–7.4%)	1.4% (1) –(0.3%–7.6%)	0.0% (0) –(2.9%–19.0%)	0.0% (0) –(5.2%–71.0%)			
					0.97 (0.93–1.10)	1.74 (0.89–3.43)	0.77 (0.45–1.32)
70.0% (142) (63.7%–75.6%)	63.8% (74) (55.0%–71.8%)	81.4% (57) (71.6%–88.5%)	60.0% (9) (38.6%–78.2%)	100.0% (2) (29.0%–105.2%)			
22.7% (46) (17.7%–28.6%)	27.6% (32) (20.4%–36.1%)	11.4% (8) (6.0%–20.3%)	40.0% (6) (21.8%–64.4%)	0.0% (0) –(5.2%–71.0%)			
4.9% (10) (2.7%–8.7%)	4.3% (5) (1.7%–9.7%)	7.1% (5) (3.0%–15.1%)	0.0% (0) –(2.9%–19.0%)	0.0% (0) –(5.2%–71.0%)			
1.5% (3) –(5.2%–62.6%)	2.6% (3) –(4.9%–63.3%)	0.0% (0) –(0.91%–5.5%)	0.0% (0) –(2.9%–19.0%)	0.0% (0) –(5.2%–71.0%)			
1.0% (2) –(5.0%–71.4%)	1.7% (2) –(4.8%–71.7%)	0.0% (0) –(0.91%–5.5%)	0.0% (0) –(2.9%–19.0%)	0.0% (0) –(5.2%–71.0%)			
					1.05* (1.00–1.09)	1.38 (0.53–3.56)	0.39*** (0.19–0.69)
70.7% (146) (64.5%–76.3%)	61.3% (87) (52.4%–69.4%)	44.4% (49) (34.2%–55.2%)	100.0% (8) (81.0%–102.9%)	65.5% (2) (15.0–95.6%)			
29.3% (77) (23.7%–35.5%)	38.8% (36) (30.6%–47.6%)	55.6% (31) (44.8%–65.8%)	0.0% (10) –(2.9%–19.0%)	34.5% (0) (4.4%–85.0%)			
					1.05 (0.98–1.13)	2.96 (0.84–10.55)	0.97 (0.25–2.40)
92.8% (205) (88.6%–95.5%)	93.4% (114) (87.4%–96.8%)	94.9% (75) (87.5%–98.3%)	77.8% (14) (55.5%–91.1%)	100.0% (2) (29.0%–105.2%)			
7.2% (18) (4.5%–11.4%)	6.6% (8) (3.2%–12.6%)	5.1% (4) (1.7%–12.5%)	22.2% (4) (8.9%–44.5%)	0.0% (0) –(5.2%–71.0%)			

Reporting on their most recent sexual event, most men indicated high levels of sexual pleasure and they rarely reported pain associated with sex. Pain and orgasm were both related to relationship partner type with men reporting less pain with a nonrelationship partner and higher rates of orgasm with a relationship partner. If the men are engaging in sexual relationships with women of a similar age, lower rates of pain may be related to the heightened amount of lubrication experienced

by women who engage in sexual behavior with a nonrelationship partner. The correlational data limits conclusions regarding the direction of the relationship between the variables and, thus, it is also possible that men who regularly experience pain during sexual activities are less likely to initiate sexual activities with new partners in contrast to men with relationship partners who may engage in sexual behaviors for other reasons (e.g., to increase intimacy). The heightened intimacy, increased comfort or previous practice/ knowledge of their own and their partner's needs may be accountable for the higher rates of orgasm reported by men whose last sexual act occurred with a relationship partner. Regardless of their relationship status, overall, men were more likely to report difficulties with arousal and erectile function with more advanced age. A sizable percentage of men in each age cohort reported the use of erectile medications (such as Viagra, Levitra, Cialis, etc.). As such, healthcare providers are advised to ask their male patients as part of their sexual history taking about their use of medications for erectile or other sexual concerns [4,31].

Sweeping conclusions about the sexual health of older adults from this study should be tempered as several of the variables that may have influenced the sexual lives of the participants were unaccounted for in this study including a detailed STI and medication history; both of which are important constructs as certain medications may enhance or inhibit sexual behavior [22]. Additionally, the participant's partnered sexual behavior was assessed using preset measures of behavior that did not include some partnered behaviors that may have been endorsed by participants in this age group (e.g., kissing, the use of sexual enhancement products). Practitioners and future researchers who are interested in assessing the sexual health of older adults may benefit from the inclusion of these questions.

Conclusions

Our data demonstrate that many older men and women continue be sexually active, alone and/or with a partner, well into advanced age. As such, sexual health professionals need to be attentive to the nuanced sexual health needs of older adults in terms of STI education and testing, condom education and/or provision, and the taking of a complete sexual health history that asks about patients' experiences of sexual pleasure, difficulties, and concerns.

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Conflict of Interest: Michael Reece is a member of the sexual health advisory council of Church & Dwight Co., Inc.

References

1 Bancroft JHJ. Sex and aging. N Engl J Med 2007;357:820–2.
2 Waite LJ, Laumann EO, Das A, Schumm LP. Sexuality: Measures of partnerships, practices, attitudes, and problems in the National Social Life, Health, and Aging Study. J Gerontol B Psychol Sci Soc Sci 2009;64(Suppl 1):i56–66.
3 Fink HA, MacDonald R, Rutks IR, Nelson DB, Wilt TJ. Sildenafil for male erectile dysfunction a systematic review and meta-analysis. Intern Med 2002;162:1349–60.
4 Sanders SA, Milhausen RR, Crosby RA, Graham CA, Yarber WL. Do phosphodiesterase type 5 inhibitors protect against condom-associated erection loss and condom slippage? J Sex Med 2009;6:1451–6.
5 Herbenick D, Reece M, Sanders SA, Dodge B, Ghassemi A, Fortenberry JD. Prevalence and characteristics of vibrator use by women in the United States: Results from a nationally representative study. J Sex Med 2009;6:1857–66.
6 Reece M, Herbenick D, Sanders SA, Dodge B, Ghassemi A, Fortenberry JD. Prevalence and characteristics of vibrator use by men in the United States. J Sex Med 2009;6:1867–74.
7 Katz S, Marshall B. New sex for old: Lifestyle, consumerism, and the ethics of aging well. J Aging Stud 2003;17:3–16.
8 Centers for Disease Control and Prevention. AIDS among persons aged greater than or equal to 50 years—United States, 1991–1996. MMWR 1998;47:21–7.
9 El-Sadr W, Gettler J. Unrecognized\human immunodeficiency virus infection in the elderly. Arch Intern Med 1995;155:184–6.
10 Ferro S, Salit IE. HIV infection in patients over 55 years of age. J Acquir Immune Defic Syndr 1992;5:348–55.
11 Whipple B, Scura KW. The overlooked epidemic: HIV in older adults. Am J Nurs 1996;96:23–8.
12 Binson D, Pollack L, Catania JA. AIDS-related risk behaviors and safer sex practices of women in midlife and older in the United States: 1990 to 1992. Health care Women Int 1997;18:343–54.
13 Stall R, Catania J. AIDS risk behaviors among late middle-aged and elderly American: The national AIDS behavioral surveys. Arch Intern Med 1994;154:57–63.
14 Catania JA, Binson D, Dolcini MM, Stall R, Choi KH, Pollack LM, Hudes ES, Canchola J, Phillips K, Moskowitz JT. Risk factors for HIV and other sexually transmitted diseases and prevention practices among US heterosexual adults: Changes from 1990 to 1992. Am J Public Health 1995;85:1492–9.
15 Bancroft J, Loftus J, Long JS. Distress about sex: A national survey of women in heterosexual relationships. Arch Sex Behav 2003;32:193–208.
16 Addis IB, Van Den Eeden SK, Wassel-Fyr CL, Vittinghoff E, Brown JS, Thom DH. Sexual activity and function in middle-aged and older women. Obstet Gynecol 2006;107:755–64.
17 Laumann EO, Nicolosi A, Glasser DB, Paik A, Gingell C, Moreira E, Wang T. Sexual problems among women and men

aged 40–80 years: Prevalence and correlates identified in the Global Study of Sexual Attitudes and Behaviors. Int J Impot Res 2005;17:39–57.
18 AARP. (1999). AARP/Modern Maturity Sexuality Survey. Retrieved August 4, 2010 from http://assets.aarp.org/rgcenter/health/mmsexsurvey.pdf.
19 Eisenberg ML, Shindel AW, Smith JF, Breyer BN, Lipshultz LI. Socioeconomic, anthropomorphic, and demographic predictors of adult sexual activity in the United States: Data from the national survey of family growth. J Sex Med 2010;7:50–8.
20 Lindau ST, Schumm P, Laumann EO, Levinson W, O'Muircheartaigh C, Waite LJ. A study of sexuality and health among older adults in the United States. N Engl J Med 2007;357:762–74.
21 Hayes R, Dennerstein L. The impact of aging on sexual function and sexual dysfunction in women: A review of population based-studies. J Sex Med 2005;2:317–30.
22 Corona G, Lee DM, Forti G, O'Connor DB, Maggi M, O'Neill TW, Pendleton N, Bartfai G, Boonen S, Casanueva FF, Finn JD, Giwercman A, Han TS, Huhtaniemi IT, Kula K, Lean ME, Punab M, Silman AJ, Vanderschueren D, Wu FC. Age-related changes in general and sexual health in middle-aged and older men: Results from the European Male Ageing Study (EMAS). J Sex Med 2010;7:1362–80.
23 Baker L, Wagner TH, Singer S, Bundorf MK. Use of the Internet and e-mail for health care information: Results from a national survey. JAMA 2003;289:2400–6.
24 Heiss F, McFadden D, Winter J. Who failed to enroll in Medicare Part D, and why? Early results. Health Aff (Millwood) 2006;25:344–54.
25 Holman EA, Silver RC, Poulin M, Andersen J, Gil-Rivas V, McIntosh DN. Terrorism,acute stress, and cardiovascular health: A 3-year national study following the September 11th attacks. Arch Gen Psychiatry 2008;65:73–80.
26 Silver RC, Holman EA, McIntosh DN, Poulin M, Gil-Rivas V. Nationwide longitudinal study of psychological responses to September 11. JAMA 2002;288:1235.
27 Current Population Survey December 2008. U.S. Census Bureau. 1994—[cited June 9, 2010]. Available from: http://www.bls.census.gov/ferretftp.htm.
28 Fleiss JL, Levin B, Paik MC. Statistical methods for rates and proportions. 3rd edition. New York: John Wiley; 2003.
29 DeSalvo KB, Bloser N, Reynolds K, Jiang H, Muntner P. Mortality prediction with a single general self rated health question: A meta-analysis. J Gen Intern Med 2005;20:267–75.
30 Little RJA. Post-stratification: A modeler's perspective. J Am Stat Assoc 1993;88:1001–12.
31 Gott M, Hinchliff S, Galena E. General practitioner attitudes to discussing sexual health issues with older people. Soc Sci Med 2004;58:2093–103.
32 Laumann EO, Paik A, Glasser D, Jeong-Han K, Tianfu W, Levinson B, Moreira ED, Nicolosi A, Gingell C. A cross-national study of subjective sexual well-being among older women and men: Findings from the Global Study of Sexual Attitudes and Behaviors. Arch Sex Behav 2006;35:145–61.
33 Herbenick D, Reece M, Hollub A, Satinsky S, Dodge B. Young female breast cancer survivors: Their sexual function and interest in sexual enhancement products and services. Cancer Nurs 2008;31:417–25.
34 Masheb RM, Lozano-Blanco C, Kohorn EI, Minkin MJ, Kerns RD. Assessing sexual function and dyspareunia with the female sexual function index (FSFI) in women with vulvodynia. J Sex Marital Ther 2004;30:315–32.

Sexual Health Among U.S. Black and Hispanic Men and Women: A Nationally Representative Study

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ABSTRACT

Introduction. Little is known about the prevalence of sexual behaviors among the black and Hispanic populations in the United States outside the context of sexual risk and disease transmission in "high-risk" samples.

Aim. This study sought to establish current rates of sexual behaviors, sexual health care practices (i.e., experiences with testing and diagnosis of sexually transmitted infections [STIs]), and condom use in a probability sample of black and Hispanic adult men and women in the United States.

Main Outcome Measures. Sexual behaviors including solo masturbation, partnered masturbation, receiving oral sex and giving oral sex, vaginal intercourse, and anal intercourse were assessed. Self-reported rates of HIV and other STI testing, and self-reported history of STI diagnosis were examined. Also assessed were rates of condom use during most recent and past 10 vaginal intercourse events.

Methods. Data from a probability sample of 1246 black and Hispanic adults were analyzed to explore sexual behaviors, condom use, and STI testing and diagnosis trends.

Results. Masturbation, oral sex, and vaginal intercourse were prevalent among black and Hispanic men and women throughout the life course. Anal intercourse and same-gender sexual activities were less common. Self-reported rates of HIV testing were relatively high but varied by gender across age groups. Similarly, rates of testing for other STI were high and differed by gender across age groups. Overall rates of condom use among black and Hispanic men and women were relatively high and did not appear to be related to a variety of situational factors including location of sexual encounter, relationship status, other contraceptive use, and substance use during sexual activity.

Conclusion. These data provide a foundation for understanding diverse sexual behaviors, sexual health-care practices, and condom use among the general population of black and Hispanic men and women in the United States.

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Key Words. Black; Hispanic; Sexual Health; Probability Sample; Sexual Behavior; African American; Latino

Introduction

Race and ethnicity have served as central organizing concepts in social science and public health research in the United States, although limited attention has been given specifically to the intersections of race/ethnicity and sexual behavior [1]. Over recent decades, the vast majority of research on the sexual behaviors of black and Hispanic individuals in the United States has focused on preventive health and sexual risk, often in "high risk" samples (including low income, substance abusing, etc.) that are not representative of the general population [2]. Large-scale empirical studies have most often made comparisons of ethnic minority individuals' sexual behaviors to their majority counterparts on a narrow range of variables related to sexual health (including age at first intercourse, condom use, sexually transmitted infections history, and unintended pregnancy

history). Much less is known about the prevalence of a range of sexual behaviors including masturbation, oral sex, anal sex, and same-gender sexual activity among the general black and Hispanic adult population in the United States [1]. Given that such data have not been collected in over a decade, this information would be of great utility to public health professionals and others seeking to understand sexual health among black and Hispanic individuals in the general population.

Kinsey made data available on sexual behavior among black individuals over a half a century ago [3,4]. He made careful attempts to examine them separately so as not to make statistical comparisons but to demonstrate how the social realities of being black in America created different opportunities and shaped different norms related to sexual behavior. Although not designed to explore the sexual behavior of ethnic minority individuals in probability samples, Kinsey's work was perhaps one of the earliest empirical reports on sexual behavior in these populations outside of the exclusive context of sexual risk.

An irrefutable factor involved in the focus on sexual risk among black and Hispanic individuals is that sexually transmitted infections (STIs), most recently HIV/AIDS, have disproportionately impacted these communities. In recent decades, HIV/AIDS became a leading cause of death among black women and men. An important milestone occurred in 1998 when the Centers for Disease Control and Prevention (CDC) held a consultation with black community leaders in order to develop a Call to Action in terms of HIV/AIDS in the black community [5]. This resulted in the creation of the Congressional Black Caucus Initiative, later known as the Minority AIDS Initiative (MAI). Initiatives such as this have led to significant federal funding for both HIV/AIDS prevention and care in black and Hispanic communities [6].

It is undeniable that major disparities continue to exist between black and Hispanic individuals and their White counterparts in the United States in terms of a variety of sexual health issues, most notably HIV/AIDS. Explanatory factors for higher rates of infection among black and Hispanic individuals are not directly related to race/ethnicity but rather to the social and ecological barriers faced by individuals within these communities, including poverty, racism, migration, and stigma [7–9]. Thus, research focused on documenting sexual risk in these communities with the ultimate goal of alleviating the burden of infection has been necessary. However, in the process of documenting sexual risk, particularly in high risk samples, researchers have also inadvertently produced a body of literature that is heavily problem-focused. Indeed, ethnic minority status itself is often viewed as a "risk factor" in public health research. Some have noted that the exclusive concentration on adverse sexual health "problems" among black and Hispanic individuals has produced a context in which black and Hispanic sexuality, in general, has been deemed non-normative [10,11].

Thus, studies focused on a wide range of sexual behaviors and related issues in the general population of black and Hispanic Americans are necessary in order to provide baseline data to be used for programs and interventions when necessary as well as to offer clinicians and other health professionals a frame of reference for understanding the broader population. It is also important to examine data separately for various racial and ethnic groups as the sexual behaviors of ethnic minority individuals in nationally representative samples may become conflated with majority individuals. Last, as ethnic minority individuals in the United States have been historically stigmatized for their sexuality, establishing current rates of sexual behaviors may help to "normalize" sexual behaviors within and across communities.

Aim

The purpose of the National Survey of Sexual Health and Behavior (NSSHB) study was to establish current rates of sexual behaviors among black and Hispanic adults (ages 18 years and older) in the United States. Additionally, we explored these participants' rates of testing for HIV and other STI, as well as previous diagnosis for STI. Last, we examine current rates of condom use in relation to a variety of contextual variables.

Methods

During March–May 2009, the NSSHB data were collected using a population-based cross-sectional survey of 5865 adolescents and adults in the United States via research panels of Knowledge Networks (Menlo Park, CA, USA). Research panels accessed through Knowledge Networks are based on a national probability sample established using both random digit dialing (RDD) and an address-based sampling (ABS) frame. ABS involves the probability sampling of a frame of residential

addresses in the United States derived from the U.S. Postal Service's Delivery Sequence File, a system that contains detailed information on every mail deliverable address in the United States. Collectively, the sampling frame from which participants are recruited covers approximately 98% of all U.S. households. Randomly selected addresses are recruited to the research panel through a series of mailings and subsequently by telephone follow-ups to non-responders when possible. To further correct sources of sampling and non-sampling error, study samples are corrected with a post-stratification adjustment using demographic distributions from the most recent data available from the Current Population Survey (CPS), the monthly population survey conducted by the U.S. Bureau of the Census considered to be the standard for measuring demographic and other trends in the United States. These adjustments result in a panel base weight that was employed in a probability proportional to size selection method for establishing the samples for this study. Population specific distributions for this study were based upon the December 2008 Current Population Survey [12].

Once the sample frame was established, all individuals within that frame received a recruitment message from Knowledge Networks that provided a brief description of the NSSHB and invited them to participate. Of 6,182 adults reviewing the study description, 5,045 (82%) consented to and participated. The data presented in this report are limited to the 1,246 participants surveyed in the NSSHB who self-identified their race/ethnicity as "black" or "Hispanic." The demographic characteristics of the sample are consistent with the characteristics of the overall U.S. black and Hispanic population based on the data that were available at the time of this study [12].

All data were collected by Knowledge Networks via the Internet; participants in a given Knowledge Networks panel were provided with access to the Internet and hardware if needed. Multiple researchers have used Knowledge Networks for multiple health-related studies, substantiating the validity of such methods for obtaining data from nationally representative samples of the U.S. population [13–17].

Main Outcome Measures

Sexual Behaviors

To assess sexual behaviors, participants were asked to describe the extent to which they had participated in a range of solo and partnered sexual behaviors during specific time periods (within the past month, with the past 90 days, and within the past year), consistent with other recent nationally representative studies of specific sexual behaviors. Behaviors assessed included solo masturbation, partnered masturbation, receiving oral sex and giving oral sex (with measures specific to the gender of the participating partner for each behavior), vaginal intercourse, and anal intercourse (for men, both insertive and receptive). The text of this paper includes summaries of sexual behaviors that occurred within the past year. We chose this because it is the recommended time period between wellness exams. Thus, these data may be particularly useful to clinicians in the sense that they provide insight into what behaviors patients may have engaged in since their last annual exam.

STI Testing Behaviors

Participants were asked to indicate whether they had ever been tested for HIV, whether they had ever been tested for other STI, and whether they had ever been diagnosed with an STI.

Condom Use

Two measures of condom use were included, one specific to the most recent vaginal intercourse event and one specific to condom use over the past 10 vaginal intercourse events. Condom use during a person's most recent sexual event has been found to be a good indicator of condom use over a period of time [18]. Additionally, participants who reported having vaginal intercourse within the past year were asked to provide an estimate of the number of times condoms had been used during their past 10 episodes of vaginal intercourse. To reduce the potential for participant error that might be incurred when asking individuals to calculate a rate, individuals were also presented with the option "I have not had vaginal intercourse at least 10 times."

Results

Demographics

Table 1 provides an overview of the descriptive characteristics of the black and Hispanic participants in this study.

Sexual Behaviors Among Black Men and Women

Rates of black men's recent and lifetime sexual behaviors, stratified by age, are detailed in Table 2.

Table 1 Weighted participant characteristics for total sample (N = 1,246) and by ethnicity

	Total sample (N = 1,246)		Black (N = 553)		Hispanic (N = 693)	
Sample characteristics	%	N	%	N	%	N
Gender						
Female	49.8%	620	54.8%	303	45.7%	371
Male	50.2%	626	45.2%	250	54.3%	376
Age						
18–24	11.2%	140	7.1%	39	14.5%	100
25–29	11.6%	144	12.0%	66	11.2%	78
30–39	21.6%	269	17.9%	99	24.6%	171
40–49	23.9%	298	22.5%	124	25.0%	174
50–59	17.8%	222	21.3%	118	15.0%	104
60–69	10.1%	125	14.5%	80	6.5%	45
≥70	3.9%	48	4.7%	26	3.2%	22
Ethnicity						
Black, non-Hispanic	44.4%	553				
Hispanic	55.6%	693				
Education						
Bachelors degree or higher	17.6%	219	17.9%	99	17.3%	120
Some college	29.7%	371	33.2%	184	27.0%	187
High school graduate	33.9%	422	33.4%	185	34.3%	237
Less than high school	18.8%	235	15.5%	86	21.4%	149
Sexual orientation (N = 1,246)						
Heterosexual	90.8%	1,132	92.2%	509	89.8%	622
Bisexual	3.5%	44	3.6%	20	3.5%	24
Homosexual	3.2%	40	2.3%	13	3.9%	27
Other	2.5%	30	2.0%	11	2.8%	20
Marital status						
Married	35.0%	436	25.7%	142	42.4%	294
Never married	31.9%	398	34.8%	192	29.7%	206
Divorced	12.8%	160	17.2%	95	9.3%	65
Living together-not married	11.6%	145	11.7%	65	11.6%	80
Separated	4.9%	61	6.5%	36	3.7%	26
Widowed	3.7%	46	4.1%	23	3.4%	23
Relationship status						
Single, not dating	28.3%	352	35.7%	197	22.4%	154
Single, dating one or more person	9.5%	118	13.0%	72	6.7%	46
In relationship, not living together	11.0%	137	11.4%	63	10.7%	74
In relationship, living together	13.7%	171	13.0%	72	14.3%	99
Married, living together	35.3%	438	24.0%	133	44.3%	305
Married, not living together	2.2%	27	2.9%	16	1.6%	11
Geographic region of the United States						
Northeast	16.7%	209	18.7%	104	15.1%	105
Midwest	12.6%	157	17.8%	99	8.5%	59
South	40.8%	509	51.5%	285	32.4%	224
West	29.8%	371	12.0%	66	44.0%	305
Metropolitan Statistical Area status						
Metropolitan area	93.7%	1,168	91.6%	507	95.5%	662
Non-metropolitan area	6.3%	78	8.4%	47	4.5%	31
Annual household income						
Less than $25,000	26.9%	336	37.5%	207	18.5%	128
$25,000–$49,999	34.7%	433	37.3%	206	32.6%	226
$50,000–$74,999	16.9%	210	13.8%	76	19.3%	134
Over $75,000	21.5%	268	11.4%	63	29.6%	205
Children under 18 in household						
No	67.1%	836	71.8%	397	63.3%	438
Yes	32.9%	411	28.2%	156	36.7%	255
Health status						
Excellent	14.3%	178	11.9%	66	16.3%	113
Very good	40.5%	504	35.1%	194	44.8%	310
Good	32.1%	399	37.7%	208	27.6%	191
Fair	10.7%	133	12.5%	69	9.2%	64
Poor	2.5%	31	2.9%	16	2.2%	15

Table 2 Weighted black men's and women's sexual behavior rates, stratified by age

	Men (by age)							
	18–24	25–29	30–39	40–49	50–59	60–69	70+	Total sample men
	% Engaged in behavior past 90 days (total N)							% (N)
Sexual behaviors	(95% CI)							95% CI
Solo masturbation								
90 day	36.8% (19) (19.0–59.1%)	68.2% (22) (47.1–83.8%)	53.5% (43) (38.9–67.5%)	50.0% (54) (37.1–62.9%)	49.2% (63) (37.3–61.2%)	31.3% (32) (17.8–48.7%)	22.2% (9) (5.3–55.7%)	47.5% (242) (41.3–53.8%)
Year	63.2% (19) (40.9–81.0%)	31.8% (22) (16.2–52.9%)	46.5% (43) (32.5–61.1%)	50.0% (54) (37.1–62.9%)	50.8% (63) (38.8–62.7%)	68.8% (32) (51.3–82.2%)	77.8% (9) (44.3–94.7%)	61.5% (239) (55.2–67.4%)
Lifetime	68.4% (19) (45.8–84.8%)	100.0% (21) (81.8–102.8%)	83.3% (42) (69.1–92.0%)	77.4% (53) (64.3–86.7%)	77.8% (63) (66.0–86.4%)	67.7% (31) (50.0–81.5%)	50.0% (10) (23.7–76.3%)	77.4% (239) (71.7–82.3%)
Partnered masturbation								
90 days	0.0% (19) –(3.0–19.8%)	31.8% (22) (16.2–52.9%)	15.9% (44) (7.6–29.7%)	25.5% (55) (15.7–38.4%)	12.7% (63) (6.3–23.4%)	3.2% (31) –(0.8–17.6%)	22.2% (9) (5.3–55.7%)	16.0% (243) (11.9–21.2%)
Year	0.0% (19) –(3.0–19.8%)	52.4% (21) (32.4–71.7%)	25.6% (43) (14.8–40.4%)	37.5% (56) (26.0–50.6%)	14.3% (63) (7.5–25.2%)	9.7% (31) (2.6–25.7%)	22.2% (9) (5.3–55.7%)	23.6% (242) (18.6–29.3%)
Lifetime	0.0% (19) –(3.0–19.8%)	72.7% (22) (51.6–87.1%)	40.9% (44) (27.7–55.6%)	49.1% (55) (36.4–61.9%)	23.8% (63) (14.9–35.7%)	28.1% (32) (15.4–45.5%)	22.2% (9) (5.3–55.7%)	35.7% (244) (29.9–41.8%)
Gave oral sex to a female partner								
90 days	21.1% (19) (8.0–43.9%)	66.7% (21) (45.2–83.0%)	60.5% (43) (45.6–73.7%)	30.4% (56) (19.8–43.4%)	22.2% (63) (13.6–34.0%)	19.4% (31) (8.8–36.7%)	20.0% (10) (4.6–52.1%)	34.2% (243) (28.5–40.3%)
Year	31.6% (19) (15.2–54.2%)	66.7% (21) (45.2–83.0%)	65.9% (44) (51.1–78.2%)	37.5% (56) (26.0–50.6%)	32.8% (64) (22.5–45.0%)	34.4% (32) (20.3–51.8%)	30.0% (10) (10.3–60.8%)	42.7% (246) (36.7–48.9%)
Lifetime	31.6% (19) (15.2–54.2%)	66.7% (27) (47.7–81.5%)	83.7% (43) (69.7–92.2%)	68.4% (57) (55.5–79.0%)	65.1% (63) (52.7–75.7%)	67.7% (31) (50.0–81.5%)	50.0% (10) (23.7–76.3%)	66.4% (244) (60.2–72.0%)
Received oral sex from a female partner								
90 days	21.1% (19) (8.0–43.9%)	66.7% (21) (45.2–83.0%)	64.3% (42) (49.1–77.1%)	40.0% (55) (28.1–53.2%)	28.6% (63) (18.8–40.8%)	18.8% (32) (8.5–35.7%)	20.0% (10) (4.6–52.1%)	38.4% (242) (32.5–44.7%)
Year	31.6% (19) (15.2–54.2%)	66.7% (21) (45.2–83.0%)	78.6% (42) (63.8–88.5%)	51.9% (54) (38.9–64.6%)	46.0% (63) (34.3–58.2%)	45.2% (31) (29.2–62.2%)	22.2% (9) (5.3–55.7%)	52.7% (239) (46.4–59.0%)
Lifetime	31.6% (19) (15.2–54.2%)	90.5% (21) (69.9–98.6%)	83.7% (43) (69.7–92.2%)	74.1% (54) (61.0–84.0%)	81.0% (63) (69.4–88.9%)	77.4% (31) (59.9–88.9%)	50.0% (10) (23.7–76.3%)	75.1% (241) (69.3–80.2%)
Vaginal intercourse								
90 days	42.1% (19) (23.1–63.8%)	57.1% (21) (36.5–75.6%)	73.8% (42) (58.8–84.8%)	53.6% (56) (40.7–66.0%)	45.3% (63) (33.7–57.4%)	45.2% (31) (29.2–62.2%)	62.5% (8) (30.4–86.5%)	53.5% (241) (47.2–59.7%)
Year	42.1% (19) (23.1–63.8%)	57.1% (21) (36.5–75.6%)	73.8% (42) (58.8–84.8%)	66.1% (56) (53.0–77.1%)	53.8% (65) (41.9–65.4%)	48.4% (31) (32.0–65.2%)	62.5% (8) (30.4–86.5%)	59.1% (239) (52.8–65.1%)
Lifetime	57.9% (19) (36.2–76.9%)	57.1% (21) (36.5–75.6%)	85.7% (42) (71.8–93.7%)	80.4% (56) (68.0–88.8%)	82.8% (64) (71.6–90.3%)	87.1% (31) (70.5–95.5%)	87.5% (8) (50.8–99.9%)	79.3% (241) (73.7–83.9%)
Insertive anal intercourse								
90 days	0.0% (19) –(3.0–19.8%)	9.5% (21) (1.4–30.1%)	9.1% (44) (3.0–21.7%)	7.1% (56) (2.3–17.5%)	11.1% (63) (5.2–21.5%)	3.3% (30) –(0.8–18.1%)	0.0% (10) –(4.3–32.1%)	7.4% (243) (4.7–11.5%)
Year	0.0% (19) –(3.0–19.8%)	31.8% (22) (16.2–52.9%)	18.6% (43) (9.5–32.9%)	14.5% (55) (7.3–26.4%)	12.7% (63) (6.3–23.4%)	3.3% (30) –(0.8–18.1%)	0.0% (10) –(4.3–32.1%)	13.2% (242) (9.5–18.1%)
Lifetime	10.5% (19) (1.7–32.6%)	52.4% (21) (32.4–71.7%)	36.4% (44) (23.7–51.2%)	33.9% (56) (22.9–47.0%)	33.3% (63) (22.9–45.7%)	20.0% (30) (9.1–37.7%)	10.0% (10) –(0.4–42.6%)	31.3% (243) (25.8–37.4%)

Table 2 Continued

	Women (by age)							
	18–24	25–29	30–39	40–49	50–59	60–69	70+	Total sample women
	% Engaged in behavior past 90 days (total N)							% (N)
Sexual behaviors	(95% CI)							95% CI
Solo masturbation								
90 days	40.0% (20)	66.7% (45)	56.6% (53)	24.1% (54)	30.2% (53)	55.1% (49)	12.5% (16)	43.4% (290)
	(21.8–61.4%)	(52.0–78.7%)	(43.3–69.1%)	(14.5–37.1%)	(19.4–43.6%)	(41.3–68.2%)	(2.2–37.3%)	(37.9–49.2%)
Year	50.0% (20)	75.6% (45)	62.3% (53)	46.3% (54)	43.4% (53)	56.3% (48)	20.0% (3)	53.8% (288)
	(29.9–70.1%)	(61.2–85.9%)	(48.8–74.1%)	(33.7–59.4%)	(30.9–56.7%)	(42.3–69.3%)	(0.7–73.0%)	(48.0–59.5%)
Lifetime	50.0% (20)	93.3% (45)	64.8% (54)	70.4% (54)	56.6% (53)	83.3% (48)	56.3% (16)	70.3% (290)
	(29.9–70.1%)	(81.5–98.4%)	(51.4–76.2%)	(57.1–80.9%)	(43.3–69.1%)	(70.2–91.6%)	(33.2–76.9%)	(64.8–75.3%)
Partnered masturbation								
90 day	20.0% (20)	44.4% (45)	30.9% (55)	5.7% (53)	7.5% (53)	10.4% (48)	0.0% (16)	18.3% (290)
	(7.5–42.2%)	(30.9–58.8%)	(20.2–44.1%)	(1.3–16.0%)	(2.5–18.4%)	(4.1–22.6%)	–(3.3–22.7%)	(14.2–23.1%)
Year	20.0% (20)	53.3% (45)	32.7% (55)	28.3% (53)	13.2% (53)	29.2% (48)	0.0% (16)	28.3% (290)
	(7.5–42.2%)	(39.1–67.1%)	(21.8–45.9%)	(17.9–41.7%)	(6.2–25.2%)	(18.2–43.3%)	–(3.3–22.7%)	(23.4–33.7%)
Lifetime	25.0% (20)	62.2% (45)	38.2% (55)	43.4% (53)	32.1% (53)	52.1% (48)	0.0% (16)	41.0% (290)
	(10.8–47.2%)	(47.6–74.9%)	(26.5–51.4%)	(30.9–56.7%)	(21.0–45.5%)	(38.3–65.5%)	–(3.3–22.7%)	(35.5–46.8%)
Gave oral sex to a male partner								
90 day	35.0% (20)	60.0% (45)	43.6% (55)	9.4% (53)	13.2% (53)	17.8% (45)	0.0% (16)	27.2% (287)
	(18.0–56.8%)	(45.4–73.0%)	(31.4–56.7%)	(3.7–20.7%)	(6.2–25.2%)	(9.0–31.6%)	–(3.3–22.7%)	(22.3–32.6%)
Year	50.0% (20)	71.1% (45)	45.5% (55)	35.2% (54)	20.8% (53)	20.0% (45)	0.0% (16)	36.8% (290)
	(29.9–70.1%)	(56.5–82.4%)	(33.0–58.5%)	(23.8–48.6%)	(11.8–33.6%)	(10.7–34.0%)	–(3.3–22.7%)	(31.5–42.5%)
Lifetime	50.0% (20)	84.4% (45)	64.3% (56)	57.4% (54)	50.9% (53)	59.1% (44)	33.3% (15)	60.3% (287)
	(29.9–70.1%)	(70.9–92.6%)	(51.2–75.6%)	(44.2–69.7%)	(37.9–63.9%)	(44.4–72.3%)	(15.0–58.5%)	(54.5–65.8%)
Received oral sex from a male partner								
90 day	45.0% (20)	44.4% (45)	41.8% (55)	18.9% (53)	23.1% (52)	19.1% (47)	0.0% (16)	28.8% (288)
	(25.8–65.8%)	(30.9–58.8%)	(29.7–55.0%)	(10.4–31.6%)	(13.6–36.3%)	(10.2–32.8%)	–(3.3–22.7%)	(23.9–34.3%)
Year	52.4% (21)	66.7% (45)	47.3% (55)	45.3% (53)	36.5% (52)	36.2% (47)	0.0% (16)	43.9% (289)
	(32.4–71.7%)	(52.0–78.7%)	(34.7–60.2%)	(32.7–58.5%)	(24.8–50.2%)	(23.9–50.5%)	–(3.3–22.7%)	(38.3–49.7%)
Lifetime	80.0% (20)	91.1% (45)	76.4% (55)	86.8% (53)	73.1% (52)	83.0% (47)	46.7% (15)	79.8% (287)
	(57.8–92.5%)	(78.7–97.0%)	(63.5–85.8%)	(74.8–93.8%)	(59.6–83.3%)	(69.6–91.4%)	(24.8–69.9%)	(74.7–84.0%)
Vaginal intercourse								
90 day	55.0% (20)	71.1% (45)	43.1% (51)	54.7% (53)	44.4% (54)	36.2% (47)	0.0% (14)	47.5% (284)
	(34.2–74.2%)	(56.5–82.4%)	(30.5–56.7%)	(41.5–67.3%)	(32.0–57.6%)	(23.9–50.5%)	–(3.6–25.1%)	(41.8–53.3%)
Year	71.4% (21)	82.2% (45)	46.2% (52)	65.4% (52)	50.9% (53)	47.9% (48)	0.0% (14)	56.1% (285)
	(49.8–86.4%)	(68.4–91.0%)	(33.3–59.5%)	(51.8–76.9%)	(37.9–63.9%)	(34.5–61.7%)	–(3.6–25.1%)	(50.3–61.8%)
Lifetime	80.0% (20)	91.1% (45)	75.0% (52)	92.3% (52)	92.5% (53)	85.4% (48)	64.3% (14)	85.6% (284)
	(57.8–92.5%)	(78.7–97.0%)	(61.7–84.9%)	(81.3–97.5%)	(81.6–97.5%)	(72.5–93.1%)	(38.6–83.8%)	(81.0–89.2%)
Receptive anal intercourse								
90 day	10.0% (20)	11.1% (45)	3.7% (54)	3.8% (53)	0.0% (51)	6.3% (48)	0.0% (15)	4.9% (286)
	(1.6–31.3%)	(4.4–24.0%)	(0.3–13.3%)	(0.3–13.5%)	–(1.4–8.4%)	(1.5–17.5%)	–(3.5–23.9%)	(2.9–8.1%)
Year	15% (20)	20.0% (45)	7.4% (54)	14.8% (54)	0.0% (51)	12.2% (49)	0.0% (15)	10.4% (288)
	(4.4–36.9%)	(10.7–34.0%)	(2.4–18.0%)	(7.4–26.9%)	–(1.4–8.4%)	(5.4–24.6%)	–(3.5–23.9%)	(7.4–14.5%)
Lifetime	19.0% (21)	55.6% (45)	32.1% (53)	24.1% (54)	11.5% (52)	24.5% (49)	13.3% (15)	27.3% (289)
	(7.1–40.6%)	(41.2–69.1%)	(21.0–45.5%)	(14.5–37.1%)	(5.0–23.3%)	(14.5–38.2%)	(2.5–39.1%)	(22.5–32.8%)

CI = Confidence Interval.

Solo masturbation was common, with 62% of men reporting they had engaged in this behavior during the past year. The percentage of men who reported partnered masturbation (24%) was considerably lower than solo masturbation. Approximately 43% of participants reported giving oral sex to a female partner during the past year. Men were more likely to report receiving oral sex (53%) from a female partner. Vaginal intercourse was the most commonly reported behavior with a partner, with an average of 59% of men across age groups. Rates of anal intercourse during the past year were lower among men (13%) relative to other sexual behaviors.

Black women's sexual behaviors, stratified by age, are summarized in Table 2. Solo masturbation during the past year was reported by 54% of women. Reports of partnered masturbation were considerably lower (28%) than for solo masturbation. Approximately 37% of participants reported giving oral sex to a male partner during the past year. Reported rates of receiving oral sex (44%) were higher than rates of giving oral sex. Vaginal intercourse was the most commonly reported partnered behavior among women, with an average of 56%. Reported rates of anal intercourse were relatively lower (10%) than other sexual behaviors.

In terms of gender, black men's and women's reports of sexual behaviors revealed both similarities and differences. Masturbation for both men and women followed similar patterns in terms of considerably higher frequency of solo masturbation relative to partnered masturbation. Reported rates of receiving oral sex were higher than those for giving oral sex among both men and women. Vaginal intercourse was the most commonly reported behavior with a partner for both men and women whereas anal intercourse was the least commonly reported behavior.

Sexual Behaviors among Hispanic Men and Women

Rates of Hispanic men's sexual behaviors, stratified by age, are summarized in Table 3. Solo masturbation during the past year was across all age groups of Hispanic men, with an average of 72% across age groups. Reported rates of partnered masturbation (41%) were nearly half the rates of solo masturbation. Hispanic men's reports of giving oral sex (62%) and receiving oral sex (65%) were also high. Vaginal intercourse was the most commonly reported partnered sexual behavior (75%) among men. Reported rates of anal intercourse were generally lower among men (20%) than other sexual behaviors.

Hispanic women's sexual behaviors, stratified by age, are summarized in Table 3. Solo masturbation during the past year was common, with 56% of women reporting they had engaged in this behavior. Reported rates of partnered masturbation were lower (34%) than rates of solo masturbation and approximately half of the women reported having received (51%) or given (50%) oral sex to a male partner within the past year. Vaginal intercourse was the most commonly reported partnered sexual behavior (70%) among women. Reports of anal intercourse were generally lower among women (18%) relative to other sexual behaviors.

Overall, Hispanic men's and women's reports of sexual behaviors seemed to follow similar patterns for solo masturbation, partnered masturbation, giving and receiving oral sex, vaginal intercourse, and anal intercourse. Vaginal intercourse was the most commonly reported partnered sexual behavior for both men and women whereas anal intercourse was the least commonly reported behavior. For all sexual behaviors, men's reported rates were higher than women's reported rates.

Same-Gender Behaviors Among Black and Hispanic Men and Women

Reports of same-gender behaviors were less common in this probability sample and, thus, exploring them in detail across age groups and time periods was not possible. For black men, lifetime rates of giving oral sex to another man were 7% (N = 16) and rates of receiving oral sex from another man were 7% (N = 17). Rates of receptive anal intercourse were 7% (N = 17). For black women, 12% (N = 34) reported ever giving oral sex to a woman and 13% (N = 35) ever receiving oral sex from another woman.

Among Hispanic men, 11% (N = 39) reported ever giving oral sex to another man and 13% (N = 46) reported ever receiving oral sex from another man. Rates of receptive anal intercourse were 9% (N = 32). For Hispanic women, 12% (N = 35) reported ever giving oral sex to another woman and 10% (N = 31) reported ever receiving oral sex from another woman.

HIV Testing, STI Testing, and STI Diagnosis

Table 4 presents the lifetime HIV testing, STI testing, and STI diagnosis history of black and Hispanic study participants stratified by age. Rates of HIV testing in the samples were relatively high (almost always over 50% with the exception of the oldest age groups). Overall, 84% of both black

Table 3 Weighted Hispanic men's and women's sexual behavior rates, stratified by age

	Men (by age)							
	18–24	25–29	30–39	40–49	50–59	60–69	70+	Total sample men
	% Engaged in behavior past 90 days (total N)							% (N)
Sexual behaviors	(95% CI)							95% CI
Solo masturbation								
90 days	71.0% (62)	68.3% (41)	67.4% (92)	56.0% (84)	58.0% (50)	60.0% (25)	0.0% (13)	61.3% (367)
	(58.6–80.8%)	(52.9–80.5%)	(57.3–76.1%)	(45.3–66.1%)	(44.2–70.6%)	(40.7–76.6%)	–(3.8–26.6%)	(56.2–66.2%)
Year	88.7% (62)	68.3% (41)	75.0% (92)	66.7% (84)	68.0% (50)	79.2% (24)	23.1% (13)	72.1% (366)
	(78.2–94.7%)	(52.9–80.5%)	(65.2–82.8%)	(56.0–75.8%)	(54.1–79.3%)	(59.1–91.2%)	(7.5–50.9%)	(67.3–76.5%)
Lifetime	98.4% (62)	87.8% (41)	97.8% (91)	86.7% (83)	74.0% (50)	100.0% (25)	46.2% (13)	89.3% (365)
	(90.6–100.5%)	(74.0–95.1%)	(91.9–99.9%)	(77.6–92.6%)	(60.3–84.2%)	(84.2–102.4%)	(23.2–70.9%)	(85.7–92.1%)
Partnered masturbation								
90 days	27.6% (58)	25.0% (40)	36.3% (91)	25.3% (83)	28.0% (50)	0.0% (25)	0.0% (13)	26.1% (360)
	(17.7–40.3%)	(14.0–40.4%)	(27.1–46.5%)	(17.1–35.7%)	(17.4–41.8%)	–(2.4–15.8%)	–(3.8–26.6%)	(21.8–30.9%)
Year	56.1% (57)	55.0% (40)	45.6% (90)	39.8% (83)	36.0% (50)	4.0% (20)	0.0% (13)	41.1% (358)
	(43.3–68.2%)	(39.8–69.3%)	(35.7–55.8%)	(29.9–50.5%)	(24.1–49.9%)	–(1.4–24.2%)	–(3.8–26.6%)	(36.1–46.2%)
Lifetime	65.5% (58)	75.0% (40)	65.9% (91)	55.4% (83)	44.0% (50)	41.7% (24)	21.4% (14)	58.1% (209)
	(52.6–76.5%)	(59.6–86.0%)	(55.7–74.9%)	(44.7–65.6%)	(31.2–57.7%)	(24.4–61.2%)	(6.8–48.3%)	(51.3–64.5%)
Gave oral sex to a female partner								
90 days	47.5% (59)	63.9% (36)	57.6% (92)	38.6% (83)	47.1% (51)	12.5% (24)	50.0% (14)	47.4% (359)
	(35.3–60.0%)	(47.5–77.6%)	(47.4–67.2%)	(28.8–49.3%)	(34.1–60.5%)	(3.5–31.8%)	(26.8–73.2%)	(42.2–52.5%)
Year	71.2% (59)	75.0% (36)	70.7% (92)	50.6% (83)	62.7% (51)	28.0% (25)	50.0% (14)	61.7% (360)
	(58.5–81.2%)	(58.7–86.4%)	(60.6–79.0%)	(40.1–61.1%)	(49.0–74.7%)	(14.1–47.8%)	(26.8–73.2%)	(56.5–66.5%)
Lifetime	89.8% (59)	78.4% (37)	85.9% (92)	71.1% (83)	78.0% (50)	76.0% (25)	84.6% (13)	80.5% (359)
	(79.2–95.6%)	(62.6–88.9%)	(77.2–91.7%)	(60.5–79.8%)	(64.6–87.4%)	(56.2–88.8%)	(56.5–96.9%)	(76.1–84.3%)
Received oral sex from a female partner								
90 days	54.2% (59)	67.6% (37)	59.3% (91)	48.8% (84)	46.0% (50)	16.0% (25)	50.0% (14)	51.7% (187)
	(41.7–66.3%)	(51.4–80.5%)	(49.1–68.9%)	(38.4–59.3%)	(33.0–59.6%)	(5.8–35.3%)	(26.8–73.2%)	(44.5–58.7%)
Year	66.1% (59)	86.1% (36)	79.3% (92)	59.0% (83)	50.0% (50)	32.0% (25)	50.0% (14)	64.6% (359)
	(53.3–76.9%)	(70.9–94.4%)	(69.9–86.4%)	(48.3–69.0%)	(36.6–63.4%)	(17.1–51.7%)	(26.8–73.2%)	(59.5–69.4%)
Lifetime	84.7% (59)	86.1% (36)	85.7% (91)	75.9% (83)	80.4% (51)	80.0% (25)	84.6% (13)	82.1% (358)
	(73.3–92.0%)	(70.9–94.4%)	(76.9–91.6%)	(65.6–83.9%)	(67.3–89.2%)	(60.4–91.6%)	(56.5–96.9%)	(77.8–85.8%)
Vaginal intercourse								
90 days	56.5% (62)	72.2% (36)	78.2% (87)	67.5% (83)	78.4% (51)	47.8% (23)	46.2% (13)	68.2% (355)
	(44.1–68.1%)	(55.9–84.3%)	(68.3–85.6%)	(56.8–76.6%)	(65.2–87.7%)	(29.2–67.0%)	(23.2–70.9%)	(63.1–72.8%)
Year	69.4% (62)	77.1% (35)	86.2% (87)	69.9% (83)	82.0% (50)	47.8% (23)	57.1% (14)	74.3% (354)
	(57.0–79.5%)	(60.7–88.2%)	(77.3–92.1%)	(59.3–78.7%)	(69.0–90.5%)	(29.2–67.0%)	(32.5–78.7%)	(69.5–78.6%)
Lifetime	83.9% (62)	82.9% (35)	90.8% (87)	80.7% (83)	90.0% (50)	73.9% (23)	85.7% (14)	85.0% (301)
	(72.6–91.2%)	(66.9–92.3%)	(82.7–95.5%)	(70.9–87.9%)	(78.2–96.1%)	(53.2–87.7%)	(58.8–97.2%)	(80.5–88.6%)
Insertive intercourse								
90 days	12.9% (62)	16.7% (36)	16.7% (36)	20.9% (86)	15.7% (83)	6.3% (48)	31.7% (13)	14.8% (352)
	(6.4–23.7%)	(7.5–32.3%)	(7.5–32.3%)	(13.6–30.8%)	(9.2–25.1%)	(1.5–17.5%)	(13.0–58.8%)	(11.4–18.9%)
Year	14.5% (62)	21.6% (37)	30.2% (86)	21.7% (83)	14.3% (49)	16.7% (24)	0.0% (13)	20.3% (354)
	(7.6–25.6%)	(11.1–37.4%)	(21.5–40.6%)	(14.1–31.8%)	(6.8–27.0%)	(6.1–36.5%)	–(3.8–26.6%)	(16.5–24.9%)
Lifetime	24.2% (62)	48.6% (37)	55.8% (86)	39.8% (83)	47.9% (48)	54.2% (24)	15.4% (13)	43.1% (353)
	(15.1–36.3%)	(33.4–64.1%)	(45.3–65.8%)	(29.9–50.5%)	(34.5–61.7%)	(35.1–72.1%)	(3.1–43.5%)	(38.0–48.3%)

Table 3 Continued

Sexual behaviors	Women (by age)							Total sample women
	18–24	25–29	30–39	40–49	50–59	60–69	70+	
	% Engaged in behavior past 90 days (total N) (95% CI)							% (N) 95% CI
Solo masturbation								
90 day	30.3% (33) (17.2–47.5%)	54.3% (35) (38.2–69.5%)	39.4% (71) (28.9–51.1%)	67.4% (86) (57.0–76.4%)	28.8% (52) (18.2–42.4%)	31.6% (19) (15.2–54.2%)	22.2% (9) (5.3–55.7%)	45.2% (305) (39.8–50.9%)
Year	56.3% (18) (34.3–76.0%)	63.9% (23) (43.5–80.3%)	45.1% (32) (29.3–61.9%)	77.6% (66) (66.1–86.1%)	37.3% (19) (19.4–59.4%)	42.1% (8) (16.4–73.0%)	33.3% (3) (5.6–79.8%)	55.8% (303) (50.1–61.3%)
Lifetime	75.0% (32) (57.7–87.0%)	71.4% (35) (54.8–83.8%)	64.8% (71) (53.2–74.9%)	77.9% (86) (68.0–85.5%)	80.4% (51) (67.3–89.2%)	52.6% (19) (31.7–72.7%)	100.0% (9) (65.5–104.5%)	73.3% (303) (68.0–77.9%)
Partnered masturbation								
90 day	21.2% (33) (10.4–38.0%)	22.2% (36) (11.5–38.3%)	25.4% (71) (16.6–36.6%)	32.6% (86) (23.6–43.0%)	21.2% (52) (12.1–34.2%)	5.3% (19) –(0.9–26.5%)	0.0% (8) –(4.8–37.2%)	23.9% (305) (19.5–29.0%)
Year	30.3% (33) (17.2–47.5%)	45.7% (35) (30.5–61.8%)	40.3% (72) (29.7–51.8%)	40.7% (86) (30.9–51.3%)	25.0% (52) (15.1–38.3%)	5.3% (19) –(0.9–26.5%)	0.0% (8) –(4.8–37.2%)	34.1% (305) (29.0–39.6%)
Lifetime	36.4% (33) (22.1–53.4%)	65.7% (35) (49.1–79.2%)	60.6% (71) (48.9–71.1%)	57.0% (86) (46.4–66.9%)	55.8% (52) (42.3–68.4%)	20.0% (20) (7.5–42.2%)	25.0% (8) (6.3–59.9%)	53.1% (305) (47.5–58.6%)
Gave oral sex to a male partner								
90 day	50.0% (34) (34.1–65.9%)	37.1% (35) (23.1–53.7%)	47.2% (72) (36.1–58.6%)	34.1% (88) (25.0–44.5%)	41.7% (48) (28.8–55.7%)	26.3% (19) (11.5–49.1%)	22.2% (9) (5.3–55.7%)	39.7% (305) (34.3–45.3%)
Year	64.7% (34) (47.8–78.6%)	61.1% (36) (44.8–75.2%)	55.6% (72) (44.1–66.5%)	48.9% (88) (38.7–59.1%)	42.6% (47) (29.5–56.7%)	31.6% (19) (15.2–54.2%)	22.2% (9) (5.3–55.7%)	50.8% (305) (45.2–56.4%)
Lifetime	69.7% (33) (52.5–82.8%)	77.1% (35) (60.7–88.2%)	72.2% (72) (60.9–81.3%)	80.5% (87) (70.8–87.5%)	74.5% (47) (60.4–84.9%)	65.0% (20) (43.2–82.0%)	66.7% (9) (35.1–88.3%)	74.6% (303) (69.4–79.2%)
Received oral sex from a male partner								
90 day	52.9% (34) (36.7–68.6%)	51.4% (35) (35.6–67.0%)	45.9% (74) (35.1–57.2%)	40.7% (86) (30.9–51.3%)	34.0% (47) (22.1–48.4%)	26.3% (19) (11.5–49.1%)	0.0% (9) –(4.5–34.5%)	41.4% (304) (36.0–47.1%)
Year	57.6% (33) (40.8–72.8%)	62.9% (35) (46.3–76.9%)	56.8% (74) (45.4–67.4%)	51.2% (86) (40.8–61.4%)	40.4% (47) (27.6–54.7%)	26.3% (19) (11.5–49.1%)	0.0% (9) –(4.5–34.5%)	49.8% (303) (44.2–55.4%)
Lifetime	69.7% (33) (52.5–82.8%)	77.8% (36) (61.7–88.5%)	66.2% (74) (54.8–76.0%)	81.4% (86) (71.8–88.3%)	83.0% (47) (69.6–91.4%)	65.0% (20) (43.2–82.0%)	77.8% (9) (44.3–94.7%)	75.1% (305) (69.9–79.6%)
Vaginal intercourse								
90 day	65.5% (29) (47.3–80.1%)	62.5% (32) (45.2–77.1%)	75.0% (72) (63.8–83.6%)	62.4% (85) (51.7–71.9%)	59.6% (52) (46.1–71.9%)	65.0% (20) (43.2–82.0%)	25.0% (8) (6.3–59.9%)	64.4% (298) (58.8–69.7%)
Year	75.9% (29) (57.6–88.0%)	71.9% (32) (54.5–84.6%)	75.0% (72) (63.8–83.6%)	68.2% (82) (57.5–77.3%)	67.3% (52) (53.7–78.5%)	65.0% (20) (43.2–82.0%)	25.0% (8) (6.3–59.9%)	69.5% (298) (64.0–74.4%)
Lifetime	79.3% (23) (58.8–91.5%)	78.1% (32) (61.0–89.3%)	84.7% (72) (74.5–91.4%)	89.3% (84) (80.7–94.5%)	92.3% (52) (81.3–97.5%)	100.0% (19) (80.2–103.0%)	100% (9) (65.5–104.5%)	87.5% (297) (83.3–90.9%)
Receptive anal intercourse								
90 Day	25.0% (28) (12.4–43.6%)	14.3% (35) (5.8–29.9%)	12.5% (72) (6.5–22.3%)	8.3% (84) (3.8–16.4%)	0.0% (47) –(1.5–9.0%)	5.3% (19) –(0.9–26.5%)	0.0% (9) –(4.5–34.5%)	9.9% (294) (6.9–13.8%)
Year	31.0% (29) (17.1–49.4%)	28.6% (35) (16.2–45.2%)	25.0% (72) (16.4–36.2%)	14.1% (85) (8.1–23.2%)	6.4% (47) (1.6–17.8%)	10.5% (19) (1.7–32.6%)	0.0% (9) –(4.5–34.5%)	18.2% (296) (14.2–23.1%)
Lifetime	44.8% (29) (28.4–62.5%)	51.4% (35) (35.6–67.0%)	37.5% (72) (27.2–49.1%)	49.4% (85) (39.0–59.8%)	42.6% (47) (29.5–56.7%)	21.1% (19) (8.0–43.9%)	37.5% (8) (13.5–69.6%)	43.1% (295) (37.5–48.8%)

CI = Confidence Interval.

Table 4 Weighted lifetime HIV and sexually transmitted infection (STI) testing rates by gender, stratified by age

	HIV testing			STI testing			STI diagnosis		
	Men	Women	Not tested vs. tested	Men	Women	Not tested vs. tested	Men	Women	No STI diagnosis vs. STI diagnosis
Participants by age	% Engaged in behavior (N) (95% CI)		Odds ratio (95% CI)	% Engaged in behavior (N) (95% CI)		Odds ratio (95% CI)	% Engaged in behavior (N) (95% CI)		Odds ratio (95% CI)
Black									
18–24	40.0% (15) (19.7–64.3%)	100.0% (18) (79.3–103.1%)	8.70** (0.00–1.37)	26.7% (15) (10.5–52.4%)	85.0% (20) (63.1–95.6%)	0.06**** (0.1–0.34%)	0.0% (15) –(3.5–23.9%)	37.5% (16) (18.4–61.5%)	— —
25–29	73.7% (19) (50.9–88.5%)	97.4% (39) (85.6–100.7%)	0.12* (0.02–0.85)	64.7% (17) (41.2–82.8%)	97.4% (39) (85.6–100.7%)	0.05** (0.01–0.49)	0.0% (19) –(3.0–19.8%)	60.0% (40) (44.6–73.7%)	— —
30–39	82.5% (40) (67.7–91.6%)	93.6% (47) (82.2–98.4%)	0.26 (0.06–1.16)	80.5% (41) (65.7–90.0%)	93.5% (46) (81.8–98.4%)	0.30 (0.07–1.21)	37.5% (40) (24.2–53.0%)	41.9% (43) (28.4–56.7%)	0.84 (0.35–2.02)
40–49	90.6% (53) (79.3–96.3%)	75.5% (53) (62.3–85.2%)	3.18* (1.01–9.99)	77.1% (48) (63.3–86.9%)	76.5% (51) (63.1–86.1%)	1.04 (0.42–2.62)	13.5% (52) (6.4–25.6%)	24.5% (53) (14.8–37.7%)	0.45 (0.16–1.25)
50–59	75.0% (48) (61.1–85.2%)	70.2% (47) (55.9–81.4%)	1.32 (0.54–3.23)	70.8% (48) (56.7–81.8%)	63.8% (47) (49.5–76.1%)	1.33 (0.56–3.15)	43.9% (57) (31.8–56.7%)	26.5% (49) (16.1–40.4%)	2.13 (0.94–4.83)
60–69	57.1% (28) (39.1–73.5%)	90.2% (41) (76.9–96.7%)	0.16*** (0.05–0.56)	88.9% (27) (71.1–97.0%)	68.4% (38) (52.5–81.0%)	4.19* (0.99–17.85)	55.2% (29) (37.5–71.6%)	26.8% (41) (15.6–42.1%)	3.32** (1.22–9.04)
70+	42.9% (7) (15.8–75.0%)	20.0% (10) (4.6–52.1%)	3.42 (0.35–33.83)	42.9% (7) (15.8–75.0%)	25.0% (8) (6.3–59.9%)	3.32 (0.33–33.52)	14.3% (7) (0.5–53.3%)	0.0% (9) –(4.5–34.5%)	— —
Hispanic									
18–24	42.1% (57) (30.2–55.0%)	66.7% (24) (46.6–82.2%)	0.36* (0.13–0.97)	49.1% (57) (36.6–61.7%)	75.0% (24) (54.8–88.3%)	2.35*** (0.12–0.95)	0.0% (55) –(1.3–7.8%)	12.5% (34) (3.5–31.8%)	— —
25–29	64.5% (31) (46.9–79.0%)	84.6% (26) (65.9–94.5%)	0.36 (0.10–0.33)	51.7% (29) (34.4–68.6%)	88.9% (27) (71.1–97.0%)	0.12*** (0.03–0.53)	12.9% (31) (4.5–29.5%)	17.9% (28) (7.4–36.1%)	0.67 (0.16–2.86)
30–39	63.8% (80) (52.8–73.4%)	71.7% (60) (59.2–81.6%)	0.68 (0.33–1.4)	53.8% (78) (42.9–64.5%)	70.7% (58) (57.9–80.9%)	0.50 (0.24–1.02)	10.1% (89) (5.2–18.3%)	14.1% (64) (7.4–24.8%)	0.66 (0.25–1.75)
40–49	69.0% (71) (57.5–78.6%)	68.8% (80) (57.9–77.9%)	1.01 (0.50–2.01)	64.8% (71) (53.2–74.9%)	65.7% (67) (53.7–75.9%)	0.94 (0.47–1.90)	10.4% (77) (5.1–19.4%)	28.8% (0) (0.2–97.4%)	0.28*** (0.12–0.67)
50–59	71.4% (42) (56.3–82.9%)	40.0% (50) (27.6–53.8%)	3.86*** (1.60–9.31)	48.7% (39) (33.9–63.8%)	50.0% (48) (36.4–63.6%)	0.94 (0.40–2.19)	22.4% (49) (12.9–36.0%)	10.0% (50) (3.9–21.8%)	2.64 (0.86–8.16)
60–69	64.7% (17) (41.2–82.8%)	45.0% (20) (25.8–65.8%)	2.18 (0.58–8.19)	62.5% (16) (38.5–81.6%)	27.8% (18) (12.2–51.2%)	4.10* (0.98–17.22)	19.0% (21) (7.1–40.6%)	0.0% (19) –(3.0–19.8%)	— —
70+	14.3% (14) (2.8–41.2%)	60.0% (5) (22.9–88.4%)	0.11 (0.01–1.24)	23.1% (13) (7.5–50.9%)	22.2% (9) (5.3–55.7%)	1.03 (0.15–7.30)	14.3% (14) (2.8–41.2%)	0.0% (9) –(4.5–34.5%)	— —

*$P \leq 0.05$, **$P \leq 0.01$, ***$P \leq 0.005$, ****$P \leq 0.001$.
CI = confidence interval.

men and black women and 83% of both Hispanic men and women had been HIV tested. Significant gender differences were found such that 18–24 year old Hispanic women, 18- to 29-year-old black women, and 60- to 69-year-old black women were significantly more likely to have been HIV tested than their male counterparts. Inversely, 40- to 49-year-old black men were more likely and 50- to 59-year-old Hispanic men were more likely to have been tested for HIV than their female counterparts.

Overall rates of STI testing in the sample were also high (81% of black men, 82% of black women, 81% of Hispanic men, and 79% of Hispanic women), with several exceptions. Gender differences were found in the 18- to 29-year-old age groups suggesting that young women were significantly more likely to be tested for STI than young men. Among black and Hispanic men age 60–69 years, rates of testing exceed rates among women.

In terms of previous diagnosis with a STI, young women ages 18–24 in both racial/ethnic groups were more likely than men in the same age group to have been diagnosed. Additionally, Hispanic women ages 40–49 were significantly more likely than men in the same age group to have been diagnosed with a STI. Last, black men ages 60–69 were significantly more likely than women in the same age group to have been diagnosed with a STI.

Condom and Contraceptive Use

Condom Use at Most Recent Vaginal Intercourse Event

Table 5 offers an examination of condom use at most recent vaginal intercourse event in light of event specific variables stratified by race/ethnicity and gender. Few significant predictors were found, although caution must be used in interpreting associations because of small sample sizes in many subgroups. Both black and Hispanic men were significantly more likely to use condoms if the last sexual event was with a "friend" compared with those whose last event was with a relationship partner. Hispanic men were less likely to report condom use if they also used hormonal/barrier methods of contraception compared with those reporting no other contraceptive was used.

Condom Use during Last 10 Vaginal Events

Across the total sample of black adults who reported having vaginal intercourse in the past year, condoms were reported as being used for a mean of 28.5% of past 10 events reported by men (N = 144) and during 33.0% of events reported by women (N = 160). Among men, condom use rates increased with age through age 49, with men aged 18–24 years reporting a mean of 20.5% of the past 10 vaginal intercourse events being condom protected and those aged 40–49 reporting a mean of 41.3% of events being condom protected. Condom use was lower among men in their 50s (19.5%) with very low rates reported by men aged 60 and over (<10% of past 10 vaginal events). The inverse trend was seen among black women, with the highest rates being among women aged 18–24 years, with 55.3% of the past 10 vaginal events being condom protected. Rates of condom use dropped during each subsequent age category through the 40s to 23.7% and then are slightly higher among women in their 50s (32.2%) and 60s (28.9%).

Among Hispanic adults reporting vaginal intercourse within the past year, condoms were reported as being used for a mean of 31.6% of past 10 events reported by men (N = 263) and during 17.4% of events reported by women (N = 204). Use by Hispanic men peaked among those in the 18- to 24-year age group (50.6% of past 10 events), remained at above 30% through age 39, and then was consistently below 25% of events for all individuals aged 40 and over. Rates of condom use reported by Hispanic women were consistent with those reported by black women, with rates peaking among those aged 18–24 years (39.7%), dropping to 24.1% among those aged 25–29, and then remaining consistently low past age 29, being below 17% across all subsequent age groups.

Discussion

The data presented in this paper provide a baseline for understanding current rates of sexual behavior, sexual health care (i.e., testing behaviors), and condom use among black and Hispanic men and women in the United States. A wide range of behaviors (including masturbation, oral sex, and vaginal intercourse) is found among this population throughout the life course with rates of anal intercourse and same-gendered sexual behaviors being less prevalent. These data are novel in that they provide a snapshot of the range of sexual behaviors among diverse yet probabilistic samples of black and Hispanic men and women. One example of such diversity is the broad representation of age groups. Given that the youngest black participants were born long after the inception of

Table 5 Weighted occurrence of condom use during most recent vaginal intercourse event by event characteristics, stratified by gender and ethnicity

	Black							
	Men				Women			
	N	No condom used	Condom used	Condom used vs. no condom used†	N	No condom used	Condom used	Condom used vs. no condom used†
Characteristics of last penile-vaginal intercourse	% (95% CI)			Adjusted odds ratio (95% CI)	% (95% CI)			Adjusted odds ratio (95% CI)
Location of sexual encounter								
Participant's home (ref)	51	72.5% (59.0%–83.0%)	27.5% (17.0%–41.0%)		68	66.2% (54.3%–76.3%)	33.8% (23.7%–45.7%)	
Partner's home	36	69.4% (53.0%–82.1%)	30.6% (17.9%–47.0%)	1.59 (0.41–6.13)	18	55.6% (33.7%–75.5%)	44.4% (24.5%–66.3%)	0.67 (0.18–2.44)
Other (e.g., friend's home, public)	9	66.7% (35.1%–88.3%)	33.3% (11.7%–64.9%)	0.29 (0.03–2.74)	8	62.5% (30.4%–86.5%)	37.5% (13.5%–69.6%)	1.67 (0.25–11.18)
Last sexual partner								
Relationship partner (ref)	28	82.1% (63.9%–92.6%)	17.9% (7.4%–36.1%)		15	66.7% (41.5%–85.0%)	33.3% (15.0%–58.5%)	
Casual/dating partner	20	90.0% (68.7%–98.4%)	10.0% (1.6%–31.3%)	3.47 (0.44–27.45)	40	62.5% (47.0%–75.8%)	37.5% (24.2%–53.0%)	0.80 (0.23–2.85)
Friend	23	39.1% (22.1%–59.3%)	60.9% (40.7%–77.9%)	0.11** (0.03–0.46)	18	72.2% (48.8%–87.8%)	27.8% (12.2%–51.2%)	1.28 (0.29–5.64)
New acquaintance	15	40.0% (19.7%–64.3%)	60.0% (35.7%–80.3%)	0.06** (0.01–0.36)	11	36.4% (15.0%–64.8%)	63.6% (35.2%–85.0%)	0.36 (0.07–1.81)
Transactional	2	50.0% (9.5%–90.5%)	50.0% (9.5%–90.5%)	0.31 (0.01–7.06)	1	0.0% –(3.9%–83.3%)	100.0% (16.7%–103.9%)	— —
Prior sexual intercourse with partner								
First sexual intercourse (ref)	5	40.0% (11.6%–77.1%)	60.0% (22.9%–88.4%)		5	40.0% (11.6%–77.1%)	66.0% (22.9%–88.4%)	
Second to tenth sexual intercourse	28	46.4% (29.5%–64.2%)	53.6% (35.8%–70.5%)	0.76 (0.01–62.79)	19	57.9% (36.2%–76.9%)	42.1% (23.1%–63.8%)	6.73 (0.25–181.48)
More than 10th	62	77.4% (65.5%–86.2%)	22.6% (13.8%–34.5%)	1.00 (0.01–86.17)	70	67.1% (55.5%–77.0%)	32.9% (23.0%–44.5%)	7.50 (0.32–176.22)
Partner history 6 months								
Known no other partners (ref)	56	71.4% (58.4%–81.7%)	28.6% (18.3%–41.6%)		44	65.9% (51.1%–78.2%)	34.1% (21.8%–48.9%)	
Known other partner history	14	35.7% (16.2%–61.4%)	64.3% (38.6%–83.8%)	2.43 (0.36–16.36)	30	63.3% (45.5%–78.2%)	36.7% (21.8%–54.5%)	1.24 (0.42–3.66)
Unknown partner history	26	73.1% (53.7%–86.5%)	26.9% (13.5%–46.3%)	7.64* (1.15–50.76)	18	61.1% (38.5%–79.8%)	38.9% (20.2%–61.5%)	1.05 (0.30–3.66)
Other contraceptive used								
None (ref)	64	65.6% (53.4%–76.1%)	34.4% (23.9%–46.6%)		50	50.0% (36.6%–63.4%)	50.0% (36.6%–63.4%)	
Hormonal/barrier (e.g., birth control pill, diaphragm)	16	62.5% (38.5%–81.6%)	37.5% (18.4%–61.5%)	1.62 (0.26–10.05)	27	74.1% (55.1%–87.1%)	25.9% (12.9%–44.9%)	1.68 (0.53–5.31)
Natural (e.g., withdrawal)	6	66.7% (29.6%–90.7%)	33.3% (9.3%–70.4%)	13.73 (0.33–577.57)	3	100.0% (38.3%–105.6%)	0.0% –(5.6%–61.7%)	— —
Other contraceptive (e.g., surgical)	3	66.7% (20.2%–94.4%)	33.3% (5.6%–79.8%)	3.73 (0.24–58.61)	10	90.0% (57.4%–100.4%)	10.0% –(0.4%–42.6%)	9.89* (1.00–98.04)
Alcohol use								
No alcohol use (ref)	63	65.1% (52.7%–75.7%)	34.9% (24.3%–47.3%)		66	65.2% (53.1%–75.6%)	34.8% (24.4%–46.9%)	
Alcohol use	22	66.7% (45.7%–82.7%)	33.3% (17.3%–54.3%)	1.35 (0.42–4.33)	26	61.5% (42.5%–77.6%)	38.5% (22.4%–57.5%)	1.00 (0.34–2.9)
Marijuana use								
No marijuana use (Ref)	84	61.9% (51.2%–71.6%)	38.1% (28.4%–48.8%)		84	64.3% (53.6%–73.7%)	35.7% (26.3%–46.4%)	
Marijuana use	12	100.0% (71.8%–103.9%)	0.0% –(3.9%–28.2%)	4.89 (0.16–150.88)	8	62.5% (30.4%–86.5%)	37.5% (13.5%–69.6%)	1.19 (0.26–5.56)
Erection medication use								
No ED medication (Ref)	85	65.9% (55.3%–75.1%)	34.1% (24.9%–44.7%)			—	—	
ED medication use	10	70.0% (39.2%–89.7%)	30.0% (10.3%–60.8%)	1.03 (0.17–6.32)		—	—	

Table 5 Continued

Characteristics of Last Penile-Vaginal Intercourse	Hispanic							
	Men				Women			
	N	No condom used	Condom used	Condom used vs. no condom used†	N	No condom used	Condom used	Condom used vs. no condom used†
	% (95% CI)			Adjusted odds ratio (95% CI)	% (95% CI)			Adjusted odds ratio (95% CI)
Location of sexual encounter								
Participant's home (ref)	112	64.3% (55.1%–72.6%)	35.7% (27.4%–44.9%)		95	82.1% (73.1%–88.6%)	17.9% (11.4%–26.9%)	
Partner's home	11	54.5% (28.0%–78.7%)	45.5% (21.3%–72.0%)	0.55 (0.12–2.57)	14	71.4% (45.0%–88.7%)	28.6% (11.3%–55.0%)	0.47 (0.10–2.15)
Other (e.g., friend's home, public)	9	44.4% (18.8%–73.4%)	55.6% (26.6%–81.2%)	0.58 (0.07–4.44)	5	80.0% (36.0%–98.0%)	20.0% (2.0%–64.0%)	1.07 (0.09–13.21)
Last sexual partner								
Relationship partner (ref)	70	71.4% (59.9%–80.7%)	28.6% (19.3%–40.1%)		64	81.3% (69.9%–89.1%)	18.8% (10.9%–30.1%)	
Casual/dating partner	28	78.6% (60.1%–90.1%)	21.4% (9.9%–39.9%)	3.45* (1.00–11.94)	32	75.0% (57.7%–87.0%)	25.0% (13.0%–42.3%)	0.93 (0.31–2.77)
Friend	19	36.8% (19.0%–59.1%)	63.2% (40.9%–81.0%)	0.20** (0.06–0.62)	9	66.7% (35.1%–88.3%)	33.3% (11.7%–64.9%)	0.58 (0.12–2.9)
New acquaintance	7	28.6% (7.6%–64.8%)	71.4% (35.2%–92.4%)	0.21 (0.03–1.38)	2	100.0% (29.0%–105.2%)	0.0% –(5.2%–71.0%)	— —
Transactional	6	16.7% (1.1%–58.2%)	83.3% (41.8%–98.9%)	0.14 (0.02–1.13)	2	100.0% (29.0%–105.2%)	0.0% –(5.2%–71.0%)	— —
Prior sexual intercourse with partner								
First sexual intercourse (ref)	9	22.2% (5.3%–55.7%)	77.8% (44.3%–94.7%)		1	0.0% –(3.9%–83.3%)	100.0% (16.7%–103.9%)	
Second to tenth sexual intercourse	19	42.1% (23.1%–63.8%)	57.9% (36.2%–76.9%)	1.05 (0.04–25.43)	12	100.0% (71.8%–103.9%)	0.0% –(3.9%–28.2%)	— —
More than 10th	103	69.9% (60.4%–77.9%)	30.1% (22.1%–39.6%)	1.44 (0.06–36.87)	101	78.2% (69.2%–85.2%)	21.8% (14.8%–30.8%)	— —
Partner history 6 months								
Known no other partners (ref)	93	68.8% (58.8%–77.4%)	47.6% (37.8%–57.7%)		17	78.2% (53.9%–92.1%)	21.8% (7.9%–46.1%)	
Known other partner history	17	41.2% (21.6%–64.0%)	58.8% (36.0%–78.4%)	1.60 (0.31–8.23)	78	94.1% (86.2%–97.9%)	5.9% (2.1%–13.8%)	13.36* (1.00–178.56)
Unknown partner history	11	47.6% (22.8%–73.7%)	52.4% (26.3%–77.2%)	4.15 (0.80–21.54)	78	73.7% (62.9%–82.2%)	26.3% (17.8%–37.1%)	0.81 (0.22–2.99)
Other contraceptive used								
None (ref)	81	51.9% (41.1%–62.4%)	48.1% (37.6%–59.9%)		66	78.8% (67.4%–87.0%)	21.2% (13.0%–32.6%)	
Hormonal/barrier (e.g., birth control pill, diaphragm)	32	75.0% (57.7%–87.0%)	25.0% (13.0%–42.3%)	3.33* (1.16–9.55)	26	80.8% (61.7%–92.0%)	19.2% (8.0%–38.3%)	2.75 (0.71–10.56)
Natural (e.g., withdrawal)	11	81.8% (51.2%–96.0%)	18.2% (4.0%–48.8%)	4.51 (0.66–30.71)	12	83.3% (54.0%–96.5%)	16.7% (3.5%–46.0%)	1.58 (0.24–10.48)
Other contraceptive (e.g., surgical)	5	100.0% (51.1%–105.5%)	0.0% –(5.5%–48.9%)	— —	12	100.0% (71.8%–103.9%)	0.0% –(3.9%–28.2%)	— —
Alcohol use								
No alcohol use (ref)	104	69.2% (59.8%–77.3%)	30.8% (22.7%–40.2%)		92	77.2% (67.5%–84.6%)	22.8% (15.4%–32.5%)	
Alcohol use	27	37.0% (21.5%–55.8%)	63.0% (44.2%–78.5%)	0.44 (0.15–1.34)	23	91.3% (72.0%–98.8%)	8.7% (1.2%–28.0%)	3.62 (0.59–22.18)
Marijuana use								
No marijuana use (Ref)	123	65.0% (56.3%–72.9%)	35.0% (27.1%–43.7%)		103	77.7% (68.7%–84.7%)	22.3% (15.3%–31.3%)	
Marijuana use	7	14.3% (0.5%–53.3%)	85.7% (46.7%–99.5%)	0.15 (0.01–2.07)	12	100.0% (71.8%–103.9%)	0.0% –(3.9%–28.2%)	— —
Erection medication use								
No ED medication (Ref)	125	60.8% (52.0%–68.9%)	39.2% (31.1%–48.0%)	—		—	—	—
ED medication use	5	100.0% (51.1%–105.5%)	0.0% –(5.5%–48.9%)	—		—	—	—

†Adjusted odds ratios are based on a logistic regression including the partner status and age as covariates, with the exception of relationship status which includes only age as a covatriate.
*$P \leq 0.05$, **$P \leq 0.01$, ***$P \leq 0.005$, ****$P \leq 0.001$.
CI = confidence interval.

the civil rights movement and the oldest participants likely spent their early adulthood when there were social and legal prohibitions against dating or marrying outside of one's race, participants' sexual practices and norms are undoubtedly situated within particular socio-historical contexts that may differ by age. Additionally, it is important to understand the prevalence of a diverse range of behaviors (e.g., nonpenetrative behaviors) and partnering practices in relation to age in order to provide a comprehensive examination of the sexual health, and potential implications for education and intervention, among these ethnic groups.

Establishing current rates of sexual behavior and other sexual health behaviors may also shed light on how the large amount of resources allocated to improving sexual health among black and Hispanic communities may be reflected in individuals' practices. Overall high rates of testing for HIV/STI among black and Hispanic participants in this study suggest that targeted efforts at intervening in this population may, indeed, impact protective behaviors in positive ways. Gender differences among younger, as well as in some cases older, black and Hispanic men and women point to the need for continued targeted interventions. In line with other reports, a need exists for programs aimed at increasing testing for HIV and other STI among young black and Hispanic men. Similarly, although it is encouraging that older black and Latino men appear to have accessed HIV/STI testing services, it is unclear whether these trends are a result of exposure to previous campaigns (such as the Minority AIDS Initiative) or whether it is in artifact of a higher likelihood of ever having been tested simply by being older. Although evaluations have been conducted at the community level [19], researchers have yet to examine whether or not the such efforts as the MAI have created shifts in the sexual health behaviors of black and Hispanic individuals at the population level. Further research should also investigate unique factors associated with older black and Hispanic men's experiences with accessing sexual health testing. For example, older black men may have been sexually active at the specific socio-historical points in time (e.g., when Tuskegee was being publicized) and many may also be conscious of widely circulated theories that AIDS was a conspiracy against black people. Additionally, lower rates of HIV/STI testing among older black and Hispanic women suggest that attention may need to be directed toward determining factors associated with these trends and ways to increase testing as needed.

Similarly, the relatively high rates of condom use found among black and Hispanic participants suggest that targeted condom use promotion programs geared toward these groups by public health institutions have likely made a positive impact on sexual health behaviors at a population level. Yet, more work remains to be done [20–23]; black and Hispanic communities have been and continue to be disproportionally affected by HIV/AIDS and other STI in the United States. Therefore, the development of sexual health promotion programs for these populations, that take into account the unique issues faced by black and Hispanic individuals and communities, remains critical tasks for public health professionals [24].

Although one of the strengths of this study is its use of probability sampling methods, one constraint of the methodology is that it only allowed for participation among persons with sufficient English proficiency to complete the survey. The data presented here may not fully represent the sexual behaviors, and associated cultural values, of recent immigrants who may not be English-speaking. As with other nationally representative studies of adult sexual behavior, the methods do not allow for an in-depth analysis of behaviors among individuals who do not have an established household, particularly those who were institutionalized or homeless. Last, population-based sampling does not allow for a detailed analysis of data within groups of black and Hispanic individuals who identify themselves as gay or bisexual given that, as is consistent with other population-based studies, these individuals account for only approximately 2–6% of men and 1–5% of women in this sample.

Conclusions

Gaps still exist in terms of a comprehensive understanding of sexual health among black and Hispanic individuals outside of the exclusive context of sexual risk and disease transmission. Researchers may consider ways to take these nationally representative, yet primarily descriptive, results on sexual health behaviors among black and Hispanic men and women and follow up with in depth studies that focus on disseminating and making meaning of these findings for the individuals within these communities [25]. One of the artifacts of the heavily "problem-centered" approach to the study of black and Hispanic sexuality is that it has

focused almost exclusively on the description and documentation of sexual risk rather than examining the underlying causes and meanings of sexual behaviors and their potential outcomes [26]. These issues should continue to be explored in samples that are both representative and inclusive of the wide range of diverse social and ecological factors related to sexual health that may be found among black and Hispanic communities in the United States. Future research should also examine a wide range of sexual health issues among black and Hispanic individuals that have not traditionally been included in previous investigations, including sexual satisfaction, pleasure, sexual function [27–29], and other topics not directly related to sexual risk.

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References

1 Laumann EO, Michael RT. Sex, love, and health in America: Private choices and public places. Chicago, IL: University of Chicago; 2001.
2 Lewis LJ. Examining sexual health discourses in a racial/ethnic context. Arch Sex Behav 2004;33:223–34.
3 Kinsey A, Pomeroy WB, Martin CE. Sexual behavior in the human male. Philadelphia, PA: WB Saunders; 1948.
4 Kinsey A, Pomeroy WB, Martin CE, Gebhard PH. Sexual behavior in the human female. Philadelphia, PA: WB Saunders; 1953.
5 Newsline. U.S. to begin minority AIDS initiative. Newsline (People with AIDS Coalition of New York). 1998: 32.
6 Sutton MY, Jones RL, Wolitski RJ, Cleveland JC, Dean HD, Fenton KA. A review of the centers for disease control and prevention's response to the HIV/AIDS crisis among blacks in the United States, 1981–2009. Am J Public Health 2009; 99:S351–S9.
7 Dworkin SL, Ehrhardt AA. Going beyond "ABC" to include "GEM: Critical reflections on progress in the HIV/AIDS epidemic. Am J Public Health 2007;97:13–8.
8 Ford CL, Airhihenbuwa CO. Critical Race Theory, race equity, and public health: Toward antiracism praxis. Am J Public Health 2010;100(suppl 1):S30–5.
9 Sanders-Phillips K, Settles-Reaves B, Walker D, Brownlow J. Social inequality and racial discrimination: Risk factors for health disparities in children of color. Pediatrics 2009; 124(suppl 3):S176–86.
10 McGruder K. Black sexuality in the U.S.: Presentations as non-normative. J Afr Am Stud 2009;13:251–62.
11 Jeffries WL, Dodge B. Male bisexuality and condom use at last sexual encounter: Results from a national survey. J Sex Res 2007;44:278–89.
12 Current Population Survey December 2008. U.S. Census Bureau. 1994—[cited June 9, 2010]. Available from: http://www.bls.census.gov/ferretftp.htm.
13 Baker L, Wagner TH, Singer S, Bundorf MK. Use of the Internet and e-mail for health care information: Results from a national survey. JAMA 2003;289:2400–6.
14 Stanford University. Validity of the survey of health and Internet and Knowledge Network's panel and sampling. Stanford, CA: Stanford University; 2003.
15 Heiss F, McFadden D, Winter J. Who failed to enroll in Medicare Part D, and why? Early results. Health Aff (Millwood) 2006;25:w344–54.
16 Holman EA, Silver RC, Poulin M, Andersen J, Gil-Rivas V, McIntosh DN. Terrorism, acute stress, and cardiovascular health: A 3-year national study following the September 11th attacks. Arch Gen Psychiatry 2008;65:73–80.
17 Silver RC, Holman EA, McIntosh DN, Poulin M, Gil-Rivas V. Nationwide longitudinal study of psychological responses to September 11. JAMA 2002;288:1235–44.
18 Younge SN, Salazar LF, Crosby RF, DiClemente RJ, Wingood GM, Rose E. Condom use at last sex as a proxy for other measures of condom use: Is it good enough? Adolescence 2008;43:927–31.
19 Eshel A, Moore A, Mishra M, Wooster J, Toledo C, Uhl G, Aguero LW. Community stakeholders' perspectives on the impact of the minority AIDS initiative in strengthening HIV prevention capacity in four communities. Ethnicity & Health 2008;13:39–54.
20 Hall HI, Song R, Rhodes P, Prejean J, An Q, Lee LM, Karon J, Brookmeyer R, Kaplan EH, McKenna MT, Janssen RS; HIV Incidence Surveillance Group. Estimation of HIV Incidence in the United States. JAMA 2008;300:520–9.

21 Centers for Disease Control and Prevention. African Americans and AIDS. Atlanta, GA: U.S. Department of Health and Human Services; 2006.
22 Oramasionwu CU, Brown CM, Ryan L, Lawson KA, Hunter JM, Frei CR. HIV/AIDS disparities: The mounting epidemic plaguing US blacks. J Natl Med Assoc 2009;101:1196–204.
23 Centers for Disease Control and Prevention. Sexually transmitted disease surveillance. Atlanta, GA: U.S. Department of Health and Human Services; 2007.
24 Adimora AA, Schoenbach VJ, Floris-Moore MA. Ending the Epidemic of Heterosexual HIV Transmission Among African Americans. American Journal Preventive Medicine 2009; 37:468–71.
25 Lewis LJ, Kertzner RM. Toward improved interpretation and theory building of African American male sexualities. J Sex Res 2003;40:383–95.
26 Kim AE, Kumanyika S, Shive D, Igweatu U, Kim S-H. Coverage and framing of racial and ethnic health disparities in US newspapers, 1996–2005. Am J Public Health 2010; 100(suppl 1):S224–31.
27 Smith JF, Caan BJ, Sternfeld B, Haque R, Quesenberry CP Jr, Quinn VP, Shan J, Walsh TJ, Lue TF, Jacobsen SJ, Van den Eeden SK. Racial disparities in erectile dysfunction among participants in the California Men's Health Study. J Sex Med 2009;6:3433–9.
28 Kupelian V, Link CL, Rosen RC, McKinlay JB. Socioeconomic status, not race/ethnicity, contributes to variation in the prevalence of erectile dysfunction: Results from the Boston Area Community Health (BACH) Survey. J Sex Med 2008;5:1325–33.
29 Hullfish KL, Pastore LM, Mormon AJ, Wernecke Y, Bovbjerg VE, Clayton AH. Sexual functioning of Latino women seeking outpatient gynecologic care. J Sex Med 2006;6:61–9.

An Event-Level Analysis of the Sexual Characteristics and Composition Among Adults Ages 18 to 59: Results from a National Probability Sample in the United States

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ABSTRACT

Introduction. Although studies of specific groups of individuals (e.g., adolescents, "high risk" samples) have examined sexual repertoire, little is known, at the population level, about the sexual behaviors that comprise a given sexual encounter.

Aim. To assess the sexual behaviors that men and women report during their most recent sexual event; the age, partner and situational characteristics related to that event; and their association with participants' evaluation of the sexual event.

Methods. During March–May 2009, data from a United States probability sample related to the most recent partnered sexual event reported by 3990 adults (ages 18–59) were analyzed.

Main Outcome Measures. Measures included sexual behaviors during the most recent partnered sexual event, event characteristics (i.e., event location, alcohol use, marijuana use, and for men, erection medication use), and evaluations of the sexual experience (pleasure, arousal, erection/lubrication difficulty, orgasm).

Results. Great diversity exists in the behaviors that occur during a single sexual event by adults, with a total of 41 combinations of sexual behaviors represented across this sample. Orgasm was positively related to the number of behaviors that occurred and age was related to greater difficulty with erections and lubrication. Men whose most recent event was with a relationship partner indicated greater arousal, greater pleasure, fewer problems with erectile function, orgasm, and less pain during the event compared with men whose last event was with a nonrelationship partner.

Conclusion. Findings demonstrate that adults ages 18 to 59 engage in a diverse range of behaviors during a sexual event and that greater behavior diversity is related to ease of orgasm for both women and men. Although both men and women experience sexual difficulties related to erectile function and lubrication with age, men's orgasm is facilitated by sex with a relationship partner whereas the likelihood of women's orgasm is related to varied sexual behaviors. **Herbenick D, Reece M, Schick V, Sanders SA, Dodge B, and Fortenberry JD. An event-level analysis of the sexual characteristics and composition among adults ages 18 to 59: Results from a national probability sample in the United States. J Sex Med 2010;7(suppl 5):346–361.**

Key Words. Sexual Event; Sexual Behaviors; Event-Level Analysis; Probability Sample; Orgasm; Lubrication

Introduction

Although studies of specific groups of individuals (e.g., adolescents, "high risk", samples) have examined sexual repertoire, little is known, at the population level, about the types of sexual behaviors that comprise a given sexual encounter among men and women in the United States [1,2]. The National Health and Social Life Survey (NHSLS) provided data about the diversity of

sexual behavior, but little about the composition of any one sexual event [3,4]. The National Social Life, Health and Aging Project (NSHAP) asked about the types of behaviors that typically occurred when people "had sex," however, that sample was restricted to individuals who were at least 57 years old at the time of the study [5]. Only a handful of national studies have examined the composition of sexual events and these have largely been conducted in countries outside of the United States (e.g., Australia, France, Finland) [6–8]. Given cultural differences in sexual expression, it is difficult to know to what extent these data reflect the sexual repertoire of adults in the US.

An understanding of the composition of sexual events in the United States is important for reasons related to public health as well as pleasure and enjoyment. Regarding public health, preventive measures related to contraception and infections are often prescribed as if sex were limited to one behavior (e.g., messages such as "use a condom when you have sex" or about putting a condom on prior to vaginal intercourse). However, sex often involves more than one sexual behavior, culminating in a sophisticated, creative, or even clumsy sequence of behaviors and their associated feelings. The sequence of sexual behaviors, too, is likely associated with aspects of sex related to comfort/discomfort, safety/risk, and pleasure/lack of pleasure in specific sexual events. By having more information about the types of sexual behaviors that comprise adults' sexual events, clinicians and researchers may be better equipped to craft appropriate educational or clinical messages. Such messages may relate to how to adjust one's sexual practices to reduce the risk of infection and/or vaginal or anal tearing or how or when to use condoms or lubricants for safer or more pleasurable sex, as timing of use may influence product efficacy.

In addition, greater knowledge of the composition of adults' sexual events may help to inform popular and/or clinical education messages related to sexual pleasure, enjoyment, and orgasm. For example, it is commonly said that women experience orgasm more easily from manual or oral-genital stimulation (compared with penile–vaginal intercourse [PVI] alone) but partnered masturbation and cunnilingus are rarely the only behaviors comprising a given (hetero)sexual event [1,6,9,10]. Rather, the composition of sexual events tends to be varied, with one research study identifying a total of 64 combinations of sexual behaviors [6]. Consequently, it may be that orgasm is facilitated not only by a particular stimulus—such as oral stimulation of a woman's glans clitoris—but also by the psychological and/or physical experience of engaging in multiple behaviors, or the sensory experiences (e.g., sight, scent, taste, feel) related to engaging with certain body parts in varied ways during oral sex, partnered masturbation, anal sex, or vaginal sex.

It is also important to understand more about the context of women's and men's sexual events, such as where people have sex, with whom they have sex, and whether they use substances such as alcohol or marijuana around the time of sex, which—in previous research—have sometimes been associated with sexual risk-taking and sometimes not [11–13]. In addition, greater knowledge related to sexual experiences in different age cohorts—experiences such as orgasm, pleasure, arousal, and difficulties (or not) with erections or lubrication—adds to our understanding of sexual pleasure and function throughout the life course.

Aims

The purpose of this study was to, in a subset of 3,990 men and women ages 18 to 59 from the National Survey of Sexual Health and Behavior (NSSHB) [14], assess the types of sexual behaviors that men and women report having engaged in during their most recent sexual event, as well as the age, partner, and situational characteristics related to that event and their association with participants' evaluation of the sexual event.

Methods

During March–May 2009, the NSSHB data were collected using a population-based cross-sectional survey of adolescents and adults in the United States via research panels of Knowledge Networks (Menlo Park, CA, USA). Research panels accessed through Knowledge Networks are based on a national probability sample established using both random digit dialing (RDD) and an address-based sampling (ABS) frame. ABS involves the probability sampling of a frame of residential addresses in the United States derived from the U.S. Postal Service's Delivery Sequence File, a system that contains detailed information on every mail deliverable address in the United States. Collectively, the sampling frame from which participants are recruited covers approximately 98% of all United States households. Randomly selected addresses

are recruited to the research panel through a series of mailings and subsequently by telephone follow-ups to nonresponders when possible. To further correct sources of sampling and non-sampling error, study samples are corrected with a post-stratification adjustment using demographic distributions from the most recent data available from the Current Population Survey (CPS), the monthly population survey conducted by the United States Bureau of the Census considered to be the standard for measuring demographic and other trends in the United States. These adjustments result in a panel base weight that was employed in a probability-proportional-to-size selection method for establishing the samples for this study. Population specific distributions for this study were based upon the December 2008 Current Population Survey [14].

Once the sample frame was established, all individuals within that frame received a recruitment message from Knowledge Networks that provided a brief description of the NSSHB and invited them to participate. Of 6,182 adults reviewing the study description, 5,045 (82%) adults between the ages of 18 and 94 consented to participate. The data presented in this paper are limited to the descriptions of the most recent sexual event from 1,931 adult men (N = 1,048) and women (N = 883) who were between the ages of 18 and 59 and who reported partnered sexual activity within the previous year. Data related to the most recent sexual event of those ages 60 or older are reported elsewhere [15].

All data were collected by Knowledge Networks via the Internet; participants in a given Knowledge Networks panel were provided with access to the Internet and hardware if needed. Multiple researchers have used Knowledge Networks for multiple health-related studies, substantiating the validity of such methods for obtaining data from nationally representative samples of the United States population [16–22]. All study protocols were approved by the institutional review board of the primary author's academic institution.

Main Outcome Measures

Event Characteristics

Assessment focused on the most recent sexual event with another person. The nature of the relationship with this sexual partner was coded as follows: (i) relationship partner (my spouse or domestic partner; boyfriend, girlfriend or significant other); (ii) casual/dating partner (someone I am casually dating/hanging out with); (iii) friend; (iv) new acquaintance (someone I just met), or (v) transactional (someone who paid me or gave me something for sex; someone who I paid or gave something to for sex). Partner History during the past 6 months was assessed by asking participants "whether this partner had had sex (vaginal, oral, or anal sex) with people other than yourself within the 6 months before you two engaged in sexual activities together" The three response options were: knowing the person did, or did not, have other partners, or not knowing.

The location of the sexual encounter was categorized as: (i) participant's home; (ii) sex partner's home; (iii) a friend's home; (iv) hotel/motel; and (v) other (a public space, e.g., restroom, park, beach, video arcade; fraternity house, sorority house, or dorm room; sex club or swinger's club; other). Alcohol and marijuana use was assessed by asking participants to indicate whether they, their partner, or both of them were drinking alcohol or smoking marijuana (weed) around the time of this sexual event. Men were asked whether (yes, no, unsure) they were "using any medications designed to help you attain or maintain an erection (such as Viagra, Cialis, Levitra, etc.)?"

Experience Evaluation

The sexual aspects of the experience were assessed by asking: (i) how pleasurable this most recent sexual event was; (ii) how sexually aroused they felt; (iii) to what extent the act was painful; (iv) whether they had an orgasm; and (v) perceptions of whether their sexual partner had an orgasm. The rating scales for 1–3 were: not at all, a little, moderately, quite a bit, or extremely. Orgasm was yes, no, or not sure. Also, men were asked how difficult it was to maintain their erection and women were asked how difficult it was to become lubricated ("wet") during the sexual encounter (extremely difficult, very difficult, difficult, slightly difficult, or not difficult).

Analysis

SPSS version 17.0 (Chicago, IL, USA) was used to conduct all analyses. Post-stratification data weights based upon current United States Census data on national distributions for age, race, gender, Hispanic ethnicity, education and location within the United States were used to increase the generalizablity of the sample characteristics to the population. Analyses were conducted individually for men and women. Descriptive statistics were

used to examine the context and the evaluation of the experience. The 95% percent confidence intervals around the percentages were calculated using the Adjusted Wald method [23,24]. For men and women separately, analysis of variance was used to examine whether those who reported having engaged in penile–vaginal intercourse less often than once a week were more likely to report partnered masturbation (defined as masturbating with a partner, rubbing genitals together, dry sex, or humping), giving oral sex, receiving oral sex, penile–vaginal intercourse, or penile–anal intercourse at their most recent sexual event.

A bivariate logistic regression model was used to test the relationship between age and partner status (controlling for health) on partnered masturbation, oral sex and anal intercourse. The relationship between age and partner status (controlling for health status) on frequency rates for masturbation and PVI were tested with an ordinal logistic regression model. Again, ordinal or bivariate logistic regressions were used to assess differences in the participants' evaluation of the sexual event as a function of age and partner status (controlling for health status). Ordinal logistic regression models were run with a negative log–log link because of the higher likelihood of positive experience evaluations.

Health Status

Health status was assessed by a single item that asked participants to rate their overall health through a single 5-response item (excellent, very good, good, fair, poor) that has been used across multiple studies [25,26].

Relationship Status

Participants were asked to describe their current relationship status (married, living with partner but not married, in a relationship but not living together, single but dating one or more people, or single and not dating).

Results

Participants

Table 1 provides an overview of the sociodemographic characteristics of the sample.

Characteristics of Most Recent Sexual Event

Vaginal intercourse was the most commonly reported behavior occurring during men's and women's most recent sexual event (Table 2). However, oral sex (giving and receiving) was frequently a part of participants' most recent sexual event, particularly for men ages 25 to 49 and women ages 18 to 39.

Most participants reported that their most recent sexual event occurred in their own home or that of their sexual partner. Though small, the next largest proportions of women and men (about 4%) indicated that their most recent sexual event occurred in a hotel/motel or some other place not listed.

The vast majority of participants described sexual encounters that occurred with an other-sex partner, although 7.8% of men reported on a sexual event that occurred with another man (3.9% to 10.9% of men in different cohorts). More than half of participants ages 18 to 24 indicated that their partner was a casual or dating partner; for the rest of the age cohorts, the majority indicated that their most recent sexual partner was a relationship partner. Similar proportions of women and men, throughout all age cohorts, indicated that their sexual partner was a friend or a new acquaintance.

The majority of men and women reported that neither they nor their sexual partner used alcohol or marijuana around the time of their most recent sexual event. However, more men reported alcohol use than women. Only 2.2% or fewer men reported the use of erectile function medications in the age cohorts between 18 and 49. However, a total of 7.7% of men in the 50- to 59-year-old cohort reported the use of such medications.

Evaluation of the Sexual Event

Age

For men, older age is associated with more erectile difficulties, more pain during sexual activity and a lower likelihood of one's own orgasm (Table 3). For women, older age is associated with more difficulties with lubrication and a higher likelihood of one's own orgasm. Age was not associated with partner orgasm for either gender. However, the majority of men and women—even of those in their 50s—report the experience high in terms of pleasure and arousal.

Partner Status

Engaging in a sexual act with a relationship partner was entered into the logistic regression as the referent. In Table 3, significant odds ratios under 1 indicate that engaging in a sexual act with a nonrelationship partner is related to higher evaluation of the reported event (e.g., higher

Table 1 Weighted participant characteristics for total sample (N = 1,931) and by gender

	Total sample		Men (N = 1,048)		Women (N = 883)	
Sample characteristics	%	N	%	N	%	N
Age						
18–24	13.5	260	14.3	150	12.4	110
25–29	21.8	421	18.1	190	26.2	231
30–39	22.6	436	22.2	232	23.0	203
40–49	24.7	476	25.4	267	23.8	210
50–59	17.5	338	20.0	209	14.6	129
Ethnicity						
White	66.9	1,292	66.5	697	67.3	595
Black, non-Hispanic	11.1	214	10.9	114	11.3	100
Hispanic	15.2	294	15.7	165	14.6	129
Other	6.8	132	6.9	72	6.7	59
Education						
Less than high school	10.4	201	11.5	121	9.1	80
High school	27.7	535	29.3	307	25.8	228
Some college	29.7	574	28.0	293	31.8	281
Bachelors degree or higher	32.2	621	31.2	327	33.3	294
Sexual orientation						
Heterosexual	92.1	1,777	91.0	954	93.3	824
Homosexual	3.2	63	5.5	58	0.6	5
Bisexual	4.5	87	3.3	35	5.9	52
Other	0.2	3	0.1	1	0.2	2
Marital status						
Married	45.1	871	43.3	454	47.3	417
Widowed	1.2	23	0.5	5	2.0	18
Divorced	10.4	200	11.0	115	9.6	85
Separated	2.8	55	2.5	27	3.2	28
Never married	28.9	558	31.5	331	25.7	227
Living with partner	11.6	224	11.1	117	12.2	108
Relationship status						
Single, not dating	14.2	275	16.5	173	11.5	102
Single, dating one or more person	13.1	252	15.3	160	10.4	92
In relationship, not living together	12.6	243	11.2	117	14.3	126
In relationship, living together	12.9	250	12.0	126	14.1	124
Married, living together	45.6	881	44.1	463	47.4	418
Married, not living together	1.5	29	0.9	9	2.3	20
Geographic region of the United States						
Northeast	19.9	384	19.3	203	20.6	182
Midwest	22.1	426	22.9	240	21.1	186
South	34.8	671	33.6	352	36.1	319
West	23.3	450	24.2	253	22.3	197
Metropolitan Statistical Area (MSA) status						
Non-metropolitan area	14.2	275	15.0	157	13.4	118
Metropolitan area	85.8	1,656	85.0	891	86.6	765
Annual household income						
Less than $25,000	17.0	329	17.4	183	16.5	146
$25,000–$49,999	28.7	554	27.8	291	29.7	263
$50,000–$74,999	22.4	432	21.1	221	23.8	210
Over $75,000	31.9	617	33.6	353	29.9	264
Children under 18 in household						
No	67.0	1,293	68.4	717	65.3	576
Yes	33.0	638	31.6	331	34.7	307
Health status						
Excellent	14.6	282	15.5	163	13.5	119
Very good	47.1	909	46.6	488	47.8	421
Good	29.9	577	29.7	312	30.1	265
Fair	7.1	136	6.9	73	7.2	63
Poor	1.3	25	1.2	12	1.4	12

arousal or easier lubrication or erections) or less pain. Significant odds ratios over 1 indicate that engaging in a sexual act with a nonrelationship partner is related to lower evaluation of that event.

When controlling for age and health status, men ages 18 to 59 whose last sexual event was with a relationship partner indicated greater arousal, greater pleasure during the event, fewer problems with erectile function, and less pain during the event compared with men whose last event was with a non-relationship partner. In addition, a greater proportion of men whose most recent

Table 2 Weighted description of the most recent sexual event (within the past year), stratified by age (N = 1,931)

	Men						Women					
	18–24 (N = 150)	25–29 (N = 190)	30–39 (N = 232)	40–49 (N = 267)	50–59 (N = 209)	All respondents (N = 1,048)	18–24 (N = 110)	25–29 (N = 231)	30–39 (N = 203)	40–49 (N = 210)	50–59 (N = 129)	All respondents (N = 883)
Context of sexual event	% Endorsed item (95% CI)						% Endorsed item (95% CI)					
Sexual acts during event												
Partnered masturbation	28.7% (22.0–36.4%)	45.8% (38.9–52.9%)	29.3% (23.8–35.5%)	23.3% (18.6–28.8%)	20.6% (15.6–26.6%)	28.9% (26.3–31.8%)	30.9% (23.0–40.1%)	31.0% (25.4–37.3%)	22.2% (17.0–28.4%)	15.7% (11.4–21.3%)	19.4% (13.4–27.1%)	23.6% (21.0–26.6%)
Gave oral sex	32.7% (25.7–40.5%)	34.2% (27.8–41.2%)	37.5% (31.5–43.9%)	37.2% (31.6–43.2%)	41.6% (35.2–48.4%)	37.0% (34.1–39.9%)	50.9% (41.7–60.1%)	38.5% (32.5–44.9%)	36.0% (29.7–42.8%)	28.1% (22.4–34.5%)	35.7% (27.9–44.2%)	36.6% (33.5–39.8%)
Received oral sex	35.3% (28.1–43.3%)	39.5% (32.8–46.6%)	46.1% (39.8–52.5%)	49.2% (43.3–55.2%)	45.0% (38.4–51.7%)	43.9% (41.0–47.0%)	40.9% (32.2–50.3%)	30.7% (25.1–37.0%)	33.0% (26.9–39.7%)	29.5% (23.8–36.0%)	24.0% (17.4–32.1%)	31.3% (28.3–34.4%)
Penile–vaginal sex	76.8% (69.4–82.9%)	85.2% (79.4–89.6%)	84.9% (79.7–89.0%)	79.7% (74.4–84.1%)	73.7% (67.3–79.2%)	80.2% (77.7–82.5%)	86.4% (78.6–91.7%)	86.1% (81.1–90.1%)	82.8% (76.9–87.4%)	86.7% (81.4–90.7%)	89.1% (82.5–93.5%)	86.0% (83.5–88.1%)
Anal intercourse (receptive)	3.3% (1.2–7.8%)	3.2% (1.3–6.9%)	2.1% (0.8–5.1%)	2.3% (0.9%–4.9%)	1.4% (0.3–4.3%)	2.4% (1.6–3.5%)	5.5% (2.3–11.6%)	1.3% (0.3–3.9%)	3.9% (1.9–7.7%)	4.8% (2.5–8.6%)	3.1% (0.9–8.0%)	3.5% (2.5–5.0%)
Anal intercourse (insertive)	6.7% (3.5–12.0%)	7.9% (4.8–12.7%)	5.2% (2.9–8.9%)	7.9% (5.2–11.8%)	4.8% (2.5–8.7%)	6.5% (5.1–8.1%)	— —	— —	— —	— —	— —	— —
Location												
Own home	59.6% (51.6–67.1%)	79.6% (73.2–84.7%)	76.7% (70.9–81.7%)	76.5% (71.1–81.2%)	77.6% (71.5–82.8%)	75.0% (72.3–77.6%)	53.3% (44.0–62.3%)	82.4% (76.9–86.8%)	72.4% (65.9–78.1%)	83.2% (77.5–87.7%)	82.8% (75.3–88.4%)	76.7% (73.8–79.4%)
Partner home	21.3% (15.5–28.5%)	10.8% (7.0–16.0%)	11.6% (8.1–16.4%)	13.3% (9.7–17.9%)	11.9% (8.1–17.0%)	13.3% (11.3–15.5%)	34.6% (26.3–43.9%)	9.3% (6.1–13.7%)	18.7% (13.9–24.7%)	9.1% (5.9–13.9%)	10.9% (6.5–17.6%)	14.8% (12.6–17.3%)
Hotel/motel	2.8% (0.9–7.1%)	8.1% (4.9–12.9%)	7.3% (4.6–11.5%)	4.5% (2.5–7.8%)	1.9% (0.6–5.0%)	5.0% (3.9–6.5%)	5.6% (2.4–11.8%)	5.3% (3.0–9.1%)	4.4% (2.2–8.3%)	3.4% (1.5–6.9%)	3.1% (1.0–8.0%)	4.4% (3.2–5.9%)
Public (outide, car, etc.)	3.5% (1.4–8.1%)	0.5% –(0.2–3.2%)	0.9% (0.0–3.3%)	0.4% –(0.2–2.3%)	4.3% (2.2–8.1%)	1.7% (1.1–2.7%)	1.9% (0.1–6.9%)	0.0% –(0.3–2.0%)	0.0% –(0.4–2.2%)	0.0% –(0.4–2.2%)	0.0% –(0.6–3.5%)	0.2% (0.0–0.9%)
Sex club	0.0% –(0.5–3.0%)	0.0% –(0.4–2.4%)	0.4% –(0.2–2.6%)	0.4% –(0.2–2.3%)	2.4% (0.9–5.6%)	0.7% (0.3–1.4%)	0.0% –(0.7–4.1%)	0.0% –(0.3–2.0%)	0.5% –(0.2–3.0%)	0.0% –(0.4–2.2%)	0.0% –(0.6–3.5%)	0.1% (0.0–0.7%)
Other	12.8% (8.3–19.1%)	1.1% (0.1–4.0%)	3.0% (1.3–6.2%)	4.9% (2.8–8.3%)	1.9% (0.6–5.0%)	4.3% (3.2–5.7%)	4.7% (1.8–10.6%)	3.1% (1.4–6.3%)	3.9% (1.9–7.7%)	4.3% (2.2–8.1%)	3.1% (1.0–8.0%)	3.8% (2.7–5.3%)
Partner type												
Relationship partner	13.1% (8.5–19.5%)	65.6% (58.6–72.0%)	61.2% (54.8–67.3%)	54.7% (48.7–60.6%)	51.8% (45.1–58.5%)	51.6% (48.6–54.6%)	20.0% (13.5–28.5%)	61.7% (55.3–67.7%)	52.2% (45.4–59.0%)	62.6% (55.9–68.9%)	55.6% (46.9–63.8%)	53.5% (50.2–56.7%)
Casual/dating partner	53.8% (45.8–61.6%)	12.9% (8.8–18.5%)	16.7% (12.5–22.1%)	14.8% (11.0–19.6%)	13.8% (9.8–19.2%)	20.3% (18.0–22.9%)	53.6% (44.3–62.7%)	26.0% (20.7–32.0%)	20.4% (15.4–26.5%)	20.2% (15.3–26.2%)	26.2% (19.3–34.4%)	26.9% (24.1–29.9%)
Friend	13.1% (8.5–19.5%)	10.8% (7.0–16.0%)	8.8% (5.7–13.2%)	15.6% (11.7–20.5%)	16.9% (12.4–22.6%)	13.1% (11.2–15.3%)	16.4% (10.5–24.5%)	9.7% (6.5–14.2%)	11.9% (8.1–17.2%)	9.6% (6.2–14.4%)	9.5% (5.4–16.0%)	11.0% (9.1–13.3%)
New acquaintance	16.6% (11.4–23.4%)	7.0% (4.1–11.6%)	8.8% (5.7–13.2%)	11.3% (8.0–15.7%)	11.3% (7.6–16.3%)	10.7% (9.0–12.7%)	9.1% (4.8–16.1%)	2.6% (1.1–5.7%)	13.9% (9.8–19.4%)	7.1% (4.2–11.4%)	7.1% (3.7–13.1%)	7.8% (6.2–9.7%)
Transactional	3.4% (1.3–7.9%)	3.8% (1.7–7.7%)	4.4% (2.3–8.0%)	3.5% (1.8–6.6%)	6.2% (3.5–10.4%)	4.3% (3.2–5.7%)	0.9% –(0.3–5.5%)	0.0% –(0.3–2.0%)	1.5% (0.3–4.5%)	0.5% –(0.2–3.0%)	1.6% (0.1–5.9%)	0.8% (0.4–1.7%)
Partner's gender												
Other	93.3% (88.0–96.4%)	95.3% (91.1–97.6%)	96.1% (92.7–98.1%)	89.9% (85.6–93.0%)	87.1% (81.8–91.0%)	92.2% (90.4–93.7%)	99.1% (94.5–100.3%)	98.3% (95.5–99.5%)	94.6% (90.5–97.1%)	97.6% (94.4–99.1%)	99.2% (95.3–100.3%)	97.5% (96.2–98.4%)
Same	6.7% (3.6–12.0%)	4.7% (2.4–8.9%)	3.9% (1.9–7.3%)	10.1% (7.0–14.4%)	12.9% (9.0–18.2%)	7.8% (6.3–9.6%)	0.9% –(0.3–5.5%)	1.7% (0.5–4.5%)	5.4% (2.9–9.5%)	2.4% (0.9–5.6%)	0.8% –(0.3–4.7%)	2.5% (1.6–3.8%)
Alcohol use												
Neither person	76.5% (69.1–82.6%)	79.5% (73.1–84.6%)	76.0% (70.1–81.0%)	76.7% (71.2–81.4%)	65.9% (59.2–72.0%)	74.9% (72.1–77.4%)	80.0% (71.5–86.5%)	87.8% (82.9–91.5%)	77.0% (70.7–82.2%)	76.2% (70.0–81.5%)	83.7% (76.3–89.2%)	81.0% (78.2–83.4%)
Participant used it	7.4% (4.1–12.8%)	5.3% (2.8–9.5%)	6.0% (3.5–9.9%)	4.1% (2.2–7.3%)	11.5% (7.8–16.6%)	6.7% (5.3–8.4%)	5.5% (2.3–11.6%)	3.0% (1.4–6.3%)	5.4% (2.9–9.5%)	5.2% (2.8–9.2%)	1.6% (0.1–5.8%)	4.2% (3.0–5.7%)
Partner used it	0.7% –(0.3–4.1%)	1.1% (0.0–4.0%)	6.4% (3.9–10.4%)	2.3% (0.9–4.9%)	3.8% (1.8–7.5%)	3.1% (2.2–4.3%)	1.8% (0.1–6.8%)	3.0% (1.4–6.3%)	1.0% (0.0–3.7%)	5.2% (2.8–9.2%)	3.1% (0.9–8.0%)	2.9% (2.0–4.3%)
They both used it	15.4% (10.5–22.1%)	14.2% (9.9–19.9%)	11.6% (8.0–16.4%)	16.9% (12.9–21.9%)	18.8% (14.0–24.6%)	15.4% (13.3–17.7%)	12.7% (7.6–20.4%)	6.1% (3.6–10.0%)	16.7% (12.1–22.4%)	13.3% (9.3–18.6%)	11.6% (7.1–18.4%)	11.9% (9.9–14.2%)
Marijuana use												
Neither person	91.3% (85.6–95.0%)	95.3% (91.1–97.6%)	92.7% (88.6–95.5%)	96.3% (93.2–98.0%)	86.2% (80.8–90.3%)	92.6% (90.8–94.0%)	93.6% (87.2–97.1%)	93.5% (89.5–96.1%)	96.6% (92.9–98.5%)	96.2% (92.5–98.2%)	95.3% (90.0–98.0%)	95.1% (93.5–96.4%)
Participant used it	4.0% (1.7–8.6%)	0.5% –(0.2–3.2%)	3.0% (1.3–6.2%)	1.9% (0.7–4.4%)	6.2% (3.6–10.4%)	3.0% (2.2–4.3%)	0.9% –(0.3–5.5%)	1.3% (0.3–3.9%)	0.0% –(0.4–2.2%)	1.4% (0.3–4.3%)	0.8% –(0.3–4.7%)	0.9% (0.4–1.8%)
Partner used it	0.0% –(0.5–3.0%)	0.0% –(0.4–2.4%)	0.4% –(0.2–2.6%)	0.0% –(0.3–1.7%)	1.4% (0.3–4.3%)	0.4% (0.1–1.0%)	2.7% (0.6–8.1%)	3.9% (1.9–7.3%)	1.0% (0.0–3.8%)	0.0% –(0.4–2.2%)	3.1% (1.0–8.0%)	2.0% (1.3–3.2%)
They both used it	4.7% (2.1–9.5%)	4.2% (2.0–8.2%)	3.9% (1.9–7.3%)	1.9% (0.7–4.4%)	6.2% (3.6–10.4%)	4.0% (3.0–5.4%)	2.7% (0.6–8.1%)	1.3% (0.3–3.9%)	2.5% (0.9–5.8%)	2.4% (0.9–5.6%)	0.8% –(0.3–4.7%)	1.9% (1.2–3.1%)
Erectile medication												
Used medication	0.7% –(0.2–4.1%)	1.1% (0.0–4.0%)	2.2% (0.8–5.1%)	1.5% (0.4–3.9%)	7.7% (4.7–12.2%)	2.7% (1.9–3.9%)	— —	— —	— —	— —	— —	— —

CI = confidence interval.

Table 3 Event experience by age and partner status, stratified by gender (weighted)

	Men							
	All respondents	18–24	25–29	30–39	40–49	50–59	Evaluation by age†	Evaluation by sexual relationship†
Event experience	% Engaged in behavior past year (95% CI)						Adjusted odds ratio (95% CI)	Adjusted odds ratio (95% CI)
Arousal							1.01 (1–1.01)	1.53**** (1.29–1.82)
Extremely	49.4% (513) (46.4–52.5%)	52.4% (44.6–60.1%)	47.9% (41.0–54.9%)	52.2% (45.9–58.4%)	53.3% (47.3–59.1%)	41.0% (34.7–47.5%)		
Quite a bit	34.7% (360) (31.8–37.6%)	30.3% (23.6–38.0%)	43.2% (36.4–50.2%)	30.6% (25.1–36.7%)	33.3% (28.0–39.1%)	36.2% –(30.1–42.7%)		
Moderately	14.5% (150) (12.4–16.7%)	14.5% (9.7–21.0%)	8.9% (5.6–13.9%)	14.7% (10.7–19.7%)	12.3% (8.8–16.7%)	21.9% (16.9–27.8%)		
A little	1.3% (13) (0.7–2.2%)	2.1% (0.5–6.0%)	0.0% –(0.4–2.3%)	2.2% (0.8–5.0%)	1.1% (0.2–3.4%)	1.0% (0.1–3.5%)		
Not at all	0.2% (2) (0.0–0.7%)	— —	— —	— —	— —	— —		
Pleasure							1.00 (1.00–1.01)	1.61**** (1.35–1.93)
Extremely	46.9% (490) (43.9–49.9%)	51.0% (43.2–58.8%)	46.0% (39.1–53.1%)	48.1% (41.9–54.3%)	48.9% (43.0–54.8%)	41.0% (34.7–47.5%)		
Quite a bit	36.1% (377) (33.2–39.0%)	26.2% (19.8–33.7%)	41.3% (34.6–48.3%)	35.6% (29.9–41.8%)	36.7% (31.2–42.6%)	38.1% (31.9–44.7%)		
Moderately	12.7% (133) (10.8–14.9%)	12.8% (8.3–19.0%)	11.1% (7.4–16.4%)	10.7% (7.4–15.3%)	11.4% (8.1–15.7%)	18.1% (13.5–23.7%)		
A little	3.9% (41) (2.9–5.3%)	9.4% (5.6–15.1%)	1.6% (0.3–4.7%)	4.3% (2.3–7.7%)	3.0% (1.5–5.9%)	2.9% (1.2–6.1%)		
Not at all	0.4% (4) (0.1–1.0%)	0.7% –(0.2–4.0%)	0.0% –(0.4–2.3%)	1.3% (0.3–3.8%)	0.0% –(0.3–1.7%)	0.0% –(0.3–2.1%)		
Erection difficulty							1.03**** (1.02–1.05)	1.68*** (1.22–2.3)
Not difficult	83.0% (862) (80.6–85.1%)	88.5% (82.4–92.7%)	91.5% (86.6–94.7%)	83.6% (78.4–87.8%)	83.6% (78.7–87.5%)	69.9% (63.5–75.5%)		
Some difficulty	12.2% (127) (10.4–14.4%)	7.4% (4.1–12.8%)	6.9% (4.0–11.5%)	13.8% (10.0–18.7%)	12.6% (9.1–17.1%)	18.2% (13.6–23.8%)		
Moderate	3.6% (37) (2.6–4.9%)	3.4% (1.3–7.8%)	1.6% (0.3–4.7%)	1.7% (0.5–4.4%)	3.1% (1.5–5.9%)	8.1% (5.1–12.6%)		
Quite	0.6% (6) (0.2–1.3%)	0.0% –(0.5–2.9%)	0.0% –(0.4–2.3%)	0.4% –(0.2–2.6%)	0.4% –(0.1–2.3%)	1.9% (0.6–4.9%)		
Very	0.7% (7) (0.3–1.4%)	0.7% –(0.2–4.0%)	0.0% –(0.4–2.3%)	0.4% –(0.2–2.6%)	0.4% –(0.1–2.3%)	1.9% (0.6–4.9%)		
Pain							0.97** (0.94–0.99)	2.06** (1.11–3.83)
Not difficult	94.4% (826) (92.7–95.8%)	91.0% (85.3–94.7%)	91.7% (86.8–94.9%)	95.6% (92.1–97.6%)	95.1% (91.8–97.2%)	97.5% (94.3–99.0%)		
Some difficulty	4.5% (39) (3.3–6.0%)	5.7% (2.9–10.7%)	7.1% (4.2–11.8%)	4.4% (2.4–7.9%)	3.6% (1.8–6.6%)	1.9% (0.6–4.8%)		
Moderate	0.7% (6) (0.3–1.5%)	0.8% –(0.2–4.2%)	0.6% –(0.2–3.3%)	0.0% –(0.3–1.9%)	1.3% (0.4–3.7%)	0.6% –(0.1–3.1%)		
Quite	0.5% (4) (0.1–1.2%)	2.5% (0.7–6.5%)	0.6% –(0.2–3.3%)	0.0% –(0.3–1.9%)	0.0% –(0.3–1.7%)	0.0% –(0.3–2.1%)		
Very	—	—	—	—	—	—		
Participant orgasm							1.02** (1–1.04)	2.45**** (1.52–3.95)
Orgasm	91.3% (929) (89.4–92.8%)	95.7% (91.0–98.1%)	91.4% (86.6–94.7%)	92.9% (88.8–95.5%)	90.8% (86.8–93.8%)	86.9% (81.8–90.8%)		
No orgasm	8.7% (89) (7.2–10.6%)	4.3% (1.9–4.0%)	8.6% (5.3–13.4%)	7.1% (4.5–11.2%)	9.2% (6.2–13.2%)	13.1% (9.2–18.2%)		
Partner orgasm							0.99 (0.97–1.01)	0.96 (0.66–1.4)
Orgasm	85.1% (755) (82.6–87.3%)	86.4% (80.0–91.0%)	94.1% (89.8–96.8%)	91.1% (86.7–94.1%)	93.3% (89.7–95.8%)	93.4% (89.3–96.1%)		
No orgasm	14.9% (132) (12.7–17.4%)	13.6% (9.0–20.0%)	5.9% (3.2–10.2%)	8.9% (5.9–13.3%)	6.7% (4.2–10.3%)	6.6% (3.9–10.7%)		

Table 3 Continued

	Women							
	All respondents	18–24	25–29	30–39	40–49	50–59	Evaluation by age†	Evaluation by sexual relationship†
Event experience	% Engaged in behavior past year						Adjusted odds ratio (95% CI)	Adjusted odds ratio (95% CI)
Arousal							1.00 (0.99–1.01)	0.78**** (0.66–0.93)
Extremely	34.8% (303) (31.7–38.1%)	45.0% (36.2–54.1%)	29.1% (23.7–35.2%)	42.2% (35.7–49.0%)	32.7% (26.8–39.1%)	28.3% (21.4–36.5%)		
Quite a bit	30.6% (266) (27.6–33.7%)	28.4% (21.0–37.3%)	33.5% (27.8–39.7%)	23.1% (17.9–29.3%)	31.3% (25.5–37.7%)	37.8% (30.1–46.2%)		
Moderately	20.1% (175) (17.6–22.9%)	15.6% (10.0–23.4%)	22.0% (17.2–27.7%)	16.1% (11.7–21.7%)	24.0% (18.9–30.1%)	20.5% (14.5–28.1%)		
A little	10.8% (94) (8.9–13.0%)	7.3% (3.6–13.8%)	12.8% (9.1–17.7%)	11.6% (7.9–16.6%)	9.6% (6.3–14.3%)	11.0% (6.7–17.5%)		
Not at all	3.7% (32) (2.6–5.2%)	3.7% (1.19–9.15%)	2.6% (1.11–5.69%)	7.0% (4.21–11.40%)	2.4% (0.91–5.53%)	2.4% (0.55–6.81%)		
Pleasure							1.00 (0.99–1.01)	0.86 (0.73–1.02)
Extremely	35.3% (307) (32.2–38.6%)	45.4% (36.6–54.5%)	31.7% (26.1–37.9%)	37.2% (30.9–43.9%)	35.9% (29.8–42.4%)	29.4% (22.3–37.6%)		
Quite a bit	31.1% (270) (28.1–34.2%)	25.0% (17.9–33.7%)	31.7% (26.1–37.9%)	31.7% (25.7–38.2%)	27.8% (22.2–34.0%)	39.7% (31.8–48.1%)		
Moderately	19.4% (169) (16.9–22.2%)	21.3% (14.7–29.7%)	18.9% (14.4–24.4%)	14.1% (10.0–19.5%)	23.9% (18.7–30.0%)	19.8% (13.9–27.4%)		
A little	10.6% (92) (8.7–12.8%)	5.6% (2.4–11.6%)	15.4% (11.3–20.6%)	9.5% (6.2–14.3%)	10.0% (6.7–14.8%)	8.7% (4.9–14.8%)		
Not at all	3.6% (31) (2.5–5.0%)	2.8% (0.7–8.0%)	2.2% (0.8–5.1%)	7.5% (4.6–12.0%)	2.4% (0.9–5.5%)	2.4% (0.6–6.8%)		
Lubrication difficulty							1.02** (1–1.03)	0.74** (0.57–0.95)
Not difficult	65.3% (496) (61.8–68.6%)	64.9% (55.8–73.0%)	71.9% (65.8–77.2%)	68.5% (61.9–74.4%)	63.9% (57.4–70.0%)	51.7% (43.4–60.0%)		
Some difficulty	25.4% (193) (22.4–28.6%)	26.6% (19.3–35.4%)	22.1% (17.3–27.8%)	22.6% (17.5–28.8%)	29.0% (23.4–35.3%)	28.4% (21.5–36.6%)		
Moderate	6.8% (52) (5.2–8.9%)	7.4% (3.7–13.9%)	5.0% (2.8–8.7%)	7.1% (4.3–11.5%)	6.0% (3.5–10.1%)	10.3% (6.1–16.7%)		
Quite	1.6% (12) (0.9–2.8%)	1.1% –(0.2–5.5%)	0.5% –(0.1–2.7%)	0.0% –(0.4–2.2%)	1.1% (0.1–3.7%)	6.9% (3.6–12.6%)		
Very	0.9% (7) (0.4–1.9%)	0.0% –(0.7–3.9%)	0.5% –(0.1–2.7%)	1.8% (0.5–4.8%)	0.0% –(0.4–2.1%)	2.6% (0.7–7.1%)		
Pain							1.00 (0.99–1.01)	1.08 (0.83–1.4)
Not difficult	69.7% (529) (66.3–72.9%)	66.3% (57.3–74.3%)	67.3% (61.1–73.0%)	72.4% (65.9–78.0%)	75.3% (69.2–80.5%)	63.8% (55.4–71.4%)		
Some difficulty	25.7% (195) (22.7–28.9%)	27.4% (20.0–36.2%)	30.1% (24.6–36.2%)	21.8% (16.7–27.8%)	22.5% (17.5–28.5%)	27.6% (20.7–35.7%)		
Moderate	2.9% (22) (1.9–4.4%)	2.1% (0.3–7.0%)	1.5% (0.4–4.2%)	4.7% (2.5–8.6%)	2.2% (0.8–5.3%)	4.3% (1.8–9.4%)		
Quite	1.4% (11) (0.8–2.6%)	4.2% (1.5–9.9%)	1.0% (0.1–3.5%)	1.2% (0.2–4.0%)	0.0% –(0.4–2.1%)	2.6% (0.7–7.1%)		
Very	0.26% (0.01–1.02%)	0.0% (0.00–100.00%)	0.0% (0.00–100.00%)	0.0% (0.00–100.00%)	0.0% (0.00–100.00%)	1.7% (0.00–100.00%)		
Participant orgasm							0.98**** (0.97–0.99)	1.13 (0.85–1.51)
Orgasm	64.4% (540) (61.1–67.5%)	61.2% (52.0–69.6%)	57.8% (51.5–64.0%)	65.3% (58.6–71.4%)	68.5% (62.1–74.3%)	70.7% (62.5–77.8%)		
No orgasm	35.6% (299) (32.5–38.9%)	38.8% (30.4–48.0%)	42.2% (36.0–48.5%)	34.7% (28.6–41.4%)	31.5% (25.7–37.9%)	29.3% (22.2–37.5%)		
Partner orgasm								
Orgasm	92.2% (767) (90.2–93.8%)	86.4% (78.9–91.6%)	94.1% (90.3–96.6%)	91.1% (86.4–94.3%)	93.3% (89.2–96.0%)	93.4% (87.8–96.7%)	0.99 (0.97–1.02)	2.63*** (1.52–4.55)
No orgasm	7.8% (65) (6.2–9.8%)	13.6% (8.4–21.1%)	5.9% (3.4–9.7%)	8.9% (5.7–13.6%)	6.7% (4.0–10.8%)	6.6% (3.3–12.2%)		

*$P \leq 0.05$, **$P \leq 0.01$, ***$P \leq 0.005$, ****$P \leq 0.01$.
†Adjusted odds ratios are based on a logistic regression age, health, & partner status covariates. Partner status was coded as relationship partner (Ref) and non-relationship partner.
CI = confidence interval.

event was with a relationship partner indicated orgasm at last event as compared with men whose most recent event was with a nonrelationship partner.

When controlling for age and health status, women ages 18 to 59 whose last event was with a relationship partner indicated greater difficulties with arousal and lubrication yet a greater likelihood of their partner experiencing orgasm as compared with women whose last reported sexual event was with a nonrelationship partner.

Event-Level Sexual Repertoire

A total of 41 combinations of behaviors were reported at participants' most recent sexual event (Table 4). No one behavior alone, or any single combination of behaviors, was reported by the majority of men or women in any age cohort. However, in all age cohorts, the largest proportion of men and women reported having engaged solely in PVI (32.9% men, 39.0% women). The proportion of participants who reported having engaged only in PVI at last event was highest, for men, among the 18- to 24-year-old cohort whereas, for women, the proportion was lowest among the 18- to 24-year-old cohort and highest (above 40%) among women ages 40–59.

The next most common repertoires consisted of giving and receiving oral sex in tandem with PVI (11.1% men, 10.8% women), receiving oral sex in tandem with PVI (7.2% men, 5.9% women), giving oral sex in tandem with PVI (5.0% men, 8.8% women), and giving and receiving oral sex in tandem with partnered masturbation and vaginal intercourse (7.2% men, 6.0% women).

Men who had PVI less than weekly were more likely to report PVI at last event ($\chi^2 = 17.26$, $P < 0.001$). Women who had PVI less than weekly were more likely to give oral ($\chi^2 = 5.88$, $P < 0.05$), receive oral ($\chi^2 = 5.88$, $P = 0.001$), and have PVI at last event ($\chi^2 = 9.52$, $P < 0.01$).

Predictors of Orgasm

Men reported orgasm more often if their most recent sexual encounter included PVI than if it did not (Table 5). Women were significantly more likely to report orgasm if they gave oral sex, received oral sex, had penile–vaginal sex or received anal sex compared with if they had not. For women and men, the presence or absence of partnered masturbation was not associated with orgasm. In addition, women and men were more likely to experience orgasm during their most recent sexual event if, during that event, they engaged in a greater number of sexual behaviors.

Discussion

Findings from our study demonstrate the enormous variability that occurs in the sexual repertoire of adult human beings. In other studies of sexual repertoire, vaginal intercourse occurred in nearly all instances of participants' most recent occasion of "sex" [5,6]. However, this was not the case in our study. Although vaginal intercourse was the most common sexual behavior that occurred, the specificity of the questions we asked that allowed for a range of behaviors to have occurred—combined, perhaps, with the evolving and varying definitions of what it means to have "had sex" [27,28]—resulted in somewhat more men and women reporting events that did not feature vaginal intercourse. More people in our study, for example, indicated only having engaged in behaviors such as partnered masturbation or oral sex.

However, a far greater number of women and men in our study indicated having only engaged in PVI (32.9% men, 39.0% women) compared with Richters et al. (2006), who found that 12% of men and women in their national sample of Australians ages 16 to 59 indicated that only PVI had occurred during their recent event [6]. This difference may be accounted for by their more specific measurement of manual stimulation of the man and/or woman, which resulted in a larger proportion of individuals indicating they engaged in PVI in tandem with manual stimulation. By contrast, our measurement asked about partnered masturbation more generally, without specifically asking about specific acts such as hand stimulation of the penis or finger stimulation of the vagina, clitoris or anus.

Our finding that orgasm was more likely among women and men who reported a greater number of sexual behaviors is consistent with previous research that has found this to be the case for women [6]. Women tend to be less easily orgasmic than men and more variable in their sexual response, likely caused by both anatomical and psychosocial reasons [29–32]. It may be the case that many women require different types of stimulation in order to experience orgasm. Alternatively, a greater number of events may reflect that male-female couples that include a less easily orgasmic woman engage in one or more sexual behaviors for male pleasure and/or orgasm and then one or more different sexual behaviors directed toward

Table 4 Combinations of behaviors engaged in during the most recent sexual event, stratified by gender and age (weighted)

Behaviors during most recent partnered sexual event	Men						Women					
	All men (N = 1,046)	18–24 (N = 151)	25–29 (N = 189)	30–39 (N = 231)	40–49 (N = 266)	50–59 (N = 209)	All women (N = 885)	18–24 (N = 112)	25–29 (N = 231)	30–39 (N = 204)	40–49 (N = 209)	50–59 (N = 129)
	% Engaged in behavior past year (95% CI)						% Engaged in behavior past year (95% CI)					
None of the sexual acts provided	3.1% (2.2–4.3%)	6.0% (3.0–11.1%)	1.6% (0.3–4.8%)	2.2% (0.8–5.1%)	3.0% (1.4–5.9%)	3.3% (1.5–6.9%)	3.7% (2.7–5.2%)	2.7% (0.6–7.9%)	4.8% (2.6–8.4%)	3.4% (1.5–7.0%)	4.3% (2.2–8.1%)	2.3% (0.5–6.9%)
One												
Partnered masturbation	2.2% (1.5–3.3%)	2.6% (0.8–6.8%)	2.6% (1.0–6.2%)	0.9% (0.0–3.3%)	1.9% (0.7–4.5%)	3.3% (1.5–6.9%)	2.6% (1.7–3.9%)	1.8% (0.1–6.7%)	3.0% (1.4–6.2%)	3.4% (1.5–7.0%)	2.9% (1.2–6.3%)	0.8% –(0.3–4.7%)
Insertive anal sex	0.2% (0.0–0.7%)	0.7% –(0.3–4.0%)	0.0% –(0.4–2.4%)	0.0% –(0.3–2.0%)	0.4% –(0.2–2.3%)	0.0% –(0.4–2.2%)	— —	— —	— —	— —	— —	— —
Receptive anal sex	0.3% (0.1–0.9%)	0.0% –(0.5–3.0%)	0.0% –(0.4–2.4%)	0.0% –(0.3–2.0%)	0.8% (0.0–2.9%)	0.5% –(0.2–2.9%)	0.2% (0.0–0.9%)	0.9% –(0.3–5.4%)	0.0% –(0.3–2.0%)	0.0% –(0.4–2.2%)	0.0% –(0.4–2.2%)	0.8% –(0.3–4.7%)
Gave oral sex	2.6% (1.8–3.7%)	0.7% –(0.3–4.0%)	0.5% –(0.2–3.2%)	3.0% (1.4–6.2%)	1.5% (0.4–3.9%)	6.7% (3.9–11.0%)	3.3% (2.3–4.7%)	3.6% (1.1–9.1%)	3.5% (1.7–6.8%)	2.0% (0.6–5.1%)	3.8% (1.8–7.5%)	3.9% (1.4–9.0%)
Received oral sex	4.6% (3.5–6.0%)	4.0% (1.6–8.6%)	4.8% (2.4–8.9%)	3.5% (1.7–6.8%)	5.3% (3.1–8.7%)	5.3% (2.9–9.3%)	1.2% (0.7–2.2%)	1.8% (0.1–6.7%)	0.9% (0.0–3.3%)	1.5% (0.3–4.4%)	1.4% (0.3–4.3%)	0.8% –(0.3–4.7%)
Penile–vaginal intercourse	32.9% (30.1–35.8%)	39.7% (32.3–47.7%)	27.0% (21.1–33.7%)	33.3% (27.6–39.6%)	32.0% (26.6–37.8%)	34.0% (27.9–40.6%)	39.0% (35.8–42.2%)	31.3% (23.4–40.4%)	34.2% (28.4–40.5%)	37.3% (30.9–44.1%)	45.5% (38.8–52.2%)	46.5% (38.1–55.1%)
Two												
Gave oral sex receptive anal sex	0.6% (0.2–1.3%)	0.0% –(0.5–3.0%)	2.6% (1.0–6.2%)	0.0% –(0.3–2.0%)	0.4% –(0.2–2.3%)	0.0% –(0.4–2.2%)	0.0% –(0.1–0.5%)	0.0% –(0.7–4.0%)	0.0% –(0.3–2.0%)	0.0% –(0.4–2.2%)	0.0% –(0.4–2.2%)	0.0% –(0.6–3.5%)
Gave oral sex received oral sex	1.1% (0.6–1.9%)	2.0% (0.4–5.9%)	0.5% –(0.2–3.2%)	0.4% –(0.2–2.7%)	0.8% (0.0–2.9%)	1.9% (0.6–5.0%)	1.4% (0.7–2.4%)	0.9% –(0.3–5.4%)	0.9% (0.0–3.3%)	3.4% (1.5–7.0%)	0.0% –(0.4–2.2%)	1.6% (0.1–5.8%)
Gave oral sex penile–vaginal intercourse	5.0% (3.8–6.5%)	6.6% (3.5–11.9%)	5.3% (2.8–9.6%)	6.5% (3.9–10.5%)	4.5% (2.5–7.8%)	2.4% (0.9–5.6%)	8.8% (7.1–10.9%)	8.0% (4.1–14.7%)	7.8% (4.9–12.0%)	9.3% (6.0–14.2%)	8.1% (5.1–12.7%)	11.6% (7.1–18.4%)
Received oral sex insertive anal sex	0.1% (0.0–0.6%)	0.0% –(0.5–3.0%)	0.0% –(0.4–2.4%)	0.0% –(0.3–2.0%)	0.4% –(0.2–2.3%)	0.0% –(0.4–2.2%)	— —	— —	— —	— —	— —	— —
Received oral sex receptive anal sex	0.1% (0.0–0.6%)	0.0% –(0.5–3.0%)	0.0% –(0.4–2.4%)	0.0% –(0.3–2.0%)	0.4% –(0.2–2.3%)	0.0% –(0.4–2.2%)	0.0% –(0.1–0.5%)	0.0% –(0.7–4.0%)	0.0% –(0.3–2.0%)	0.0% –(0.4–2.2%)	0.0% –(0.4–2.2%)	0.0% –(0.6–3.5%)
Received oral sex penile–vaginal intercourse	7.2% (5.8–8.9%)	3.3% (1.2–7.7%)	4.2% (2.0–8.3%)	7.4% (4.6–11.5%)	10.9% (7.7–15.3%)	7.7% (4.7–12.2%)	5.9% (4.5–7.6%)	1.8% (0.1–6.7%)	5.2% (2.9–8.9%)	8.8% (5.6–13.6%)	6.7% (3.9–11.0%)	4.7% (1.9–10.0%)
Partnered masturbation received anal sex	0.1% (0.0–0.6%)	0.0% –(0.5–3.0%)	0.0% –(0.4–2.4%)	0.0% –(0.3–2.0%)	0.4% –(0.2–2.3%)	0.0% –(0.4–2.2%)	0.0% –(0.1–0.5%)	0.0% –(0.7–4.0%)	0.0% –(0.3–2.0%)	0.0% –(0.4–2.2%)	0.0% –(0.4–2.2%)	0.0% –(0.6–3.5%)
Partnered masturbation received oral sex	0.7% (0.3–1.4%)	1.3% (0.1–5.0%)	0.0% –(0.4–2.4%)	0.4% –(0.2–2.7%)	1.1% (0.2–3.4%)	0.5% –(0.2–2.9%)	0.2% (0.0–0.9%)	0.0% –(0.7–4.0%)	0.0% –(0.3–2.0%)	1.0% (0.0–3.7%)	0.0% –(0.4–2.2%)	0.0% –(0.6–3.5%)
Partnered masturbation penile–vaginal intercourse	6.3% (5.0–8.0%)	4.0% (1.6–8.6%)	15.3% (10.9–21.2%)	6.1% (3.6–10.0%)	4.5% (2.5–7.8%)	2.4% (0.9–5.6%)	7.0% (5.5–8.9%)	4.5% (1.7–10.3%)	10.4% (7.0–15.0%)	6.4% (3.7–10.7%)	5.3% (2.9–9.3%)	7.0% (3.5–12.9%)
Partnered masturbation, gave oral sex	0.5% (0.2–1.1%)	0.7% –(0.3–4.0%)	1.6% (0.3–4.8%)	0.0% –(0.3–2.0%)	0.0% –(0.3–1.7%)	0.5% –(0.2–2.9%)	0.5% (0.1–1.2%)	0.9% –(0.3–5.4%)	0.0% –(0.3–2.0%)	1.0% (0.0–3.7%)	0.0% –(0.4–2.2%)	0.8% –(0.3–4.7%)
Penile–vaginal intercourse insertive anal sex	0.4% (0.1–1.0%)	0.7% –(0.3–4.0%)	0.5% –(0.2–3.2%)	0.0% –(0.3–2.0%)	0.8% (0.0–2.9%)	0.0% –(0.4–2.2%)	— —	— —	— —	— —	— —	— —
Penile–vaginal intercourse receptive anal sex	0.0% –(0.1–0.4%)	0.0% –(0.5–3.0%)	0.0% –(0.4–2.4%)	0.0% –(0.3–2.0%)	0.0% –(0.3–1.7%)	0.0% –(0.4–2.2%)	0.1% (0.0–0.7%)	0.0% –(0.7–4.0%)	0.0% –(0.3–2.0%)	0.0% –(0.4–2.2%)	0.5% –(0.2–2.9%)	0.0% –(0.6–3.5%)
Three												
Gave oral sex received oral sex insertive anal sex	0.5% (0.2–1.1%)	0.0% –(0.5–3.0%)	0.0% –(0.4–2.4%)	0.9% (0.0–3.3%)	0.8% (0.0–2.9%)	0.5% –(0.2–2.9%)	— —	— —	— —	— —	— —	— —
Gave oral sex received oral sex receptive anal sex	0.1% (0.0–0.6%)	0.0% –(0.5–3.0%)	0.0% –(0.4–2.4%)	0.4% –(0.2–2.7%)	0.0% –(0.3–1.7%)	0.0% –(0.4–2.2%)	0.0% –(0.1–0.5%)	0.0% –(0.7–4.0%)	0.0% –(0.3–2.0%)	0.0% –(0.4–2.2%)	0.0% –(0.4–2.2%)	0.0% –(0.6–3.5%)
Gave oral sex received oral sex penile–vaginal intercourse	11.1% (9.3–13.1%)	5.3% (2.5–10.3%)	6.3% (3.6–10.9%)	12.6% (8.8–17.5%)	12.8% (9.3–17.4%)	15.8% (11.4–21.4%)	10.8% (9.0–13.1%)	17.0% (11.1–25.1%)	10.8% (7.4–15.5%)	9.3% (6.0–14.2%)	10.5% (7.0–15.5%)	8.5% (4.7–14.8%)
Gave oral sex penile–vaginal intercourse receptive anal sex	0.0% –(0.1–0.4%)	0.0% –(0.5–3.0%)	0.0% –(0.4–2.4%)	0.0% –(0.3–2.0%)	0.0% –(0.3–1.7%)	0.0% –(0.4–2.2%)	0.2% (0.0–0.9%)	0.0% –(0.7–4.0%)	0.0% –(0.3–2.0%)	1.0% (0.0–3.7%)	0.0% –(0.4–2.2%)	0.0% –(0.6–3.5%)

Table 4 Continued

Behaviors during most recent partnered sexual event	Men						Women					
	All men (N = 1,046)	18–24 (N = 151)	25–29 (N = 189)	30–39 (N = 231)	40–49 (N = 266)	50–59 (N = 209)	All women (N = 885)	18–24 (N = 112)	25–29 (N = 231)	30–39 (N = 204)	40–49 (N = 209)	50–59 (N = 129)
	% Engaged in behavior past year (95% CI)						% Engaged in behavior past year (95% CI)					
Received oral sex penile–vaginal intercourse insertive anal sex	0.4% (0.1–1.0%)	0.0% –(0.5–3.0%)	0.5% –(0.2–3.2%)	0.0% –(0.3–2.0%)	1.1% (0.2–3.4%)	0.0% –(0.4–2.2%)	— —	— —	— —	— —	— —	— —
Received oral sex penile–vaginal intercourse receptive anal sex	0.0% –(0.1–0.4%)	0.0% –(0.5–3.0%)	0.0% –(0.4–2.4%)	0.0% –(0.3–2.0%)	0.0% –(0.3–1.7%)	0.0% –(0.4–2.2%)	0.6% (0.2–1.4%)	0.0% –(0.7–4.0%)	0.0% –(0.3–2.0%)	0.0% –(0.4–2.2%)	2.4% (0.9–5.6%)	0.0% –(0.6–3.5%)
Partnered masturbation gave oral sex received oral sex	1.1% (0.6–2.0%)	1.3% (0.1–5.0%)	0.0% –(0.4–2.4%)	0.9% (0.0–3.3%)	1.9% (0.7–4.5%)	1.4% (0.3–4.3%)	0.9% (0.4–1.8%)	0.9% –(0.3–5.4%)	0.9% (0.0–3.3%)	1.5% (0.3–4.4%)	1.0% (0.0–3.6%)	0.0% –(0.6–3.5%)
Partnered masturbation gave oral sex penile–vaginal oral sex	2.1% (1.4–3.2%)	2.6% (0.8–6.8%)	3.7% (1.7–7.6%)	1.7% (0.5–4.5%)	1.1% (0.2–3.4%)	1.9% (0.6–5.0%)	2.6% (1.7–3.9%)	2.7% (0.6–7.9%)	5.2% (2.9–8.9%)	2.5% (0.9–5.8%)	0.5% –(0.2–2.9%)	1.6% (0.1–5.8%)
Partnered masturbation received oral sex insertive oral sex	0.1% (0.0–0.6%)	0.0% –(0.5–3.0%)	0.0% –(0.4–2.4%)	0.4% –(0.2–2.7%)	0.0% –(0.3–1.7%)	0.0% –(0.4–2.2%)	— —	— —	— —	— —	— —	— —
Partnered masturbation received oral sex receptive oral sex	0.2% (0.0–0.7%)	0.0% –(0.5–3.0%)	1.1% (0.0–4.0%)	0.0% –(0.3–2.0%)	0.0% –(0.3–1.7%)	0.0% –(0.4–2.2%)	0.1% (0.0–0.7%)	0.0% –(0.7–4.0%)	0.4% –(0.2–2.7%)	0.0% –(0.4–2.2%)	0.0% –(0.4–2.2%)	0.0% –(0.6–3.5%)
Partnered masturbation received oral sex penile–vaginal intercourse	4.3% (3.2–5.7%)	4.6% (2.1–9.4%)	7.9% (4.8–12.8%)	7.4% (4.6–11.5%)	0.8% (0.0–2.9%)	1.9% (0.6–5.0%)	2.5% (1.6–3.8%)	2.7% (0.6–7.9%)	2.6% (1.1–5.7%)	2.5% (0.9–5.8%)	2.9% (1.2–6.3%)	1.6% (0.1–5.8%)
Partnered masturbation gave oral sex receptive anal sex	0.0% –(0.1–0.4%)	0.0% –(0.5–3.0%)	0.0% –(0.4–2.4%)	0.0% –(0.3–2.0%)	0.0% –(0.3–1.7%)	0.0% –(0.4–2.2%)	0.2% (0.0–0.9%)	0.0% –(0.7–4.0%)	0.0% –(0.3–2.0%)	1.0% (0.0–3.7%)	0.0% –(0.4–2.2%)	0.0% –(0.6–3.5%)
Four												
Gave oral sex received oral sex receptive anal sex insertive anal sex	0.4% (0.1–1.0%)	0.0% –(0.5–3.0%)	0.0% –(0.4–2.4%)	0.4% –(0.2–2.7%)	0.4% –(0.2–2.3%)	1.0% (0.0–3.6%)	— —	— —	— —	— —	— —	— —
Gave oral sex received oral sex penile–vaginal intercourse insertive anal sex	0.7% (0.3–1.4%)	2.0% (0.4–5.9%)	0.0% –(0.4–2.4%)	0.0% –(0.3–2.0%)	1.1% (0.2–3.4%)	0.5% –(0.2–2.9%)	— —	— —	— —	— —	— —	— —
Gave oral sex received oral sex penile–vaginal intercourse receptive anal sex	0.0% –(0.1–0.4%)	0.0% –(0.5–3.0%)	0.0% –(0.4–2.4%)	0.0% –(0.3–2.0%)	0.0% –(0.3–1.7%)	0.0% –(0.4–2.2%)	1.4% (0.7–2.4%)	0.9% –(0.3–5.4%)	0.9% (0.0–3.3%)	2.0% (0.6–5.1%)	1.4% (0.4–4.3%)	1.6% (0.1–5.8%)
Partnered masturbation gave oral sex received oral sex insertive anal sex	0.5% (0.2–1.1%)	0.0% –(0.5–3.0%)	0.0% –(0.4–2.4%)	0.0% –(0.3–2.0%)	0.8% (0.0–2.9%)	1.4% –(0.3–4.3%)	— —	— —	— —	— —	— —	— —
Partnered masturbation gave oral sex received oral sex receptive anal sex	0.8% (0.4–1.5%)	2.6% (0.8–6.8%)	0.0% –(0.4–2.4%)	1.3% (0.3–3.9%)	0.4% –(0.2–2.3%)	0.0% –(0.4–2.2%)	0.0% –(0.1–0.5%)	0.0% –(0.7–4.0%)	0.0% –(0.3–2.0%)	0.0% –(0.4–2.2%)	0.0% –(0.4–2.2%)	0.0% –(0.6–3.5%)
Partnered masturbation gave oral sex received oral sex receptive anal sex	0.1% (0.0–0.6%)	0.7% –(0.3–4.0%)	0.0% –(0.4–2.4%)	0.0% –(0.3–2.0%)	0.0% –(0.3–1.7%)	0.0% –(0.4–2.2%)	0.0% –(0.1–0.5%)	0.0% –(0.7–4.0%)	0.0% –(0.3–2.0%)	0.0% –(0.4–2.2%)	0.0% –(0.4–2.2%)	0.0% –(0.6–3.5%)
Partnered masturbation gave oral sex received oral sex penile–vaginal intercourse	7.2% (5.8–8.9%)	6.6% (3.5–11.9%)	7.4% (4.4–12.1%)	7.4% (4.6–11.5%)	7.9% –(5.2–11.8%)	6.2% (3.6–10.4%)	6.0% (4.6–7.8%)	13.4% (8.2–21.0%)	8.2% (5.3–12.6%)	2.9% (1.2–6.4%)	2.4% (0.9–5.6%)	6.2% (3.0–11.9%)
Partnered masturbation gave oral sex penile–vaginal intercourse receptive anal sex	0.0% –(0.1–0.4%)	0.0% –(0.5–3.0%)	0.0% –(0.4–2.4%)	0.0% –(0.3–2.0%)	0.0% –(0.3–1.7%)	0.0% –(0.4–2.2%)	0.3% (0.1–1.0%)	2.7% (0.6–7.9%)	0.0% –(0.3–2.0%)	0.0% –(0.4–2.2%)	0.0% –(0.4–2.2%)	0.0% –(0.6–3.5%)
Partnered masturbation received oral sex penile–vaginal intercourse insertive anal sex	0.2% (0.0–0.7%)	0.0% –(0.5–3.0%)	0.0% –(0.4–2.4%)	0.9% (0.0–3.3%)	0.0% –(0.3–1.7%)	0.0% –(0.4–2.2%)	— —	— —	— —	— —	— —	— —
Five												
Partnered masturbation gave oral sex received oral sex penile–vaginal intercourse insertive anal sex	2.7% (1.8–3.9%)	2.0% (0.4–5.9%)	6.3% (3.6–10.9%)	2.2% (0.8–5.1%)	2.3% (0.9–4.9%)	1.0% (0.0–3.6%)	— —	— —	— —	— —	— —	— —
Partnered masturbation gave oral sex received oral sex penile–vaginal intercourse receptive anal sex	0.0% –(0.1–0.4%)	0.0% –(0.5–3.0%)	0.0% –(0.4–2.4%)	0.0% –(0.3–2.0%)	0.0% –(0.3–1.7%)	0.0% –(0.4–2.2%)	0.5% (0.1–1.2%)	1.8% (0.1–6.7%)	0.4% –(0.2–2.7%)	0.0% –(0.4–2.2%)	0.5% –(0.2–2.9%)	0.0% –(0.6–3.5%)

CI = confidence intervals.

Table 5 Orgasm by type and number of behaviors during last partnered sexual event, stratified by gender (weighted)

	Men				Women			
	Respondents	Did report an orgasm	Did not report an orgasm	Orgasm by sexual behavior	Respondents	Did report an orgasm	Did not report an orgasm	Orgasm by sexual behavior
Sexual behaviors	N	% Experience orgasm (95% CI)		Odds ratio (95% CI)	N	% Experience orgasm (95% CI)		Odds ratio (95% CI)
Type of sexual act partnered masturbation				1.14 (0.70–1.86)				1.00 (0.72–1.4)
No (Ref)	718	90.9% (60.6–68.0%)	9.1% (32.0–39.4%)		640	64.4% (88.6–92.8%)	35.6% (7.2–11.4%)	
Yes	301	92.0% (88.4–94.6%)	8.0% (5.4–11.6%)		199	64.3% (57.4–70.7%)	35.7% (29.3–42.6%)	
Gave oral sex				1.13 (0.72–1.79)				1.73**** (1.28–2.34)
No (Ref)	642	90.8% (88.3–92.8%)	9.2% (7.2–11.7%)		523	59.8% (55.6–64.0%)	40.2% (36.0–44.4%)	
Yes	377	91.8% (88.5–94.2%)	8.2% (5.8–11.5%)		315	72.1% (66.9–76.7%)	27.9% (23.3–33.1%)	
Received oral sex				0.99 (0.64–1.53)				3.24**** (1.71–6.13)
No (Ref)	562	91.1% (88.4–93.2%)	8.9% (6.8–11.6%)		576	56.8% (52.7–60.8%)	43.2% (39.2–47.3%)	
Yes	457	91.2% (88.3–93.5%)	8.8% (6.5–11.7%)		263	81.0% (75.8–85.3%)	19.0% (14.7–24.2%)	
Penile–vaginal sex				7.56**** (4.79–11.93)				1.62* (1.08–2.44)
No (Ref)	189	73.0% (66.3–78.9%)	27.0% (21.1–33.7%)		108	54.6% (45.2–63.7%)	45.4% (36.3–54.8%)	
Yes	830	95.3% (93.6–96.6%)	4.7% (3.4–6.4%)		730	65.9% (62.4–69.2%)	34.1% (30.8–37.6%)	

Table 5 Continued

	Men				Women			
	Respondents	Did report an orgasm	Did not report an orgasm	Orgasm by sexual behavior	Respondents	Did report an orgasm	Did not report an orgasm	Orgasm by sexual behavior
Sexual behaviors	N	% Experience orgasm (95% CI)		Odds ratio (95% CI)	N	% Experience orgasm (95% CI)		Odds ratio (95% CI)
Received anal sex				—				8.38****
				—				(3.43–20.46)
No (Ref)	993	91.0% (89.1–92.7%)	9.0% (7.3–10.9%)		808	63.2% (59.9–66.5%)	36.8% (33.5–40.1%)	
Yes	25	100.0% (84.2–102.4%)	0.0% –(2.4–15.8%)		31	93.5% (78.3–99.2%)	6.5% (0.8–21.7%)	
Gave anal sex				0.77 (0.34–1.71)				
No (Ref)	953	91.4% (89.4–93.0%)	8.6% (7.0–10.6%)					
Yes	66	89.4% (79.4–95.1%)	10.6% (4.9–20.6%)					
Number of sexual acts				1.25*** (1.07–1.46)				1.46**** (1.30–1.63)
0	22	68.2% (47.1–83.8%)	31.8% (16.2–52.9%)		24	62.5% (42.6–78.9%)	37.5% (21.1–57.4%)	
1	384	91.7% (88.4–94.1%)	8.3% (5.9–11.6%)		381	54.9% (49.8–59.8%)	45.1% (40.2–50.2%)	
2	181	87.3% (81.6–91.4%)	12.7% (8.6–18.4%)		149	59.7% (51.7–67.3%)	40.3% (32.7–48.3%)	
3	118	92.4% (86.0–96.1%)	7.6% (3.9–14.0%)		90	77.8% (68.1–85.2%)	22.2% (14.8–31.9%)	
4	185	91.9% (87.0–95.1%)	8.1% (4.9–13.0%)		128	75.8% (67.6–82.4%)	24.2% (17.6–32.4%)	
5	99	97.0% (91.1–99.3%)	3.0% (0.7–8.9%)		64	89.1% (78.8–94.9%)	10.9% (5.1–21.2%)	
6	29	100.0% (86.1–102.2%)	0.0% –(2.2–13.9%)		4	100.0% (45.4–105.6%)	0.0% –(5.6–54.6%)	

*$P \leq 0.05$, **$P \leq 0.01$, ***$P \leq 0.005$, ****$P \leq 0.001$.
CI = confidence intervals.

female pleasure and/or orgasm. A similar pattern may occur among female couples, as they may not orgasm from the same behavior and thus may want or need to engage in more than one sexual behavior in order for the both of them to orgasm. Although not all couples have sex with the goal of having an orgasm, previous research has found that sex without orgasm is not satisfying for many men and women and thus it is reasonable to assume that sexual behaviors are often directed toward orgasm as a goal [33,34].

In addition, women who engage in a greater number of sexual behaviors may be more likely to experience multiple orgasms and may thus continue sex, or expand on their behaviors, to experience continued pleasure or subsequent orgasms. We did not assess the number of orgasms that women or men experienced during their most recent sexual events, nor did we assess to what extent orgasm was a goal for either partner, and thus we are limited in our ability to understand the reasons why people engage in fewer or greater numbers of sexual behaviors in a given sex act. It is also possible that people who engage in a variety of sexual behaviors are more easily orgasmic, are less sexually inhibited or enjoy spending more time having sex, perhaps caused by higher levels of erotophilia.

Men's orgasm was more likely to occur not only in relation to the number of behaviors reported but also when the most recent event occurred with a relationship partner. As men are more likely to experience erectile difficulties with age, it may be that their experience of orgasm is facilitated by being sexual with a relationship partner, assuming that they feel more relaxed with a relationship partner or are more likely to receive patience or reassurance with a relationship partner, or benefit from technique honed from practice rather than newness. Men's orgasm was also tied specifically to PVI. When PVI was absent from the most recent sexual event, men were less likely to orgasm. For women, the path to orgasm appeared to be more variable as they were more (or less) likely to orgasm based on the presence or absence of a range of behaviors. This may reflect the greater variability among women in terms of their orgasmic response or the number of behaviors that many women and their partners engage in as an effort to facilitate female orgasm.

It is worth noting that although most recent events occurred with a relationship or dating partner, a sizable minority of women and men in all age cohorts reported that their most recent sexual event occurred with a friend. Although some media reports and research reports have described "friends with benefits" as a feature of young adults [35,36], the data suggest that this feature might also be common across all age groups. However, in this study we did not assess individuals' reasons for choosing their sexual partners.

A significant strength of this study is that it involved the collection of a nationally representative probability sample of adult men and women. Also, internet-based data collection was utilized, which may have helped some individuals to feel more comfortable answering sensitive questions. As individuals who are selected for Knowledge Networks panels are provided with computers, internet access if they do not already have it, and training to use such equipment, individuals are equally eligible to participate whether or not they have the personal financial resources to have internet access in their home. However, as with other national probability samples, this study was only available to those who were dwelling in households and not to those who were living in institutions or without an address-based home. Also, as the study was conducted via the Internet, it was also only available to those who were able to read and to navigate computer equipment.

A limitation of these data is that analyses were limited only to those who reported partnered sexual activity in the previous year. As such, we cannot know what variables might better predict ease of orgasm, arousal, or difficulties with erections or vaginal lubrication for those who have never had partnered sex or for those who have not had partnered sex in the previous year. Another limitation is that the sexual behaviors that participants were able to report was limited to partnered masturbation, giving and receiving oral sex, PVI, and anal sex. Thus, these data are not able to reflect the extent to which kissing, cuddling, sensual touching, the use of sexual enhancement products (e.g., vibrators, dildos, cock rings), and other sexual practices are part of the sexual repertoire of this sample. Finally, the study involved a cross-sectional collection of data and thus causal attributions cannot be made.

Conclusions

Findings from this study demonstrate that adults ages 18 to 59 engage in a diverse range of sexual behaviors when they have sex and that a broader range of sexual behaviors in a given sexual event is

related to ease of orgasm for both women and men. Although both men and women experience sexual difficulties related to erectile function and lubrication with age, men's orgasm is facilitated by sex with a relationship partner whereas the likelihood of women's orgasm is related to varied sexual behavior.

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References

1 Hensel DJ, Fortenberry JD, Orr DP. Variations in coital and noncoital sexual repertoire among adolescent women. J Adolesc Health 2008;42:170–6.
2 Connell RW, Kippax S. Sexuality in the AIDS crisis: Patterns of sexual practice and pleasure in a sample of Australian gay and bisexual men. J Sex Res 1990;27:167–98.
3 Laumann E, Gagnon JH, Michael RT, Michaels S. The social organization of sexuality: Sexual practices in the United States. Chicago, IL: University of Chicago Press; 1994.
4 Michael RT, Gagnon JH, Laumann EO, Kolata G. Sex in America: A definitive survey. New York: Warner Books; 1994.
5 Lindau ST, Schumm LP, Laumann EO, Levinson W, O'Muircheartaigh CA, Waite LJ. A study of sexuality and health among older adults in the United States. N Engl J Med 2007;357:762.
6 Richters J, de Visser R, Rissel C, Smith A. Sexual practices at last heterosexual encounter and occurrence of orgasm in a national survey. J Sex Res 2006;43:217–26.
7 Messiah A, Blin P, Fiche V, the ACSF Group. Sexual repertoires of heterosexuals: Implications for HIV/sexually transmitted disease risk and prevention. AIDS 1995;9:1357–65.
8 Haavio-Mannila E, Kontula O. Correlates of increased sexual satisfaction. Arch Sex Behav 1997;26:399–419.
9 Meston CM, Levin RJ, Sipski ML, Hull EM, Heiman JR. Women's orgasm. Annu Rev Sex Res 2004;15:173–257.
10 Fugl-Meyer KS, Oberg K, Lundberg PO, Lewin B, Fugl-Meyer A. On orgasm, sexual techniques and erotic perceptions in 18- to 74- year-old Swedish women. J Sex Med 2006;3:56–68.
11 Weinhardt LS, Carey MP. Does alcohol lead to sexual risk behavior? Findings from event-level research. Annu Rev Sex Res 2000;11:125–57.
12 Fortenberry JD, Orr DP, Katz BP, Brizendine EJ, Blythe MJ. Sex under the influence: A diary self-report study of substance use and sexual behavior among adolescent women. Sex Transm Dis 1997;24:313–9.
13 Leigh BC. Alcohol and condom use: A meta-analysis of event-level studies. Sex Transm Dis 2002;29:476–82.
14 Current Population Survey December 2008. U.S. Census Bureau. 1994—[cited June 9, 2010]. Available from: http://www.bls.census.gov/ferretftp.htm.
15 Schick V, Herbenick D, Reece M, Sanders SA, Dodge B, Middlestadt S, Fortenberry JD. Sexual Behaviors, condom use, and sexual health of Americans over 50: Implications for sexual health promotion for aging adults. J Sex Med 2010;7(suppl 5): 315–29.
16 Baker LC, Bundorf MK, Singer S, Wagner TH. Validity of the survey of health and Internet and Knowledge Network's panel and sampling. Stanford, CA: Stanford University; 2003.
17 Baker L, Wagner TH, Singer S, Bundorf MK. Use of the Internet and e-mail for health care information: Results from a national survey. JAMA 2003;289:2400–6.
18 Heiss F, McFadden D, Winter J. Who failed to enroll in Medicare Part D, and why? Early results. Health Aff (Millwood) 2006;25:344–54.
19 Holman EA, Silver RC, Poulin M, Andersen J, Gil-Rivas V, McIntosh DN. Terrorism, acute stress, and cardiovascular health: A 3-year national study following the September 11th attacks. Arch Gen Psychiatry 2008;65:73–80.
20 Silver RC, Holman EA, McIntosh DN, Poulin M, Gil-Rivas V. Nationwide longitudinal study of psychological responses to September 11. JAMA 2002;288:1235.
21 Herbenick D, Reece M, Sanders SA, Dodge B, Ghassemi A, Fortenberry JD. Prevalence and characteristics of vibrator use by women in the United States: Results from a nationally representative study. J Sex Med 2009;6:1857–66.
22 Reece M, Herbenick D, Sanders SA, Dodge B, Ghassemi A, Fortenberry JD. Prevalence and characteristics of vibrator use by men in the United States. J Sex Med 2009;6:1867–74.
23 Fleiss JL, Levin B, Paik MC. Statistical methods for rates and proportions. 3rd edition. New York: John Wiley; 2003.
24 Agresti A, Coull B. Approximate is better than exact for interval estimation of binomial proportions. Am Stat 1998;52: 119–26.
25 DeSalvo KB, Bloser N, Reynolds K, He J, Muntner P. Mortality prediction with a single general self-rated health question: A meta-analysis. J Gen Intern Med 2005;20:267–75.
26 Idler EL, Benyamini Y. Self-rated health and mortality: A review of twenty-seven community studies. J Health Soc Behav 1997;38:21–37.

27 Sanders SA, Reinisch JM. Would you say you "had sex" if . . . ? JAMA 1999;281:275–7.
28 Sanders SA, Hill B, Yarber WL, Graham CA, Crosby R, Milhausen RR. Misclassification Bias: Diversity in conceptualizations about having "had sex". Sex Health 2010;7:31–4.
29 Kinsey AC, Pomeroy WB, Martin CE, Gebhard PH. Sexual behavior in the human female. Philadelphia, PA: W.B. Saunders; 1953.
30 Masters WH, Johnson VE. Human sexual response. Boston, MA: Little, Brown, & Co; 1966.
31 Foldes P, Buisson O. The clitoral complex: A dynamic sonographic study. J Sex Med 2009;6:1223–31.
32 Burri AV, Cherkas LM, Spector TD. Emotional intelligence and its association with orgasmic frequency in women. J Sex Med 2009;6:1930–7.
33 Wellings K, Field J, Johnson A, Wadsworth J. Sexual behavior in Britain. London: Penguin Books; 1994.
34 Hite S. The Hite report: A nationwide study of female sexuality. New York: MacMillan; 1976.
35 Bisson MA, Levine TR. Negotiating a friends with benefits relationship. Arch Sex Behav 2009;38:66–73.
36 Denizet-Lewis B. Friends, friends with benefits, and the benefits of the local mall. *The New York Times Magazine*. May 30, 2004.

Condom Use During Most Recent Vaginal Intercourse Event Among a Probability Sample of Adults in the United States

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ABSTRACT

Introduction. Correct and consistent condom use remains the most effective way to reduce sexually transmissible infection/HIV transmission during sex and is a highly effective contraceptive method. Understanding correlates of condom use is vital to public health programs.

Aim. To explore sociodemographic, event characteristics, and experiential correlates of condom use at last penile–vaginal intercourse (PVI).

Methods. Survey data were collected from a nationally representative probability sample of adults in the United States as part of the National Survey of Sexual Health and Behavior.

Main Outcome Measures. Condom use/non-use at most recent PVI was the main outcome. Logistic regression analyses predicted condom use from sociodemographic variables (i.e., age, education, race/ethnicity, sexual orientation, health status, type of relationship with sexual partner) and event characteristics (i.e., location of sexual encounter, prior intercourse experience with partner, whether partner had other sex partners in the 6 months prior to sex with the participant; other contraceptive use, alcohol use, marijuana use, and for men, erection medication use). Logistic regression analyses examined evaluations of the sexual aspects of the experience (pleasure, arousal, erection/lubrication difficulty, participant orgasm, partner orgasm) in light of condom use.

Results. Condom-protected PVI was significantly greater among younger people, blacks and Hispanics, and those having PVI with a nonrelationship partner. Statistically adjusting for these differences, condom use was significantly associated with fewer previous intercourse experiences with the partner and not using other forms of contraception. The sexual aspects of experience were evaluated similarly regardless of whether or not a condom was used.

Conclusion. Public health programs among youths and minorities may underlie higher condom use rates among these groups. Condom use may be further improved by continuing such programs and also expanding outreach to older persons and whites, suggesting prolonging use as relationships develop, and highlighting that condom use does not necessarily interfere with the sexual experience. **Sanders SA, Reece M, Herbenick D, Schick V, Dodge B, and Fortenberry JD. Condom use during most recent vaginal intercourse event among a probability sample of adults in the United States. J Sex Med 2010;7(suppl 5):362–373.**

Key Words. Condoms; Sexual Event; Unprotected Intercourse; Penile–Vaginal Intercourse

Introduction

Correct and consistent condom use remains the most effective way to reduce the transmission of sexually transmissible infections (STIs) including Human Immunodeficiency Virus (HIV) during sex and is a highly effective contraceptive method [1–7]. According to the U.S. Centers for Disease Control [8,9], in 2007 the number of new cases was 40,920 for syphilis, 355,991 for gonorrhea, and 1,108,374 for chlamydia. Additionally, the CDC estimates that approximately 56,300 people were newly infected with HIV in 2006 [10,44]. Further, in the United States nearly half of

the 6.4 million pregnancies each year are unintended [11]. Therefore, understanding the correlates of condom use is vital to enhancing programs in order to effectively promote correct and consistent condom use.

Condom use generally declines with age (e.g., [12]) and is less common in more established relationships [13–15]. Those using other contraceptives are more likely to forego condom use as well [15–17]. Although it is often assumed that alcohol and drug use increases the likelihood of unprotected intercourse, research has yielded inconsistent findings [18–22]. Interference with sexual arousal is also often cited as a reason for not using condoms [23–28]. However, systematic studies focusing on the relations between sexual arousal and condom use are needed.

Most previous studies that have focused on consistency of condom use have been based on recall periods involving multiple sexual events. In contrast, this study presents data on condom use and its correlates for the most recent sexual event during which penile–vaginal intercourse (PVI) occurred. Analyses of data from a particular sexual event permit more careful evaluation of associations between condom use and situational and experiential variables specific to that event. Whether or not a condom was used during the last PVI event appears to be a valid proxy for condom use over longer time periods [29]. In one study, consistent (100%) condom use during the past 14 days was reported by 73% of adolescent females who used a condom for their most recent intercourse compared with only 16% of those who did not use a condom at their most recent intercourse. For the past 60 days, the figures were 57% compared with 7%. Therefore, condom use at last sexual event appears to provide a reasonable window into longer term condom use.

Aims

The aim of the current study was to use event-specific rather than cumulative data to examine, in a nationally representative probability sample of adult men and women in the United States, sociodemographic and event-specific situational factors (partner variables, use of other contraception, alcohol use, marijuana use, location of the event, and, for men, use of erection medications) that may be associated with condom use. Further, evaluations of the sexual aspects of the experience were also assessed in relation to condom use.

Methods

Data Collection

Data presented are from the National Survey of Sexual Health and Behavior (NSSHB), conducted during early 2009. NSSHB data were collected using a population-based cross-sectional survey of adolescents and adults in the United States via research panels of Knowledge Networks (Menlo Park, CA, USA). Research panels accessed through Knowledge Networks are based on a national probability sample established using both random digit dialing (RDD) and an address-based sampling (ABS) frame. ABS involves the probability sampling of a frame of residential addresses in the United States derived from the U.S. Postal Service's Delivery Sequence File, which contains detailed information on every mail deliverable address in the United States. Collectively, the sampling frame from which participants are recruited covers approximately 98% of all U.S. households. Randomly selected households are recruited to panels through a series of mailings and subsequently by telephone follow-ups to non-responders when possible. Once an individual agrees to be in a panel of Knowledge Networks, they are provided with access to the Internet and computer hardware if needed, and data collection by Knowledge Networks occurs via the Internet. Multiple health-related studies have substantiated the validity of such methods for obtaining data from nationally representative samples of the U.S. population [30–35].

For the NSSHB, to further correct sources of sampling and non-sampling error, study samples were corrected with post-stratification adjustments using demographic distributions from the most recent data (at the time of the study) available from the Current Population Survey, the monthly population survey conducted by the U.S. Bureau of the Census considered to be the standard for measuring demographic and other trends in the United States. These adjustments resulted in a panel base weight that was employed in a probability-proportional-to-size selection method for establishing the samples for this study. Population specific distributions for this study were based upon data from the December 2008 Current Population Survey [36].

Once the sample frame for this study was established, all adult individuals within that frame received a recruitment message from Knowledge Networks that provided a brief description of the NSSHB and invited them to participate. The data

presented in this article are limited to the descriptions of the most recent sexual event from 1,770 adult (age ≥ 18 years) men (N = 944) and women (N = 826) who were sexually active during the past year, whose most recent partnered sexual event included PVI, and who reported that they were not intentionally trying to conceive at the time of the sexual event. All study protocols were approved by the institutional review board of the primary author's academic institution.

Main Outcome Measures

Condom Use

The main outcome measure was condom use/non-use at any point during the most recent PVI.

Event Characteristics

Partner status or the nature of the relationship with the sexual partner was coded as follows: (1) relationship partner (spouse or domestic partner; boyfriend, girlfriend or significant other); (2) casual/dating partner (someone I am casually dating/hanging out with); (3) friend; (4) new acquaintance (someone I just met), or (5) transactional (someone who paid me or gave me something for sex; someone who I paid or gave something to for sex). Partner history in previous 6 months was assessed by asking participants "whether you knew that the partner had engaged in sex (vaginal, oral, or anal sex) with people other than yourself within the 6 months before you two engaged in sexual activities together." The three response options were: knowing the person did, or did not, have other partners, or not knowing. Participants reported whether other contraceptives (not including condoms) were used with the options of: (i) hormonal (birth control pill, NuvaRing, or birth control patch; birth control shot or implant); (ii) barrier or IUD (diaphragm, cervical cap, spermicidal gel, jelly, or foam); (iii) natural (withdrawal, rhythm method or other natural family planning method); (iv) "other," or (v) "none (we did not use any of these)."

The location of the sexual encounter was assessed, with responses including: (i) participant's home; (ii) sex partner's home; (iii) a friend's home; (iv) hotel/motel; and (v) other (a public space, e.g., restroom, park, beach, video arcade; fraternity house, sorority house, or dorm room; sex club or swinger's club; other). The previous number of PVI events with this person was measured as: (i) first time intercourse with this person, (ii) once before, (iii) several times before (2–10 times); or (iv) many times (more than 10 times). Alcohol and marijuana use were assessed by asking participants to indicate whether they, their partner, or both of them were drinking alcohol or smoking marijuana (weed) around the time of this sexual event (measured separately). Men were asked whether (yes, no, unsure) they were "using any medications designed to help you attain or maintain an erection (such as Viagra, Cialis, Levitra, etc.)?"

Evaluation of the Sexual Aspects of the Experience

The sexual aspects of the experience that served as secondary outcome measures were assessed by asking: (1) how pleasurable this most recent sexual event was; (2) how sexually aroused they felt; (3) to what extent the act was painful; (4) whether they had an orgasm; and (5) perceptions of whether their sexual partner had an orgasm. The rating scales for 1–3 were: not at all, a little, moderately, quite a bit, or extremely. Each orgasm item was assessed with responses of yes, no, or not sure. Also, men were asked how difficult it was to maintain their erection and women were asked how difficult it was to become lubricated ("wet") during the sexual encounter (extremely difficult, very difficult, difficult, slightly difficult, or not difficult).

Data Analysis

Separate analyses were conducted for men and women. All analyses were conducted using SPSS version 17.0 (SPSS Inc, Chicago, IL, USA). Post-stratification data weights were used during all analyses in order to maximize the generalizablity of the sample characteristics to the population. Post-stratification adjustments were based upon current U.S. Census data on national distributions for age, race, gender, Hispanic ethnicity, education and location within the United States. Descriptive statistics were used to calculate the percentage of condom use by sociodemographic variables, event characteristics, and evaluation of the sexual aspects of the experience. Sociodemographic and event characteristic variables, including age, were categorized as indicated in Tables 1 and 2, respectively, to permit calculation of corresponding odds ratios. Approximate 95% percent confidence intervals were calculated around the percentages using Adjusted Wald methods. Logistic regression was used to assess the likelihood of condom use as function of the participant's sociodemographic characteristics (Table 1). Subsequently, condom use was assessed in light of event characteristics (Table 2) using sexual partner status, age, and race/

Table 1 Weighted participant sociodemographic distribution by condom use at last event (N = 1,770)

		Males				Females		
		No condom used	Condom used	Condom used vs. no condom used		No condom used	Condom used	Condom used vs. no condom used
Characteristics	% (N)	% (95% CI)		Odds ratio (95% CI)	% (N)	% (95% CI)		Odds ratio (95% CI)
Age								
18–24 (ref)	12.3% (115)	57.4% (48.3%–66.1%)	42.6% (33.9%–51.7%)		10.9% (90)	63.3% (53.0%–72.5%)	36.7% (27.5%–47.0%)	
25–29	15.9% (149)	67.1% (59.2%–74.1%)	32.9% (25.9%–40.8%)	1.52 (0.92–2.52)	23.0% (189)	71.4% (64.6%–77.4%)	28.6% (22.6%–35.4%)	1.42 (0.83–2.42)
30–39	20.0% (187)	66.8% (59.8%–73.2%)	33.2% (26.8%–40.2%)	1.49 (0.92–2.41)	19.6% (161)	78.0% (71.0%–83.7%)	22.4% (16.6%–29.5%)	2.00* (1.13–3.53)
40–49	22.1% (207)	74.9% (68.6%–80.3%)	25.1% (19.7%–31.4%)	2.21**** (1.36–2.60)	22.0% (181)	85.1% (79.1%–89.6%)	14.9% (10.4%–20.9%)	3.25**** (1.80–5.89)
50–59	15.8% (148)	85.8% (79.2%–90.6%)	14.2% (9.4%–20.8%)	4.53**** (2.50–8.21)	14.0% (115)	82.6% (74.6%–88.5%)	17.4% (11.5%–25.4%)	2.75*** (1.44–5.26)
60–69	10.2% (96)	93.8% (86.8%–97.4%)	6.3% (2.7%–13.3%)	11.60**** (4.62–29.09)	8.4% (69)	84.1% (73.5%–91.1%)	15.9% (8.9%–26.5%)	3.14*** (1.44–6.87)
70+	3.7% (35)	91.4% (76.8%–97.8%)	8.6% (2.2%–23.2%)	8.35**** (2.36–29.51)	2.2% (18)	100.0% (79.3%–103.1%)	0.0% (3.1%–20.7%)	
Education								
Less than high school (ref)	12.1% (113)	72.6% (63.7%–80.0%)	27.4% (20.0%–36.3%)		10.3% (85)	81.2% (71.5%–88.2%)	18.8% (11.8%–28.5%)	
High school or GED	30.8% (288)	78.5% (73.4%–82.9%)	21.5% (17.1%–26.6%)	1.38 (0.84–2.27)	26.4% (217)	78.3% (72.3%–83.3%)	27.1% (21.6%–33.4%)	0.84 (0.45–1.57)
Some college or associates degree	26.4% (247)	76.9% (71.2%–81.7%)	23.1% (18.3%–28.8%)	1.27 (0.76–2.10)	33.5% (275)	80.4% (75.3%–84.7%)	19.6% (15.3%–24.7%)	0.94 (0.51–1.75)
College degree or higher	30.8% (288)	68.8% (63.2%–73.9%)	31.3% (26.2%–36.9%)	0.83 (0.51–1.34)	29.8% (245)	74.7% (68.9%–79.7%)	25.3% (20.3%–31.1%)	0.69 (0.37–1.27)
Race/ethnicity								
White (ref)	69.4% (650)	78.0% (74.7%–81.0%)	22.0% (19.0%–25.3%)		69% (568)	79.9% (76.4%–83.0%)	20.1% (17.0%–23.6%)	
Black	10.2% (96)	66.7% (56.8%–75.3%)	33.3% (24.7%–43.2%)	0.56* (0.35–0.89)	11.3% (93)	64.5% (54.4%–73.5%)	35.5% (26.5%–45.6%)	0.45**** (0.28–0.72)
Hispanic/Latino	14.0% (131)	62.6% (54.1%–70.4%)	37.4% (29.6%–45.9%)	0.47**** (0.31–0.69)	14.0% (115)	80.0% (71.7%–86.3%)	20.0% (13.7%–28.3%)	1.02 (0.62–1.69)
Other	6.4% (60)	71.7% (59.2%–81.6%)	28.3% (18.4%–40.8%)	0.72 (0.40–1.29)	5.7% (47)	78.7% (64.9%–88.2%)	21.3% (11.8%–35.1%)	0.94 (0.45–1.95)
Sexual orientation								
Heterosexual (ref)	99.1% (924)	74.4% (71.5%–77.1%)	25.6% (22.9%–28.5%)		95.9% (787)	78.1% (75.1%–80.9%)	21.9% (19.1%–24.9%)	
Homosexual/gay	0.0% (0)	0.0% (0.0%–100.0%)	0.0% (0.0%–100.0%)		0.1% (1)	0.0% (3.9%–83.3%)	100.0% (16.7%–103.9%)	
Bisexual	0.9% (8)	66.7% (33.5%–89.0%)	33.3% (11.0%–66.5%)	0.68 (0.20–2.29)	4.0% (33)	78.8% (62.0%–89.6%)	21.2% (10.4%–38.0%)	1.04 (0.44–2.42)
Asexual	0.0% (0)	0.0% (0.0%–100.0%)	0.0% (0.0%–100.0%)		0.0% (0)	0.0% (0.0%–100.0%)	0.0% (0.0%–100.0%)	
Other	0.0% (0)	0.0% (0.0%–100.0%)	0.0% (0.0%–100.0%)		0.0% (0)	0.0% (0.0%–100.0%)	0.0% (0.0%–100.0%)	
Health status								
Fair to poor (ref)	9.0% (84)	70.2% (59.7%–79.0%)	29.8% (21.0%–40.3%)		8.3% (68)	77.9% (66.6%–86.2%)	22.1% (13.8%–33.4%)	
Excellent to good	91.0% (853)	74.7% (71.7%–77.5%)	25.3% (22.5%–28.3%)	1.27 (0.78–2.07)	91.7% (755)	78.1% (75.0%–80.9%)	21.9% (19.1%–25.0%)	0.99 (0.54–1.82)
Nature of sexual partner during sexual event								
Relationship partner (ref)	57.9% (526)	86.7% (83.5%–89.3%)	13.3% (10.7%–16.5%)		55.8% (448)	86.2% (82.7%–89.1%)	13.8% (10.9%–17.3%)	
Casual/dating partner	20.3% (184)	75.0% (68.3%–80.7%)	25.0% (19.3%–31.7%)	0.45**** (0.30–0.69)	26.9% (216)	69.0% (62.5%–74.8%)	31.0% (25.2%–37.5%)	0.35**** (0.24–0.52)
Friend	11.1% (101)	50.5% (40.9%–60.1%)	49.5% (39.9%–59.1%)	0.16**** (0.10–0.25)	10.1% (81)	65.4% (54.5%–74.9%)	34.6% (25.1%–45.5%)	0.30**** (0.18–0.51)
New acquaintance	8.4% (76)	44.7% (34.0%–55.9%)	55.3% (44.1%–66.0%)	0.12**** (0.07–0.21)	6.7% (54)	63.0% (49.6%–74.6%)	37.0% (25.4%–50.4%)	0.27**** (0.15–0.50)
Transactional	2.3% (21)	19.0% (7.0%–40.5%)	81.0% (59.5%–93.0%)	0.03**** (0.01–0.11)	0.5% (4)	50.0% (15.0%–85.0%)	50.0% (15.0%–85.0%)	0.18 (0.03–1.11)

*$P \leq 0.05$, **$P \leq 0.01$, ***$P \leq 0.005$, ****$P \leq 0.001$.
CI = confidence interval; GED = General Educational Development.

Table 2 Weighted condom use by event description, stratified by gender

		Males				Females		
		No condom used	Condom used	Condom used vs. no condom used†		No condom used	Condom used	Condom used vs. no condom used†
Description of last vaginal sexual event by condom use	% (N)	% (95% CI)		Adjusted odds ratio (95% CI)	% (N)	% (95% CI)		Adjusted odds ratio (95% CI)
Location of sexual encounter								
Participant's home (ref)	76.1% (712)	78.9% (75.7%–81.7%)	21.1% (18.3%–24.3%)		77.8% (637)	81.3% (78.1%–84.1%)	18.7% (15.9%–21.9%)	
Partner's home	13.2% (123)	62.6% (53.8%–70.7%)	37.4% (29.3%–46.2%)	0.9 (0.53–1.54)	13.7% (112)	65.2% (56.0%–73.4%)	34.8% (26.6%–44.0%)	0.77 (0.46–1.29)
A friend's home	1.3% (12)	41.7% (19.3%–68.1%)	58.3% (31.9%–80.7%)	0.49 (0.13–1.87)	1.8% (15)	53.3% (30.1%–75.2%)	46.7% (24.8%–69.9%)	0.41 (0.14–1.23)
Hotel/motel	5.5% (51)	52.9% (39.5%–65.9%)	47.1% (34.1%–60.5%)	0.62 (0.31–0.18)	4.8% (39)	69.2% (53.5%–81.5%)	30.8% (18.5%–46.5%)	0.81 (0.37–1.78)
Other	4.0% (37)	59.5% (43.5%–73.7%)	40.5% (26.3%–56.5%)	0.18 (0.72–5.76)	2.0% (16)	87.5% (62.7%–97.8%)	12.5% (2.2%–37.3%)	2.11 (0.49–9.08)
Prior sexual intercourse with partner								
First sexual intercourse (ref)	5.1% (48)	20.8% (11.5%–34.4%)	79.2% (65.6%–88.5%)		3.3% (27)	40.7% (24.4%–59.3%)	59.3% (40.7%–75.6%)	
Second sexual intercourse	2.9% (27)	40.7% (24.4%–59.3%)	59.3% (40.7%–75.6%)	1.25 (0.39–3.98)	2.6% (21)	61.9% (40.8%–79.3%)	38.1% (20.7%–59.2%)	3.03 (0.84–10.86)
Third to 10th sexual intercourse	11.3% (106)	47.2% (38.0%–56.6%)	52.8% (43.4%–62.0%)	1.48 (0.57–3.84)	7.5% (61)	72.1% (59.7%–81.9%)	27.9% (18.1%–40.3%)	4.80** (1.57–14.61)
More than 10	80.6% (753)	82.7% (79.8%–85.2%)	17.3% (14.8%–20.2%)	3.38** (1.33–8.57)	86.7% (708)	80.6% (77.5%–83.3%)	19.4% (16.7%–22.5%)	4.77*** (1.73–13.13)
Knowledge of partner sexual history with others past 6 months								
Known no other partners (ref)	70.9% (663)	83.3% (80.3%–86.0%)	16.7% (14.0%–19.7%)		68.3% (561)	80.9% (77.4%–83.9%)	19.1% (16.1%–22.6%)	
Known other partner history	14.5% (136)	50.7% (42.4%–59.0%)	49.3% (41.0%–57.6%)	0.83 (0.55–1.62)	17.4% (143)	80.4% (73.1%–86.1%)	19.6% (13.9%–26.9%)	2.02** (1.18–3.48)
Unknown partner history	14.5% (136)	54.4% (46.0%–62.5%)	45.6% (37.5%–54.0%)	0.69 (0.41–1.19)	14.3% (117)	61.5% (52.4%–69.8%)	38.5% (30.2%–47.6%)	0.70 (0.43–1.14)
Other contraceptive use								
None (ref)	61.8% (557)	71.1% (67.2%–74.7%)	28.9% (25.3%–32.8%)		56.1% (447)	75.4% (71.2%–79.2%)	24.6% (20.8%–28.8%)	
Hormonal (e.g., birth control pill)	20.1% (181)	74.0% (67.1%–79.9%)	26.0% (20.1%–32.9%)	2.42**** (1.50–3.93)	23.1% (184)	74.5% (67.7%–80.3%)	25.5% (19.7%–32.3%)	1.83** (1.15–2.92)
Barrier or IUD (e.g., foam, etc.)	3.6% (32)	87.5% (71.3%–95.6%)	12.5% (4.4%–28.7%)	4.54** (1.38–14.96)	3.6% (29)	93.1% (77.0%–99.1%)	6.9% (0.9%–23.0%)	4.47* (0.98–20.34)
Natural (e.g., withdrawal)	7.8% (70)	78.6% (67.5%–86.7%)	21.4% (13.3%–32.5%)	4.29 (2.06–8.94)	7.7% (61)	83.6% (72.2%–91.0%)	16.4% (9.0%–27.8%)	2.32* (1.08–5.01)
Other contraceptive (e.g., Surgical)	6.8% (61)	91.8% (81.8%–96.8%)	8.2% (3.2%–18.2%)	8.25**** (2.77–24.61)	9.5% (76)	90.8% (81.9%–95.7%)	9.2% (4.3%–18.1%)	3.67*** (1.55–8.71)
Alcohol use								
No alcohol use (ref)	78.4% (735)	77.4% (74.2%–80.3%)	22.6% (19.7%–25.8%)		80.5% (664)	78.5% (75.2%–81.5%)	21.5% (18.5%–24.8%)	
Participant alcohol use	4.8% (45)	60.0% (45.4%–73.0%)	40.0% (27.0%–54.6%)	0.99 (0.42–2.33)	3.9% (32)	81.3% (64.4%–91.5%)	18.8% (8.6%–35.7%)	1.77 (0.65–4.79)
Partner alcohol use	2.7% (25)	52.0% (33.5%–70.0%)	48.0% (30.0%–66.5%)	0.52 (0.18–1.50)	3.2% (26)	80.8% (61.7%–92.0%)	19.2% (8.0%–38.3%)	1.45 (0.50–4.19)
Both alcohol use	14.1% (132)	65.2% (56.7%–72.8%)	34.8% (27.2%–43.3%)	1.05 (0.63–1.74)	12.5% (103)	73.8% (64.5%–81.4%)	26.2% (18.6%–35.5%)	1.05 (0.61–1.79)
Marijuana use								
No marijuana use (ref)	93.5% (875)	75.2% (72.2%–77.9%)	24.8% (22.1%–27.8%)		95.5% (785)	78.0% (75.0%–80.8%)	22.0% (19.2%–25.0%)	
Participant marijuana use	3% (28)	57.1% (39.0%–73.5%)	42.9% (26.5%–61.0%)	0.72 (0.21–2.46)	0.9% (7)	85.7% (46.6%–99.5%)	14.3% (0.5%–53.4%)	2.56 (0.28–23.11)
Partner marijuana use	2% (2)	0.0% (5.2%–71.0%)	100.0% (29.0%–105.2%)		1.9% (16)	87.5% (62.7%–97.8%)	12.5% (2.2%–37.3%)	5.96* (1.06–33.48)
Both marijuana use	3.3% (31)	71.0% (53.3%–84.1%)	29.0% (15.9%–46.7%)	0.95 (0.37–2.42)	1.7% (14)	71.4% (44.9%–88.6%)	28.6% (11.4%–55.1%)	0.75 (0.23–2.45)
Erection medication use								
No ED medication (Ref)	92.6% (865)	73.2% (70.1%–76.0%)	26.8% (24.0%–29.9%)					
ED medication use	7.4% (69)	87.0% (76.9%–93.2%)	13.0% (6.8%–23.1%)	0.73 (0.27–2.00)				

*$P \leq 0.05$, **$P \leq 0.01$, ***$P \leq 0.005$, ****$P \leq 0.001$.
†Adjusted odds ratios are based on a logistic regression including the partner status, age, and ethnicity as covariates.
CI = confidence interval; ED = erectile dysfunction.

Table 3 Weighted stepwise logistic regression on condom use, stratified by gender

Description of last vaginal sexual event by condom use	Males			Females		
	Adjusted odds ratio†	(95% CI)	*P*	Adjusted odds ratio†	(95% CI)	*P*
Location of sexual encounter						
Participant's home (ref)	—	—	—	—	—	—
Partner's home	—	—	—	—	—	—
A friend's home	—	—	—	—	—	—
Hotel/motel	—	—	—	—	—	—
Other	—	—	—	—	—	—
Prior sexual intercourse with partner						
First sexual intercourse (ref)						
Second sexual intercourse	1.14	(0.29–4.43)	0.85	4.50	(1.07–18.88)	0.04
Third to 10th sexual intercourse	1.56	(0.51–4.75)	0.44	9.77	(2.73–34.97)	<0.001
Over 10th Sexual Intercourse	4.85	(1.64–14.40)	≤0.005	7.09	(2.25–22.36)	<0.001
Partner history—6 months						
Known no other partner history (ref)	—	—	—			
Known other partner history	—	—	—	0.46	(0.25–0.84)	0.01
Unknown partner history	—	—	—	0.35	(0.18–0.69)	≤0.005
Other contraceptive use						
None (ref)						
Hormonal (e.g., birth control pill)	2.39	(1.45–3.94)	<0.001	1.99	(1.20–3.28)	0.01
Barrier or IUD (e.g., foam, etc.)	4.73	(1.37–16.32)	0.01	8.42	(1.08–65.54)	0.04
Natural (e.g., withdrawal)	4.16	(1.93–8.94)	<0.001	2.42	(1.09–5.39)	0.03
Other contraceptive (e.g., surgical)	8.54	(2.68–27.23)	<0.001	3.49	(1.45–8.38)	≤0.005
Alcohol use						
No alcohol use (ref)	—	—	—	—	—	—
Participant alcohol use	—	—	—	—	—	—
Partner alcohol use	—	—	—	—	—	—
Both alcohol use	—	—	—	—	—	—
Marijuana use						
No marijuana use (ref)						
Participant marijuana use	0.92	(0.21–4.01)	0.92	5.18	(0.37–72.88)	0.22
Partner marijuana use				13.21	(1.96–89.15)	0.01
Both marijuana use	1.33	(0.49–3.62)	0.58	0.71	(0.20–2.55)	0.60
Erection medication use						
ED medication use	—	—	—			

—Ellipses indicate that the variable did not enter the model.
†Adjusted odds ratios are based on a forward stepwise logistic regression including the partner status, age, and ethnicity as covariates.
CI = confidence interval; ED = erectile dysfunction.

ethnicity (the sociodemographic variables attaining bivariate significance) as covariates. To evaluate the relative contributions of the event characteristics a forward stepwise logistic regression was conducted with the sociodemographic covariates (Table 3). Subsequently, the relationships between condom use as a predictor and evaluations of the sexual aspects of the experience as outcomes were tested using logistic regression models with sociodemographic covariates (Table 4). Given the highly skewed distributions of these evaluations, these data were dichotomized as indicated in the categorizations listed in Table 4.

Results

Characteristics of the Sample

The mean age for men and women was 41.50 (standard deviation [SD] = 14.82) and 39.80 (SD = 13.76), respectively. At last PVI, 25.7% (N = 241) of men and 21.8% (N = 180) of women reported having used condoms. Table 1 presents the distributions of sociodemographic variables for men and women overall. The majority of the sample was white (69% men, 69% women), had at least some college education (57% men, 63% women), and reported good to excellent health (91% men, 92% women). Almost all participants identified as heterosexual (99% men, 96% women). More than half reported that the sexual partner for this event was a relationship partner (58% men, 56% women); about 1/3 reported a casual/dating partner or friend (31% men, 37% women).

Associations with Condom Use

Sociodemographic Variables

Table 1 also displays the adjusted percentages for condom use and non-use by gender and results

Table 4 Weighted event experience by condom use, stratified by gender

	Males			Females		
	No condom used	Condom used	No condom used (ref) vs. condom used†	No condom used	Condom used	No condom used (ref) vs. condom used‡
Experience of last vaginal sexual event by condom use	% (95% CI)		adjusted odds ratio (95% CI)	% (95% CI)		adjusted odds ratio (95% CI)
Pleasure						
Respondent no.	696	241		640	180	
Extreme (ref)	53.7% (50.0%–57.4%)	43.6% (37.5%–49.9%)		35.5% (31.9%–39.3%)	39.4% (32.6%–46.7%)	
Quite a bit to not at all	46.3% (42.6%–50.0%)	56.4% (50.1%–62.5%)	1.20 (0.84–1.71)	64.5% (60.7%–68.1%)	60.6% (53.3%–67.4%)	0.93 (0.65–1.34)
Arousal						
respondent no.	692	238		638	180	
Extreme (ref)	54.9% (51.2%–58.6%)	42.9% (36.8%–49.3%)		34.2% (30.6%–38.0%)	40.0% (33.1%–47.3%)	
Quite a bit to not at all	45.1% (41.4%–48.8%)	57.1% (50.7%–63.2%)	1.41 (0.98–2.02)	65.8% (62.0%–69.4%)	60.0% (52.7%–66.9%)	0.88 (0.61–1.25)
Erection/lubrication difficulty						
respondent no.	692	241		642	180	
No difficulty (ref)	79.6% (76.4%–82.4%)	83.8% (78.6%–87.9%)		61.1% (57.3%–64.8%)	63.3% (56.0%–70.0%)	
Slightly to extreme difficulty	20.4% (17.6%–23.6%)	16.2% (12.1%–21.4%)	0.70 (0.42–1.17)	38.9% (35.2%–42.7%)	36.7% (30.0%–44.0%)	1.18 (0.82–1.72)
Pain						
respondent no.	689	241		637	180	
No pain (ref)	95.9% (94.1%–97.2%)	95.9% (92.5%–97.9%)		70.3% (66.6%–73.7%)	71.7% (64.7%–77.8%)	
A little to extreme pain	4.1% (2.8%–5.9%)	4.1% (2.1%–7.5%)	1.17 (0.50–2.74)	29.7% (26.3%–33.4%)	28.3% (22.2%–35.3%)	0.85 (0.58–1.26)
Participant orgasm						
respondent no.	686	241		620	171	
Orgasm (ref)	95.6% (93.8%–96.9%)	94.6% (90.9%–96.9%)		65.5% (61.7%–69.1%)	64.9% (57.5%–71.7%)	
No orgasm	4.4% (3.1%–6.2%)	5.4% (3.1%–9.1%)	0.46 (0.18–1.15)	34.5% (30.9%–38.3%)	35.1% (28.3%–42.5%)	0.91 (0.62–1.33)
Partner orgasm						
Respondent no.	603	205		616	175	
Orgasm (ref)	88.6% (85.8%–90.9%)	90.2% (85.3%–93.6%)		93.5% (91.3%–95.2%)	94.9% (90.4%–97.4%)	
No orgasm	11.4% (9.1%–14.2%)	9.8% (6.4%–14.7%)	1.18 (0.63–2.22)	6.5% (4.8%–8.7%)	5.1% (2.6%–9.6%)	0.61 (0.28–1.35)

*$P \leq 0.05$, **$P \leq 0.01$, ***$P \leq 0.005$, ****$P \leq 0.001$.
†Adjusted odds ratios are based on a logistic regression including the partner status, age, ethnicity, and erectile dysfunction medication use as covariates.
‡Adjusted odds ratios are based on a logistic regression including the partner status, age, and ethnicity as covariates.
CI = confidence interval.

from the logistic regression models predicting condom non-use by each sociodemographic variable. Age ($P \leq 0.001$), race/ethnicity ($P < 0.01$), and partner relationship ($P < 0.001$) were significantly related to the likelihood of condom use during most recent PVI. Condom use was significantly less likely among men 40 years or older (all % ≤ 25, all $P \leq 0.001$) and women 30 years or older (all % ≤ 22, all $P \leq 0.005$) compared with 18- to 24-year olds (43% men, 37% women). Condom use was significantly more likely for black men (33%, $P \leq 0.05$) and women (36%, $P \leq 0.001$) and Hispanic/Latino men (37%, $P \leq 0.001$) compared with whites (22% men, 20% women). Condom use was also significantly more likely for men (all % ≥ 25, all $P \leq 0.001$) and women (all % ≥ 31, all $P \leq 0.001$) who reported sex with a casual/dating partner, friend, or new acquaintance and men with transactional partners (81%, $P \leq 0.001$) compared with those reporting a relationship partner (13% men, 14% women), education, as well as sexual orientation and health status with their limited variability in the sample, were not associated with condom use.

Event Characteristics

Table 2 shows the relationships between event characteristics and condom use. Seventy-one percent of men and 68% of women reported that they knew their partner had not had any other sexual partners in the 6 months prior to this sexual event. Of these, 17% of men and 19% of women used a condom. This variable was related to condom use for both men and women at the bivariate level with male participants who knew that their partner had no other sexual partners within the previous 6 months reporting a lower likelihood of condom use and female participants who were unaware of their partner's sexual history reporting a significantly higher likelihood of condom use. However, after adjusting for the other sociodemographic variables in the model, the multivariate model (as presented in Table 2) inverted the bivariate findings because of the relationship between sexual partner history, relationship status, and age (all $P \leq 0.001$). After adjusting for these variables, partner history emerged as a significant predictor of condom use for women, but not for men. Condom use became significantly less likely ($P \leq 0.01$) for women who knew that their partner had other sexual partners in the 6 months prior to the event as compared with women reporting there had been no other partners.

Most men (62%) and women (68%) indicated that they did not use any other form of contraception (independent of whether or not they used a condom). Of these, 29% of men and 25% of women used a condom. In these analyses with age, partner status, and race/ethnicity used as covariates, men and women who reported other forms of contraception were significantly less likely to have used a condom (all % ≤ 26; $P \leq 0.05$). However, as described below (Table 3), in stepwise regression analyses with the other event characteristics added to the model other contraceptive use attains significance for both women and men. For both genders, this was specifically related to using hormonal methods, natural methods, or "other" methods. The relationship between condom use and barrier methods met significance criterion for men and was borderline for women ($P = 0.053$).

About three-quarters of the sample reported that their most recent PVI occurred in their own homes (76% men, 78% women). Of these, 21% of men and 19% of women used a condom. After adjusting for other variables, the location of the sexual act was not a significant predictor of condom use.

Eighty-one percent of men and 87% of women reported having had more than ten prior intercourse experiences with the partner during the event; this was the first intercourse experience with the partner for 5% of men and 3% of women. Of these for whom it was a first intercourse event, 21% of men and 41% of women used a condom. Those having more than ten previous intercourse experiences were significantly less likely to use a condom (17% men $P \leq 0.01$, 19% women $P \leq 0.005$). For women, but not for men, those with three to ten previous intercourse experiences with this partner also were significantly less likely to have used a condom (28%, $P \leq 0.01$) compared with those with no previous intercourse with this partner.

Twenty-two percent of men and 20% of women reported alcohol use in association with their last PVI. Less than 10% reported marijuana use (7% men, 5% women) at most recent PVI. Use of alcohol and marijuana was generally not found to be associated with condom use, with one exception. Women reporting that their partner used marijuana were significantly less likely to report condom use (13%, $P \leq 0.05$) compared with those reporting no marijuana use (22%) For men, use of erection medications (7.4%) was not found to be associated with condom use.

Table 3 summarizes the key event characteristic predictors of condom use using stepwise regression. Acceptable models were found for both men (accounting for 42.4% of the variance and correctly predicting 81.8% of cases) and women (accounting for 22.9% of the variance and correctly predicting 79.4% of cases). For both genders, fewer previous intercourse experiences with the partner and not using other contraceptives remained significant predictors of condom use. The model for women also included whether she knew that her partner had sex with someone else in the 6 months prior to their first sexual activity together and partner marijuana use at most recent PVI.

Evaluation of the Sexual Aspects of the Experience

As can be seen in Table 4, condom use was not a significant predictor of ratings of pleasure, arousal, erection/lubrication difficulty, or pain, and whether orgasm occurred for the participant or their partner.

Discussion

In this nationally representative probability sample of adults, 25.7% of men and 21.8% percent of women used condoms during their most recent PVI event within the past 12 months. Condom-protected PVI was significantly associated with younger ages, black or Hispanic race/ethnicity, and having sex with a nonrelationship partner. Statistically adjusting for these sociodemographic differences and other event characteristics, condom use was associated with a fewer number of previous intercourse experiences with the partner and not using other forms of contraception for both men and women. For women, condom use was additionally associated with reporting that they knew that, or were unsure whether, their sexual partner had other sexual partners in the 6 months prior to the sexual event. Perhaps women are more likely than men to perceive potential STI risk from such partners and perceiving such risk may influence male condom use. Women were less likely to report condom use when their partner used marijuana around the time of the intercourse event perhaps reflecting less ability to influence condom use under such circumstances. Sexual aspects of the experience were evaluated similarly regardless of whether or not a condom was used.

Alcohol use was not correlated with condom use. Although it is often assumed that alcohol use increases the likelihood of unprotected intercourse, a number of studies [18–22] have failed to confirm a correlation or found a correlation only in specific relational contexts. Some report that expectancies about the sexual disinhibiting effect of alcohol, rather than alcohol use itself, is associated with the probability of condom use [37,38]. The association between marijuana and condom use also appears to be complex [21]. In our study, marijuana use was generally not associated with a lack of condom use except among women whose partner used marijuana. Marijuana use was retained in the final multivariate stepwise logistic regression suggesting it may play a role for both men and women in the context of other factors. Therefore, condom use intervention programs that discuss alcohol and marijuana use as risk factors for unprotected sex may need to do so in a nuanced manner helping the individual to evaluate the patterns of his/her own use and not assuming that reducing alcohol and marijuana use in association with sexual activity will improve condom use rates. More work will also be necessary to continue to understand relations between the use of erectile medications and condom use among both recreational users and those for whom such medications may be medically prescribed for chronic erectile challenges [39,40].

Consistent with other studies (e.g., [12]), age was negatively associated with condom use. The higher rates of condom use among young people suggest the success of public health efforts that highlight the potential risks of STI/HIV infection and the efficacy of condoms in protecting against them. On average, young people are less likely than older individuals to be in long-term, sexually exclusive relationships and more likely to be having sexual activity with new partners. Therefore, STI risk is higher among young people and their desire to prevent unintended pregnancy may be stronger than that of older persons. Although many older individuals are at lower risk for STI infection or pregnancy, many find themselves dating again following divorce, separation or partner loss or deal with sexual non-exclusivity even in long-term relationships. More efforts may be needed to educate older individuals regarding STI risks and the benefits of condom use in such situations and, when relevant, unintended pregnancy. Another article focused on the sexual behavior, condom use, and sexual health of Americans over 50 years from the NSSHB has assessed such issues [41].

Those in more established relationships are less likely to use condoms [13–15]. Relationship variables associated with condom use in this study

were: the nature of the relationship and number of previous intercourse experiences with the person; and, for women, whether the partner had had other sexual partners in the 6 months previous to their first sexual activity together. Confirming other studies [15–17] the use of other contraceptives was associated with lower probability of condom use. As relationships continue, condom use is often discontinued and other contraceptives methods adopted as concern for STI diminish, but contraceptive needs continue. However, even established relationships are not free from STI risk given the possibility of extra-relational sexual contacts. Condom use promotion programs may be enhanced by emphasizing the benefits of prolonging condom use as relationships continue [14].

The higher rates of condom use found among black and Hispanic participants suggest that condom use promotion programs targeted at these groups have had an impact. As the majority reported that their last intercourse was not condom-protected and blacks and Hispanics are disproportionally affected by HIV/AIDS and other STI [42–44], there remains room for improvement. Certainly not all acts of intercourse present risk for STI/HIV or unintended pregnancy, but it is likely that many intercourse acts did present such risk given the high rates of STI/HIV infection in these communities. Therefore, programs designed for minority populations remain critical to public health. Given the large numbers of white Americans affected by STI and HIV, efforts to increase the relatively low levels of condom use in this group are also warranted. A more detailed analysis of the sexual health and behaviors of black and Hispanic Americans from the NSSHB is presented in another report [45].

Some may think it is inconsistent that younger people, blacks, and Hispanics were found to have higher rates of condom use, but as groups they also experience higher rates of STI/HIV infections and unintended pregnancy than other groups in the population. However, it is important to note that the majority of last PVI events for these groups were not condom-protected and that many of these unprotected acts may have presented risks for STI/HIV and unintended pregnancy. Additionally, condom protection is not only compromised by inconsistent use (not using condoms for all potentially risky intercourse events) [46], but also by condom use errors (e.g., letting a condom contact a sharp object, late application or early removal of the condom) and problems (e.g., breakage, slippage) [47–55].

Interference with sexual experiences of both men and women are frequently cited as reasons for not using condoms [23–28]. Although more careful examinations of the relationship is needed using within-subjects designs, the current study demonstrates that sexual arousal, pleasure, and orgasm during PVI were not evaluated less positively by those who used condoms compared with those who did not use condoms. Condom promotion programs should address sexual arousal concerns [56,57] and can use these data to help challenge assumptions that condom use necessarily diminishes the sexual experience.

There are both strengths and limitations to this study. Strengths include the expansive range of ages across the adult lifespan, an event-specific analysis, and the specificity with which behaviors and characteristics of the most recent event were assessed. Additionally, these nationally representative data were collected as a result of advances in Internet research methods for such studies, and it may have been the case that men and women were more comfortable reporting behaviors using computerized methods [58] than during other previous nationally representative studies that used an interview methodology with interviews being conducted by female researchers. This study only focused on the most recent sexual event that included sexual intercourse and therefore may not fully capture the typical condom use patterns of individuals across varying sexual situations. A full description of the condom use rates from the NSSHB for both adolescents and adults (aged 14–94 years) over a longer period of time (past ten anal and vaginal events) has been provided in a separate report [59]. Additionally, the analyses presented were limited to condom use during PVI, and further research will be necessary to understand the nature of event-specific condom use during penile–anal intercourse among individuals, both during same and opposite gendered interactions. As with other nationally representative studies of adult sexual behavior, the methods of this study do not allow for an in-depth analysis of behaviors among individuals without an established household, particularly those who were institutionalized or homeless at the time of the study.

Conclusions

Continued efforts to promote condom use are in the interest of public health. Given the higher

condom use rates for youth and minorities, it appears that public health programs aimed at these groups are having a positive effect. Condom use rates may be further improved by promoting condom use among older persons and whites, suggesting prolonging use as relationships develop, and highlighting that condom use does not necessarily interfere with the sexual aspects of the experience.

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Conflict of Interest: Michael Reece is a member of the sexual health advisory council of Church & Dwight Co., Inc.

References

1 Centers for Disease Control. Male latex condoms and sexually transmitted diseases. Available at: http://www.cdc.gov/nchstp/od/condoms.pdf (accessed January 25, 2010).
2 Crosby RA, DiClemente RJ, Wingood GM, Lang D, Harrington KF. The value of consistent condom use: A study of STD prevention among African American adolescent females. Am J Public Health 2003;93:901–2.
3 Gallo MF, Steiner MJ, Warner L, Hylton-Kong T, Figueroa JP, Hobbs MM, Behets FM. Self-reported condom use is associated with reduced risk of chlamydia, gonorrhea, and trichomoniasis. Sex Transm Dis 2007;34:829–33.
4 Rietmeijer CA, Krebs JW, Feorino PM, Judson FN. Condoms as physical and chemical barriers against human immunodeficiency virus. JAMA 1988;259:1851–3.
5 Shlay JC, McClung MW, Patnaik JL, Douglas JM. Comparison of sexually transmitted deisease prevalence by reported level of condom use among patients attending an urban sexually transmitted disease clinic. Sex Transm Dis 2004;31:154–60.
6 Stone KM, Timyan J, Thomas EL. Barrier methods for the prevention of sexually transmitted diseases. In: Holmes KK, Lemon S, Mardh P, Piot P, Sparling PF, Stamm W, Wasserheit J, eds. Sexually transmitted diseases. New York: McGraw Hill; 1999:1307–22.
7 Warner DL, Hatcher RA. Male condoms. In: Hatcher RA, Trussell J, Stewart F, Cates W Jr, Stewart GK, Guest F, Kowal D, eds. Contraceptive technology. 17th edition. New York: Irvington Publishers; 1999:325–52.
8 Centers for Disease Control and Prevention. Health, United States, 2009: With Special Feature on Medical Technology. 2010. Available at http://www.cdc.gov/nchs/data/hus/hus09.pdf#047 (accessed August 6, 2010).
9 Centers for Disease Control and Prevention. Sexually Transmitted Diseases Surveillance, 2008. 2009. Available at http://http://www.cdc.gov/std/stats08/trends.htm (accessed August 6, 2010).
10 Hall HI, Song R, Rhodes P, Prejean J, An Q, Lee LM, Karon J, Brookmeyer R, Kaplan EH, McKenna MT, Janssen RS. Estimation of HIV incidence in the United States. JAMA 2008;300:520–9.
11 Trussell J. The cost of unintended pregnancies in the US. Contraception 2007;75:168–70.
12 Bensyl DM, Iuliano AD, Carter M, Santelli J, Gilbert BC. Contraceptive use—United States and Territories, Behavioral Risk Factor Surveillance System, 2002. MMWR: Surveill Summ 2005;54:1–72.
13 Anderson JE. Condom use and HIV risk among US adults. Am J Public Health 2003;93:912–4.
14 Fortenberry JD, Tu W, Harezlak J, Katz BP, Orr DP. Condom use as a function of time in new and established adolescent sexual relationships. Am J Public Health 2002;92:211–3.
15 Sayegh MA, Fortenberry JD, Shew M, Orr DP. The developmental association of relationship quality, hormonal contraceptive choice and condom non-use among adolescent women. J Adolesc Health 2006;39:388–95.
16 Mosher WD, Martinez GM, Chandra A, Abma JC, Willson SJ. Use of contraception and use of family planning services in the United States: 1982–2002. Adv Data 2004;350:1–36.
17 Woods JL, Shew ML, Tu W, Ofner S, Ott MA, Fortenberry JD. Patterns of oral contraceptive pill-taking and condom use among adolescent contraceptive pill users. J Adolesc Health 2006;39:381–7.
18 Brown JL, Vanable PA. Alcohol use, partner type, and risky sexual behavior among college students: Findings from an event-level study. Addict Behav 2007;32:2940–52.
19 Fortenberry JD, Orr DP, Katz BP, Brizendine EJ, Blythe MJ. Sex under the influence: A diary self-report study of substance use and sexual behavior among adolescent women. Sex Transm Dis 1997;24:313–9.
20 Leigh BC. Alcohol and condom use: A meta-analysis of event-level studies. Sex Transm Dis 2002;29:476–82.
21 Leigh BC, Ames SL, Stacy AW. Alcohol, drugs, and condom use among drug offenders: An event-based analysis. Drug Alcohol Depend 2008;93:38–42.
22 Leigh BC, Vanslyke JG, Hoppe MJ, Rainey DT, Morrison DM, Gillmore MR. Drinking and condom use: Results from an event-based daily diary. AIDS Behav 2008;12:104–12.
23 Adam BD, Husbands W, Murray J, Maxwell J. AIDS Optimism, condom fatigue, or self-esteem? Explaining unsafe sex among gay and bisexual men. J Sex Res 2005;42:2238–48.
24 Albarracin D, Ho R, McNatt PS, Williams WR, Rhodes F, Malotte CK, Hoxworth T, Bolan G, Zenilman J, Iatesta M, The Project RESPECT Study Group. Structure of beliefs about condom use. Health Psychol 2000;19:458–68.
25 Choi KH, Rickman R, Catania JA. What heterosexual adults believe about condoms. *New England*. J Med 1994;33:406–7.
26 Crosby RA, Graham CA, Yarber WL, Sanders SA. If the condom fits, wear it: A qualitative study of young African American men. Sex Transm Infect 2004;80:306–9.
27 Crosby R, Milhausen R, Yarber WL, Sanders SA, Graham CA. Condom "turn offs" among adults: An exploratory study. Int J STD AIDS 2008;19:590–4.
28 Norton TR, Bogart LM, Cecil H, Pinkerton SD. Primacy of affect over cognition in determining adult men's condom-use behavior: A review. J Appl Soc Psychol 2005;35:2493–534.
29 Younge SN, Salazar LF, Crosby RF, DiClemente RJ, Wingood GM, Rose E. Condom use at last sex as a proxy for other measures of condom use: Is it good enough? Adolescence 2008;43:927–31.
30 Herbenick D, Reece M, Sanders SA, Dodge B, Ghassemi A, Fortenberry JD. Prevalence and characteristics of vibrator use by women in the United States: Results from a nationally representative study. J Sex Med 2009;6:1857–66.

31 Reece M, Herbenick D, Sanders SA, Dodge B, Ghassemi A, Fortenberry JD. Prevalence and characteristics of vibrator use by men in the United States. J Sex Med 2009;6:1867–74.
32 Baker L, Wagner TH, Singer S, Bundorf MK. Use of the Internet and e-mail for health care information: Results from a national survey. JAMA 2003;289:2400–6.
33 Heiss F, McFadden D, Winter J. Who failed to enroll in Medicare Part D, and why? Early results. Health Aff (Millwood) 2006;25:344–54.
34 Holman EA, Silver RC, Poulin M, Andersen J, Gil-Rivas V, McIntosh DN. Terrorism acute stress, and cardiovascular health: A 3-year national study following the September 11th attacks. Arch Gen Psychiatry 2008;65:73–80.
35 Silver RC, Holman EA, McIntosh DN, Poulin M, Gil-Rivas V. Nationwide longitudinal study of psychological responses to September 11. JAMA 2002;288:1235.
36 Current Population Survey December 2008. U.S. Census Bureau. 1994 – [cited June 9, 2010]. Available from: http://www.bls.census.gov/ferretftp.htm.
37 Bryan A, Ray LA, Cooper ML. Alcohol use and protective sexual behaviors among high-risk adolescents. J Stud Alcohol Drugs 2007;68:327–35.
38 LaBrie J, Earleywine M, Schiffman J, Pedersen E, Marriot C. Effects of alcohol, expectancies, and partner type on condom use in college males: Event-level analyses. J Sex Res 2005;42:259–66.
39 Korkes F, Costa-Matos A, Gasperini R, Reginato PV, Perez MD. Recreational use of PDE5 inhibitors by young healthy men: Recognizing this issue among medical students. J Sex Med 2008;5:2414–8.
40 Sanders SA, Milhausen RR, Crosby RA, Graham CA, Yarber WL. Do phosphodiesterase type 5 inhibitors protect against condom-associated erection loss and condom slippage. J Sex Med 2009;6:1451–6.
41 Schick V, Herbenick D, Reece M, Sanders SA, Dodge B, Middlestadt S, Fortenberry J. Sexual behavior, condom use, and sexual health of Americans over 50: Implications for sexual health promotion for aging adults. J Sex Med 2010;7(suppl 5):315–29.
42 Centers for Disease Control and Prevention. 2006. African Americans and AIDS. Dept. of Health and Human Services: Atlanta, GA.
43 Centers for Disease Control and Prevention. Sexually transmitted disease surveillance, 2007. U.S. Department of Health and Human Services: Atlanta, GA, 2008.
44 Centers for Disease Control and Prevention. 2010. Diagnoses of HIV infection and AIDS in the United States and Dependent Areas, 2008. Available at: http://www.cdc.gov/hiv/surveillance/resources/reports/2008report/pdf/2008SurveillanceReport.pdf (accessed August 6, 2010).
45 Dodge B, Reece M, Herbenick D, Schick V, Sanders SA, Fortenberry J. Sexual health among U.S. Black and Hispanic men and women: A nationally representative sample. J Sex Med 2010;7(suppl 5):330–45.
46 Hensel DJ, Stupiansky NW, Herbenick D, Dodge B, Reece M. When condom use is not condom use: An event-level analysis of condom use behaviors during vaginal ntercourse. J Sex Med. (in press).
47 Fitch TJ, Stine C, Hanger D, Mann J, Adam MB, McIlhaney J. Condom effectiveness: Factors that influence risk reduction. Sex Transm Dis 2002;29:811–7.
48 Crosby RA, Yarber WL, Sanders SA, Graham CA, McBride K, Milhausen RR, Arno JN. Men with broken condoms: Who and why. Sex Transm Infect 2007;83:71–5.
49 Civic D, Scholes D, Ichikawa L, Grothaus L, McBride CM, Yarnall K, Fish L. Ineffective use of condoms among young women in managed care. AIDS Care 2002;14:779–88.
50 Crosby RA, Sanders SA, Yarber WL, Graham CA. Condom use errors and problems: The neglected aspect of studies assessing condom effectiveness. Am J Prev Med 2003;24:367–70.
51 Crosby R, Yarber WL, Sanders SA, Graham CA, Arno JN. Slips, breaks, and "falls": Condom errors and problems reported by men attending an STI clinic. Int J STD AIDS 2008;19:90–3.
52 Grady W, Tranfer K. Condom breakage and slippage among men in the United States. Fam Plann Perspect 1994;26:107–12.
53 Grimley DM, Annang L, Houser S, Chen H. Prevalence of condom use errors among STD clinic patients. Am J Health Behav 2005;29:324–30.
54 Richters J, Gerofi J, Donovan B. Why do condoms break or slip off in use? An exploratory study. Int J STD AIDS 1995;6:11–8.
55 Sanders SA, Graham CA, Yarber WL, Crosby RA. Condom use errors and problems among young women who put condoms on their male partners. J Am Med Womens Assoc 2003;58:95–8.
56 Graham CA, Crosby RA, Milhausen RR, Sanders SA, Yarber WL. Incomplete use of condoms: The importance of sexual arousal. AIDS Behav 2009; doi: 10.1007/s10461-009-9638-7.
57 Graham CA, Crosby R, Yarber WL, Sanders SA, McBride K, Milhausen RR, Arno JN. Erection loss in association with condom use among young men attending a public STI clinic: Potential correlates and implications for risk behaviour. Sex Health 2006;3:1–6.
58 Turner CF, Miller HG, Rogers SM. Survey measurement of sexual behaviors: Problems and progress. In: Bancroft J, ed. Researching sexual behavior. Bloomington: Indiana University; 1997.
59 Reece M, Herbenick D, Schick V, Sanders SA, Dodge B, Fortenberry J. Condom use rates in a national probability sample of males and females aged 14 to 94 in the United States. J Sex Med 2010;7(suppl 5):266–76.

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