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# Changes in Oral and Anal Sex With Opposite-Sex Partners Among Sexually Active Females and Males Aged 15 to 44 Years in the United States: National Survey of Family Growth, 2011–2019

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**Background:** Oral and anal sex with opposite-sex partners is common and associated with sexually transmitted infection (STI) transmission. Trends in these behaviors over the last decade, during which bacterial STI diagnoses have reached historic highs while HIV diagnoses have decreased, are not well understood. We examined recent trends in oral and anal sex and associated condom use with opposite-sex partners among females and males.

**Methods:** We analyzed data from 16,926 female and 13,533 male respondents aged 15 to 44 years who reported sex with an opposite-sex partner in the past 12 months from the National Survey of Family Growth, 2011–2019. We used survey-weighted linear or logistic regression to evaluate linear temporal trends in oral and anal sex behaviors.

**Results:** From 2011–2013 to 2017–2019, reports of oral sex and number of oral sex partners in the past 12 months increased among females (85.4% in 2011–2013 to 89.4% in 2017–2019; odds ratio [OR], 1.05 [95% confidence interval {CI}, 1.02–1.09], and  $\beta = 0.014$  [95% CI, 0.005–0.023]; respectively) but not males (ranges, 87.9%–89.1%; 1.27–1.31). Condom use at last oral sex decreased among both females and males (6.3%–4.3%: OR, 0.93 [95% CI, 0.88–0.99]; 5.9%–4.4%: OR, 0.95 [95% CI, 0.91–1.00]). Anal sex (ranges, 21.0%–23.3% [females] and 23.3%–24.6% [males]), number of anal sex partners (females, 0.22–0.25; males, 0.26–0.30), and condom use at last anal sex (females, 15.3%–18.2%; males, 27.0%–28.7%) remained stable.

**Conclusions:** The frequency of oral and anal sex with opposite-sex partners among U.S. 15- to 44-year-olds, paired with limited and—*for oral sex*—decreasing condom use, demonstrates the need to understand the role of these behaviors in increasing STI diagnosis rates and the potential role of extragenital screening and condoms in reducing STI transmission.

Oral and anal sex with opposite-sex partners is common among adolescents and adults in the United States,<sup>1,2</sup> and each behavior is associated with transmission of sexually transmitted infections (STIs).<sup>2–4</sup> Reported diagnoses of bacterial STIs have increased over the past decade to historic highs,<sup>5</sup> and the prevalence of gonorrhea infections with antimicrobial resistance or emerging resistance has increased,<sup>5,6</sup> whereas HIV diagnoses have been decreasing in most populations.<sup>7</sup> In addition, adolescents and young adults are disproportionately impacted by STIs, and racial/ethnic disparities are a persistent characteristic of these epidemics.<sup>5,7</sup> The extent to which population-level changes in oral and anal sex behaviors may be contributing to these trends and disparities is unclear.

Comparing cross-sectional analyses from the National Survey of Family Growth (NSFG), a nationally representative survey of adolescents and adults aged 15 to 44 years suggests that lifetime oral sex with opposite-sex partners remained stable or decreased, whereas lifetime anal sex with opposite-sex partners increased among both females and males from 2002 to 2011–2015.<sup>1,8,9</sup> This followed several earlier studies that reported an increasing prevalence of both recent anal and oral sex from the 1990s to early 2000s among urban populations.<sup>10–12</sup> How these behaviors have changed since 2015 and whether these trends vary across demographic groups are less clear. In addition, measuring behaviors over the lifetime (rather than a more recent period) may be less sensitive to changes over time and less relevant to STI transmission. Another recent nationally representative study found that the proportion of both adolescents aged 14 to 17 years and adults

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aged 18 to 49 years who reported having anal sex, giving oral sex, or receiving oral sex in the past year decreased from 2009 to 2018, although gender of partners was not specified.<sup>13</sup>

The Centers for Disease Control and Prevention (CDC) recommends that providers consider extragenital gonorrhea and chlamydia screening for cisgender women based on reported behaviors and site(s) of exposure.<sup>14</sup> No similar recommendations exist for cisgender men who only have sex with women (MSW). Prevalence of extragenital infections is typically low among women and MSW when screened, with the exception of rectal chlamydial infection among women, but most are asymptomatic and many would be missed by urogenital screening alone.<sup>15–19</sup> In addition, recommended treatments can be less efficacious for extragenital infections,<sup>16–19</sup> indicating a need to identify all sites of infection to guide treatment. Furthermore, health care providers often do not conduct comprehensive assessments of patients' sexual histories,<sup>20</sup> limiting the potential effectiveness of exposure- or behavior-based screening. However, the clinical and public health implications of extragenital infections remain unclear, and additional evidence is needed to inform extragenital screening recommendations.

Using data from NSFG, we analyzed temporal trends in oral and anal sex behaviors with opposite-sex partners in the past 12 months from 2011–2019, stratified by sex, age, and race/ethnicity. These analyses aim to inform our understanding of how anal and oral sex may be contributing to the observed trends and persistent disparities in STI diagnoses and the benefit of extragenital STI screening among those who receive (or are in need of) sexual health services.

## METHODS

### Data Source

We conducted secondary analyses of four 2-year public-use data sets from the 2011–2013, 2013–2015, 2015–2017, and 2017–2019 NSFG, which were conducted from September to September in the indicated years. During this data collection period (2011–2019), the survey included a computer-assisted personal interview administered by a trained female interviewer, along with a self-administered section using audio computer-assisted self-interview (ACASI). After a short household screening interview, only one eligible respondent was selected from each household for the NSFG interview. Females and males aged 15 to 44 years through the 2011–2015 survey period and those aged 15 to 49 years in 2015–2019 were independently sampled, with oversampling of adolescents aged 15 to 19 years and non-Hispanic Black and Hispanic people. Sex was based on reported sex ascertained through an interviewer-administered screening question. All respondents provide informed consent (ages,  $\geq 18$  years) or assent after parental permission (ages, 15–17 years). Procedures from the NSFG are approved by the National Center for Health Statistics Research Ethics Review Board and described in detail elsewhere.<sup>21</sup>

### Measures

Outcomes for this analysis were drawn from the ACASI portion of the NSFG interview. Among respondents who reported having had vaginal, oral, or anal sex with an opposite-sex partner in the past 12 months, we analyzed any oral (giving or receiving) or anal sex with an opposite-sex partner in the past 12 months and the number of total, vaginal, oral, and anal sex partners of the opposite sex in the past 12 months. In addition, we examined condom use at last penile-oral sex with an opposite-sex partner among respondents who reported any oral sex with an opposite-sex partner in the past 12 months and either reported ever having given oral sex to a male partner (females) or ever having received oral sex from a female partner (males). We examined condom use at last anal sex with an

opposite-sex partner among those who reported anal sex with an opposite-sex partner in the past 12 months.

## Analyses

We analyzed 2 data sets, 1 for female and 1 for male respondents, combining data across all survey periods from 2011–2019. We limited analyses to respondents aged 15 to 44 years and to those who reported at least 1 opposite-sex partner in the past 12 months to understand how behaviors changed among heterosexually active females and males. We use the term heterosexually active to refer to those with opposite-sex partners, regardless of sexual identity or whether they also have same-sex partners. Respondents who reported at least 1 total opposite-sex partner but zero act-specific partners across all acts (i.e., oral, vaginal, and anal) in the past 12 months were considered not to have had sex with an opposite-sex partner in the past 12 months and excluded from all analyses. Respondents who reported more act-specific partners for any act type than total partners in the past 12 months were recoded as missing all partner numbers for partner number outcomes but included in other analyses as appropriate.

The NSFG data were weighted to represent the US household populations of females and males aged 15 to 44 years at the midpoint of the respective 2-year survey periods. All analyses accounted for weights using survey analysis procedures in SAS OnDemand for Academics. Survey-weighted linear or logistic regression models treating survey year, defined as the midpoint of data collection, as a linear independent variable were used to evaluate temporal trends.  $\beta$  coefficients from linear regression and odds ratios (ORs) from logistic regression represent per-year changes from 2012 to 2018 (midpoints of the 2011–2013 and 2017–2019 survey periods, respectively). We conducted analyses separately by sex overall and stratified by age (15–19, 20–29, 30–44 years) and race/ethnicity (Hispanic, non-Hispanic Black, non-Hispanic White). We considered  $P$  values  $< 0.050$  to be statistically significant.

## RESULTS

The analysis included 16,926 female and 13,533 male respondents aged 15 to 44 years who reported sex with opposite-sex partners in the past 12 months across the four 2-year NSFG survey periods from 2011 to 2019. Demographic characteristics are presented for these female and male respondents, respectively, in Supplemental Tables 1 and 2 (Supplemental Digital Content 1, <http://links.lww.com/OLQ/A982>).

### Oral Sex

In all survey periods, most females and males aged 15 to 44 years reported oral sex with an opposite-sex partner in the past 12 months (range, 85.4%–89.4%). Condom use at last penile-oral sex was rare (4.1%–6.3%; Tables 1 [females], 2 [males]).

#### Females

The proportion of females reporting oral sex with a male partner increased significantly from 85.4% in 2011–2013 to 89.4% in 2017–2019 overall (OR, 1.05; 95% confidence interval [CI], 1.02–1.09) as well as among those aged 20 to 29 years (OR, 1.07; 95% CI, 1.01–1.13) and 30 to 44 years (OR, 1.05; 1.01–1.09) and among non-Hispanic Black females (OR, 1.14; 1.08–1.21; Tables 1, 3). During the same period, female reports of condom use at last penile-oral sex with a male partner decreased significantly from 6.3% to 4.3% overall (OR, 0.93; 95% CI, 0.88–0.99) as well as among 30- to 44-year-old and non-Hispanic White females. Some population differences were consistent across survey periods: 20- to 29-year-olds were more likely to report oral

**TABLE 1.** Sexual Behaviors Among Female Respondents Who Reported Oral, Vaginal, or Anal Sex With a Male Partner in the Past 12 Months in the 2011–2013 to 2017–2019 Survey Periods of the National Survey of Family Growth

	Weighted % or Mean (95% CI)			
	2011–2013	2013–15	2015–17	2017–2019
Total respondents (unweighted n)	4458	4517	3817	4134
Had oral sex with a male partner in past 12 mo	85.4% (83.7%–87.0%)	86.0% (84.3%–87.8%)	85.8% (83.5%–88.0%)	89.4% (87.9%–90.9%)
Used condom at last oral sex with male sex partner*	6.3% (5.1%–7.6%)	4.5% (3.6%–5.3%)	4.1% (3.2%–5.0%)	4.3% (3.3%–5.3%)
Had anal sex with male partner in past 12 mo	21.0% (19.0%–23.1%)	22.1% (20.7%–23.6%)	21.1% (19.2%–23.0%)	23.3% (21.3%–25.4%)
Used condom at last anal sex with male partner	15.3% (11.8%–19.2%)	17.6% (14.4%–20.7%)	16.5% (12.4%–20.3%)	18.2% (14.4%–22.0%)
Total no. male partners in past 12 mo	1.36 (1.30–1.42)	1.34 (1.30–1.37)	1.41 (1.35–1.46)	1.36 (1.31–1.40)
No. male vaginal sex partners in past 12 mo	1.32 (1.26–1.38)	1.29 (1.27–1.32)	1.34 (1.30–1.38)	1.31 (1.27–1.35)
No. male oral sex partners in past 12 mo	1.07 (1.02–1.11)	1.07 (1.04–1.10)	1.12 (1.08–1.17)	1.14 (1.11–1.18)
No. male anal sex partners in past 12 mo	0.22 (0.20–0.24)	0.24 (0.23–0.26)	0.23 (0.21–0.25)	0.25 (0.22–0.27)

All estimates have been weighted to represent the US household population aged 15 to 44 years.

\*Among participants reporting ever performing oral sex on a male partner and having had any oral sex in the past year.

sex in the past 12 months than 15- to 19- or 30- to 44-year-olds, and condom use at last penile-oral sex declined with age.

**Males**

The proportion of males who reported oral sex with a female partner in the past 12 months remained stable during the study period overall (OR, 1.01; 95% CI, 0.98–1.05) and among all subgroups except Hispanic males, among whom reports of oral sex increased (OR, 1.09; 95% CI, 1.03–1.16; Tables 2, 4). Similar to females, the proportion of men reporting condom use at last penile-oral sex with a female partner decreased significantly from 5.9% in 2011–2013 to 4.4% in 2017–2019 (OR, 0.95; 95% CI, 0.91–1.00) overall and among non-Hispanic White males. In all four survey periods, non-Hispanic Black and Hispanic males were more likely to report condom use at last penile-oral sex than non-Hispanic White males.

**Anal Sex**

In all survey periods, less than one-quarter of females and males aged 15 to 44 years reported anal sex with an opposite-sex partner in the past 12 months (ranges, 21.05%–23.3% [female] and 23.3%–24.6% [male]), and among those reporting anal sex, males were more likely to report condom use at last anal sex with an opposite-sex partner (27.0%–28.7%) than females (15.3%–18.2%; Tables 1, 2).

**Females**

The proportion of females who reported anal sex with a male partner remained stable during the study period overall (OR, 1.02; 95% CI, 0.99–1.05) and among all subgroups (Tables 1, 3). The proportion of females reporting condom use at last anal sex similarly remained stable overall (OR, 1.03; 95% CI, 0.97–1.09), but increased significantly among 30- to 44-year-olds (OR, 1.10; 95% CI, 1.00–1.20) and decreased among Hispanic females (OR, 0.90; 95% CI, 0.82–0.98; Tables 1, 3]. In all survey periods, 15- to 19-year-olds were more likely to report condom use at last anal sex than 20- to 29- or 30- to 44-year-olds.

**Males**

Across the study period, the proportion of males who reported anal sex with a female partner in the past 12 months remained stable overall (OR, 0.99; 95% CI, 0.96–1.02) and among all subgroups except non-Hispanic Black males, who reported significant decreases (OR, 0.93; 95% CI, 0.88–0.99). The proportion who reported condom use at last anal sex also remained stable overall (OR, 1.03; 95% CI, 0.97–1.09) and among all subgroups. In all survey periods, 20- to 29- and 30- to 44-year-olds were more likely to report anal sex than 15- to 19-year-olds, condom use at last anal sex declined with age, and Hispanic and non-Hispanic Black males were more likely to report condom use at last anal sex than non-Hispanic White males.

**TABLE 2.** Sexual Behaviors Among Male Respondents Who Reported Oral, Vaginal, or Anal Sex With a Female Partner in the Past 12 Months in the 2011–2013 to 2017–2019 Survey Periods of the National Survey of Family Growth

	Weighted % or Mean (95% CI)			
	2011–2013	2013–15	2015–17	2017–2019
Total respondents (unweighted n)	3693	3441	2976	3423
Had oral sex with a female partner in past 12 mo	88.0% (86.1%–89.8%)	87.9% (86.1%–89.7%)	89.1% (87.6%–90.6%)	88.5% (87.1%–89.8%)
Used condom at last oral sex with female sex partner*	5.9% (4.7%–7.1%)	6.0% (4.9%–7.1%)	5.1% (4.1%–6.2%)	4.4% (3.5%–5.3%)
Had anal sex with female partner in past 12 mo	24.6% (21.7%–27.4%)	23.3% (21.3–25.4%)	23.3% (20.7–26.0%)	23.5% (21.1–25.9%)
Used condom at last anal sex with female partner	28.7% (24.6%–32.7%)	27.6% (23.7%–31.5%)	28.0% (22.8%–33.1%)	27.0% (23.1%–30.9%)
Total no. female partners in past 12 mo	1.68 (1.58–1.79)	1.60 (1.51–1.69)	1.57 (1.50–1.64)	1.56 (1.45–1.66)
No. female vaginal sex partners in past 12 mo	1.56 (1.46–1.65)	1.52 (1.44–1.60)	1.44 (1.38–1.51)	1.48 (1.40–1.55)
No. female oral sex partners in past 12 mo	1.31 (1.25–1.37)	1.31 (1.25–1.38)	1.27 (1.21–1.33)	1.29 (1.21–1.38)
No. female anal sex partners in past 12 mo	0.30 (0.26–0.34)	0.28 (0.25–0.31)	0.26 (0.22–0.29)	0.27 (0.24–0.30)

All estimates have been weighted to represent the US household population aged 15 to 44 years.

\*Among participants reporting ever receiving oral sex from a female partner and having had any oral sex in the past 12 months.

**TABLE 3.** Estimates of the Annual Change in Sexual Behaviors Among Female Respondents Who Reported Sex With a Male Partner in the Past 12 Months in the 2011–2013 Through 2017–2019 Survey Periods of the National Survey of Family Growth

	ORs or $\beta$ (95% CI)						
	Overall	15–19 y	20–29 y	30–44 y	Hispanic	NH Black	NH White
Had oral sex with a male partner in past 12 mo	<b>1.05 (1.02 to 1.09)</b>	1.06 (0.97 to 1.15)	<b>1.07 (1.01 to 1.13)</b>	<b>1.05 (1.01 to 1.09)</b>	1.02 (0.97 to 1.08)	<b>1.14 (1.08 to 1.21)</b>	1.02 (0.97 to 1.07)
Used condom at last oral sex with male sex partner*	<b>0.93 (0.88 to 0.99)</b>	1.02 (0.88 to 1.18)	0.94 (0.87 to 1.03)	<b>0.90 (0.83 to 0.97)</b>	0.95 (0.86 to 1.04)	0.98 (0.90 to 1.07)	<b>0.86 (0.79 to 0.94)</b>
Had anal sex with male partner in past 12 mo	1.02 (0.99 to 1.05)	0.99 (0.90 to 1.08)	1.00 (0.96 to 1.04)	1.04 (1.00 to 1.07)	1.03 (0.97 to 1.08)	1.04 (0.96 to 1.13)	1.01 (0.98 to 1.05)
Used condom at last anal sex with male partner	1.03 (0.97 to 1.09)	1.00 (0.86 to 1.17)	0.98 (0.90 to 1.08)	<b>1.10 (1.00 to 1.20)</b>	<b>0.90 (0.82 to 0.98)</b>	1.10 (0.94 to 1.29)	1.06 (0.98 to 1.15)
Total no. male partners in past 12 mo†	0.003 (–0.008 to 0.014)	–0.003 (–0.051 to 0.044)	0.013 (–0.008 to 0.035)	–0.001 (–0.011 to 0.009)	–0.010 (–0.035 to 0.015)	–0.007 (–0.027 to 0.014)	0.015 (–0.002 to 0.031)
No. male vaginal sex partners in past 12 mo†	0.002 (–0.009 to 0.013)	–0.008 (–0.056 to 0.041)	–0.013 (–0.008 to 0.034)	–0.003 (–0.011 to 0.005)	–0.014 (–0.037 to 0.010)	–0.006 (–0.026 to 0.013)	0.010 (–0.005 to 0.026)
No. male oral sex partners in past 12 mo†	<b>0.014 (0.005 to 0.023)</b>	0.016 (–0.014 to 0.046)	<b>0.029 (0.010 to 0.048)</b>	0.005 (–0.004 to 0.014)	–0.001 (–0.018 to 0.016)	<b>0.028 (0.011 to 0.045)</b>	<b>0.017 (0.003 to 0.030)</b>
No. male anal sex partners in past 12 mo†	0.003 (–0.002 to 0.008)	–0.007 (–0.021 to 0.006)	0.002 (–0.006 to 0.010)	0.006 (0.000 to 0.012)	0.003 (–0.011 to 0.016)	0.006 (–0.007 to 0.019)	0.004 (–0.002 to 0.010)

Bold indicates significance at <0.05 level. Estimates represent per-year changes from 2012 to 2018, midpoints of the 2011–2013 and 2017–2019 survey periods, respectively.

\* Among participants reporting ever performing oral sex on a male partner and having had any oral sex in the past 12 months.

† Estimates derived from linear regression ( $\beta$ ). All others from logistic regression (ORs). All models have been weighted to represent the US household population aged 15 to 44 years.

NH indicates non-Hispanic.

**TABLE 4.** Estimates of the Annual Change in Sexual Behaviors Among Male Respondents Who Reported Sex With a Female Partner in the Past 12 Months in the 2011–2013 Through 2017–2019 Survey Periods of the National Survey of Family Growth

	ORs or $\beta$ (95% CI)				
	Overall	15–19 y	20–29 y	30–44 y	
Had oral sex with a female partner in past 12 mo	1.01 (0.98 to 1.05)	0.99 (0.90 to 1.10)	1.04 (0.97 to 1.12)	1.00 (0.96 to 1.05)	<b>1.09 (1.03 to 1.16)</b>
Used condom at last oral sex with female sex partner*	<b>0.95 (0.91 to 1.00)</b>	0.91 (0.82 to 1.01)	0.97 (0.91 to 1.04)	0.95 (0.88 to 1.03)	0.95 (0.87 to 1.04)
Had anal sex with female partner in past 12 mo	0.99 (0.96 to 1.02)	0.95 (0.87 to 1.03)	0.95 (0.91 to 1.00)	1.02 (0.98 to 1.07)	<b>0.93 (0.88 to 0.99)</b>
Used condom at last anal sex with female partner	0.99 (0.95 to 1.03)	1.02 (0.88 to 1.18)	0.98 (0.91 to 1.05)	1.01 (0.94 to 1.09)	0.93 (0.84 to 1.04)
Total no. female partners in past 12 mo <sup>†</sup>	-0.021 (-0.043 to 0.001)	<b>-0.116 (-0.201 to -0.031)</b>	-0.030 (-0.067 to 0.006)	0.005 (-0.023 to 0.034)	0.011 (-0.055 to 0.072)
No. female vaginal sex partners in past 12 mo <sup>‡</sup>	-0.016 (-0.034 to 0.002)	<b>-0.071 (-0.127 to -0.014)</b>	-0.032 (-0.068 to 0.004)	0.005 (-0.015 to 0.025)	0.032 (-0.026 to 0.091)
No. female oral sex partners in past 12 mo <sup>‡</sup>	-0.005 (-0.021 to 0.011)	<b>-0.059 (-0.110, -0.009)</b>	-0.006 (-0.032 to 0.021)	0.006 (-0.014 to 0.026)	0.011 (-0.042 to 0.063)
No. female anal sex partners in past 12 mo <sup>‡</sup>	-0.006 (-0.014 to 0.001)	-0.019 (-0.050 to 0.012)	<b>-0.016 (-0.028 to -0.004)</b>	0.002 (-0.007 to 0.010)	-0.014 (-0.032 to 0.004)

Bold indicates significance at <0.05 level. Estimates represent per-year changes from 2012 to 2018, midpoints of the 2011–2013 and 2017–2019 survey periods, respectively.

\* Among participants reporting ever receiving oral sex from a female partner and having had any oral sex in the past 12 months.

<sup>†</sup> Estimates derived from linear regression ( $\beta$ ). All others from logistic regression (ORs). All models have been weighted to represent the US household population aged 15 to 44 years.

NH indicates non-Hispanic.

## Numbers of Sex Partners

### Females

The mean numbers of total, vaginal, and anal male sex partners in the past 12 months remained stable across the study period among females aged 15 to 44 years (ranges, 1.34–1.41 [total], 1.29–34 [vaginal], 0.22–0.25 [anal]; Tables 1, 3). However, the mean number of male oral sex partners reported by females increased significantly from 1.07 in 2011–2013 to 1.14 in 2017–2019 overall ( $\beta = 0.014$ ; 95% CI, 0.005–0.023), among 20- to 29-year-olds, and among non-Hispanic Black and non-Hispanic White females (Table 3). In all survey periods, numbers of total sex partners in the past 12 months decreased with age. In addition, 15- to 19- and 20- to 29-year-olds reported more vaginal sex partners than 30- to 44-year-olds, and 20- to 29-year-olds reported the most anal sex partners in all periods (Supplemental Table 3, Supplemental Digital Content 1, <http://links.lww.com/OLQ/A982>).

### Males

Among males aged 15 to 44 years, the mean numbers of total, vaginal, oral, and anal female sex partners in the past 12 months remained stable overall (ranges, 1.56–1.68 [total], 1.44–1.56 [vaginal], 1.27–1.31 [oral], 0.26–0.30 [anal]) across the study period (Tables 2, 4). However, there were multiple significant decreases in specific subgroups: total and vaginal female sex partners among 15- to 19-year-old and non-Hispanic White males, oral sex partners among non-Hispanic White males, and anal sex partners among 20- to 29-year-olds (Table 4). In all study periods, numbers of total and oral sex partners decreased with age, 15- to 19- and 20- to 29-year-olds reported more vaginal sex partners than 30- to 44-year-olds, and non-Hispanic Black males reported more total, vaginal, and oral sex partners than Hispanic and non-Hispanic White males.

Proportions, means, and associated 95% CIs from stratified analyses are presented in Supplemental Tables 3 (females by age), 4 (females by race/ethnicity), 5 (males by age), and 6 (males by race/ethnicity; Supplemental Digital Content 1, <http://links.lww.com/OLQ/A982>).

## DISCUSSION

In a nationally representative survey, almost one-quarter of heterosexually active females and males aged 15 to 44 years in the United States reported anal sex, and most (85%–89%) reported oral sex with opposite-sex partners in the past year. Condom use at last sex was uncommon for both acts, particularly oral sex. During the period 2011–2019, reports of oral sex and number of oral sex partners of the opposite sex in the past year increased among females but not males, condom use at last penile-oral sex decreased among both females and males, and anal sex prevalence, partner number, and condom use remained stable. Trends in sexual behaviors varied across both age and race/ethnicity; of note, females aged 30 to 44 years reported the greatest number of changes, and 15- to 29-year-old and non-Hispanic White males reported declines in partner numbers.

The overall trends we observed suggest a potential departure from prior trends in oral and anal sex behaviors in 2015–2019 and differed from a contemporaneous analysis of another nationally representative study that found decreases in past-year oral and anal sex among partners of any gender from 2009 to 2018.<sup>13</sup> Estimates from three prior cross-sectional NSFG analyses suggested that, among all 15- to 44-year-old females and males, lifetime oral sex with opposite-sex partners had remained relatively stable or declined, and anal sex with opposite-sex partners had increased among both sexes from 2002 to 2011–2015.<sup>1,8,9</sup> In addition, earlier studies among urban populations found an increasing prevalence of both

recent anal and oral sex from the 1990s to early 2000s.<sup>10–12</sup> Our findings may represent true changes in population-level trends, changes in respondents' comfort in reporting these behaviors, differences in study samples or procedures (e.g., national vs. local, general population vs. clinic-based, and in-person vs. Internet-based interviews), or differences in how we defined our outcomes or denominators. Specifically, examining behaviors in the past year, rather than over the lifetime, is more likely to capture behaviors relevant to ongoing STI transmission. Limiting analyses to respondents who reported anal, oral, or vaginal sex with opposite-sex partner(s) in the past year focuses on the behaviors of heterosexually active people and highlights the potential benefits of extragenital screening for people with an indication for sexual health services. However, this choice of denominator makes findings related to prevalence of oral and anal sex and partner numbers sensitive to changes in the other types of sex, particularly reported decreases in vaginal sex in the past year over the same period.<sup>22</sup> Despite this, the trends we observed were similar when expanding our analyses to respondents who reported ever having oral, vaginal, or anal sex with an opposite-sex partner (data not shown). The sex-specific differences we observed—notably males reporting being more likely to use condoms for anal sex and greater numbers of partners than females—are common in studies of opposite-sex behaviors and may also be attributable to this choice of denominators and to sampling, social desirability, and recall biases.<sup>23–27</sup>

Increases in oral sex paired with decreases in condom use for oral sex have the potential to increase STI transmission, whereas decreases in partner number among some subgroups of males might result in decreased transmission. However, the small changes we observed are unlikely to account for the large increases in reported STI diagnoses alone. Other reports on trends in sexual behaviors and networks from this same period suggest a complex set of changes with similarly conflicting impacts on STI transmission. Separate analyses of NSFG data found (1) that reports of vaginal sex, condom use during vaginal sex, racial/ethnic homophily, and concurrency with opposite-sex partners decreased, and the percent of males reporting sex with other males increased from 2008–2019<sup>22</sup>; (2) that condom use at last vaginal sex declined from 2002 to 2011–2017 among unmarried, noncohabiting young men who have sex with women with STI risk factors, particularly 15- to 19-year-old and non-Hispanic White males, but was stable or increased among those without such risk factors<sup>28</sup>; and (3) that the proportion of males and females aged 15 to 24 who reported ever having vaginal sex remained stable from 2002 to 2015–2017.<sup>29</sup> Analyses of other nationally representative surveys have found decreases in sexual activity from 2000 to 2018<sup>30</sup> and decreases in frequency of penile-vaginal sex in the past year among adolescents and adults aged 14 to 49 years.<sup>13</sup> Our analysis expands on these findings by describing trends in oral and anal sex behaviors with opposite-sex partners, contributing to a more complete picture of sexual behavior with particular implications for extragenital STI transmission. How these complex trends intersect and may have contributed to increases in bacterial STI diagnoses and mostly declining HIV incidence during this period is unclear, whereas the COVID-19 pandemic has led to further changes in sexual behaviors and networks<sup>31s,32s</sup> not captured in our data.

With most heterosexually active females and males engaging in oral sex, almost one-quarter of females reporting anal sex in the past year, and low levels of condom use for both oral and anal sex, potential STI exposures at the rectum and pharynx may be common. However, in the absence of clear evidence of clinical and public health implications of extragenital gonorrhea and chlamydial infections, the CDC recommends only that providers consider extragenital screening for cisgender women based on reported behaviors or exposures and has no recommendation for

MSW.<sup>14</sup> The effectiveness of such exposure- or behavior-based recommendations is limited substantially by health care provider barriers to CDC-recommended routine and comprehensive sexual history taking.<sup>20,33s</sup> Additional research is needed to understand the potential benefits, costs, and cost-effectiveness of both universal and targeted extragenital screening and to support health care providers in offering routine sexual health screening to determine who may benefit from extragenital screening under current guidelines. Transmission models have potential to provide insight into the potential benefits and cost-effectiveness, but these models require better estimates of site-specific screening patterns and prevalence of gonorrhea and chlamydial infections. In particular, in the absence of data regarding true site-specific prevalences, it is not possible to estimate the number of diagnoses missed by urogenital screening alone or the potential cost-effectiveness of 3-site testing.

Our analysis has additional limitations. First, behaviors are self-reported and therefore sensitive to recall and social desirability bias, although the use of ACASI may have limited the impact of social desirability.<sup>34s</sup> Second, the public-use NSFG data sets include non-Hispanic Asian, Native Hawaiian/Pacific Islander, Native American/Alaska Native, and multiracial respondents in a single “non-Hispanic other” race/ethnicity category, therefore limiting our ability to include these groups in stratified analyses. Third, respondent's current gender identity was not ascertained, limiting analyses to biological sex and curtailing our ability to examine oral and anal sex trends among transgender and nonbinary persons. Finally, some significant differences may have been observed by chance because we made multiple comparisons.

The frequency of oral and anal sex among respondents with opposite-sex partners, paired with limited and—for oral sex—decreasing condom use, further demonstrates the need to understand the role of these behaviors in STI transmission at the individual and population levels and to explore the potential for extragenital screening and behavioral interventions that address condom use for anal sex to reduce health burden and disrupt transmission of STIs.

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For further references, please see “Supplemental References,” <http://links.lww.com/OLQ/A983>.