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## Assessment of sexual health services at US colleges and universities, 2001 and 2014

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### Abstract

**Background:** Approximately 19 million students attend post-secondary institutions in the US. With rates of sexually transmitted infections (STIs) at unprecedented highs, the college and university setting can provide the opportunity to engage young adults in their sexual health and deliver recommended services. The purpose of this study was to compare the provision of sexual health services at US college and university health centres across studies conducted in 2001 and 2014.

**Methods:** We compared data from nationally representative surveys administered by the Centers for Disease Control and Prevention (2001,  $n = 736$  schools; 2014,  $n = 482$  schools), assessing the provision of services, including STI diagnosis and treatment, contraception, STI education, condom distribution and availability of health insurance.

**Results:** Compared with 2001, statistically significant increases were observed in 2014, including in the provision of contraceptive services (56.1% vs 65.0%), HIV testing (81.5% vs 92.3%) and gonorrhoea testing (90.7% vs 95.8%). Significant decreases were found in the number of schools offering health plans (65.5% vs 49.4%) and specific modes of offering STI education, such as health fairs (82.3% vs 69.9%) and orientation presentations (46.5% vs 29.8%; all  $P < 0.001$ ).

**Conclusions:** From 2001 to 2014, there have been some improvements in sexual health services at colleges and universities, but there are areas that require additional access to services. Schools may consider regular assessments of service provision in order to further promote sexual health services on college campuses.

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Conflicts of interest

The authors declare no conflicts of interest.

## Introduction

Sexual health is one of seven target priorities in the US National Prevention Strategy (NPS),<sup>1</sup> with an overall vision of emphasising prevention, wellness and respect for others.<sup>2</sup> Access to quality health services can improve well-being and reduce sexually transmitted infections (STIs), including HIV/ AIDS and unintended pregnancies. There are approximately 19 million students attending degree-granting post-secondary institutions in the US,<sup>3</sup> and there are an estimated 20 million new STIs each year, half of which occur among those aged 15–24 years.<sup>4</sup> The college and university (hereafter college(s)) setting can provide the opportunity to engage young adults in their sexual health and deliver recommended services. The Centers for Disease Control and Prevention (CDC) recommends several clinical preventive services relevant to sexual health (e.g. treatment and counselling, screening tests, vaccines).<sup>5</sup> However, the degree to which colleges provide sexual health services is not regularly assessed, and changes in service provision over time also remain unknown.

In 2001, a national assessment of sexual health services at US colleges was conducted by the CDC<sup>6</sup> and then updated in 2014.<sup>7</sup> Both assessments collected information on the delivery of services and STI screening and testing protocols at college health centres (HCs). Both studies used a broad conceptualisation of sexual health services to include STI testing and treatment, STI education practices, provision of health insurance and associated coverage for STI screening, and condom availability. This analysis compares the provision of sexual health services at US colleges, combining data collected in these two studies.

## Methods

### Sample design

The 2001 and 2014 data collections were representative of public and private, 2- and 4-year US colleges with enrolment of at least 500 students. The 2001 study stratified a sampling frame of 2755 schools listed in the Peterson's guide to 2- and 4-year colleges by the presence or absence of an HC and enrolment size (500–1000, 1001–2000, 2001–4000, 4001–8000, 8001–16 000 and >16 000 students).<sup>6</sup> The 2014 study stratified a sampling frame of 2753 schools from the Integrated Postsecondary Education Data System (IPEDS) by enrolment size (using the aforementioned cut points).<sup>7</sup> Of the 910 schools contacted, 736 institutions responded in the 2001 study (response rate 81%) and of the 885 schools contacted in the 2014 study, 482 responded (response rate 55%).

### Distribution

The 2001 study mailed surveys to 910 schools in October of 2001. If the school was part of the American College Health Association (ACHA), the ACHA contact person completed the survey. If the school did not have an ACHA contact, the survey was sent to the contact person listed in the Peterson's guide to 2- and 4-year colleges. In the 2014 study, schools were mailed a letter asking that the individual most knowledgeable about health services on campus complete the survey electronically through SurveyMonkey between July 2014 and May 2015. Both surveys sent reminder emails and letters to schools that had not yet

completed the survey and obtained approval from an institutional review board at the CDC. For additional methodological details, see Koumans *et al.*<sup>6</sup> and Habel *et al.*<sup>7</sup>

## Raking

Schools sampled in the two studies had different probabilities of selection between their respective strata. Each study created weights based on the probability of selection, and adjusted these weights for non-response. Due to differences in sampling and school characteristics, raking adjustment was performed to ensure comparability of selected variables between the two samples.<sup>8</sup> Variables used to create raked weights were enrolment size, setting, funding, institution type and region. Auxiliary information used in the raking procedure was sourced from the 2014 IPEDS.

## Data analysis

After applying the raking procedure, the estimated proportion of schools with an HC and the estimated prevalence of health service characteristics among these schools were calculated. In the 2001 and 2014 studies, 65% (weighted  $n = 1814$ ) and 76% (weighted  $n = 1912$ ) of schools reported an HC. We then compared estimates between the pooled responses from HCs in 2001 to the pooled responses from HCs in 2014 by calculating absolute differences and  $Z$ -test statistics. Data were analysed using RStudio version 1.0.44 (RStudio, Boston, MA, USA) and R survey package version 3.31–2 (R Foundation for Statistical Computing, Vienna, Austria), which was used to perform the raking procedure. Two-sided  $P < 0.05$  was considered significant.

## Results

### Student health insurance

Compared with 2001, there was a statistically significant decrease in the percentage of schools offering their own health insurance plans in 2014 (65.5% vs 49.4%;  $P < 0.001$ ,  $Z = 4.161$ ). However, a statistically significant increase was observed between the two studies regarding the proportion of plans covering both testing of symptomatic students for STIs (78.2% vs 92.5%;  $P = 0.003$ ,  $Z = 3.738$ ) and screening of asymptomatic students (56.4% vs 87.9%;  $P < 0.001$ ,  $Z = 6.931$ ; see Table 1).

### Methods of STI education practices provided by colleges

Although the percentage of schools offering any STI education remained relatively constant between 2001 and 2014 (99.7% vs 98.7%;  $Z = 1.397$ ), the 2014 study observed statistically significant decreases in specific modes of STI education materials and practices. These included the use of flyers, pamphlets, newsletters, posters, lectures, health fairs, one-on-one education in HCs, orientation presentation and written orientation material (all  $P < 0.001$ ; Table 1).

### Services available at HCs

The percentage of schools where the HC diagnosed and treated STIs remained stable over time (70.8% vs 72.9%;  $Z = 0.565$ ), but some changes were noted. In 2014, significant

increases were found in the percentage of schools with an HC providing contraceptive services (56.1% vs 65.0%;  $P=0.027$ ,  $Z=2.245$ ), HIV testing (81.5% vs 92.3%;  $P=0.002$ ,  $Z=3.419$ ) and gonorrhoea testing (90.7% vs 95.8%;  $P=0.045$ ,  $Z=2.153$ ). Chlamydia testing among female students remained stable across the two studies (76.4% vs 72.2%;  $P=0.347$ ,  $Z=0.933$ ; Table 1).

### Condom availability

Overall, condom availability remained relatively stable across the two studies (74.1% vs 79.3%;  $Z=1.455$ ). Although most schools made condoms free in open display (64.1% vs 71.6%;  $Z=1.873$ ), statistically significant declines in distribution method were noted in 2014 with regard to condoms being free upon request, being available for a nominal fee and in vending machines (all  $P<0.001$ ; Table 1).

### Discussion

Through a narrow lens, this analysis provides a sexual health check-up for US colleges by examining how the provision of sexual health services has changed or remained the same across two time points. Although there have been improvements in the provision of some services, there are areas in which providing additional access to services may reduce missed opportunities.

Although college-sponsored insurance plans have declined since 2001, there have been increases in the proportion of plans providing coverage for both symptomatic and asymptomatic STI testing and screening. This may be explained, in part, by changes in the US healthcare system. In 2010, dependents were allowed to remain on their parents' health insurance up to 26 years of age. In addition, more plans have included US Preventive Services Task Force-recommended services, such as chlamydia screening, gonorrhoea and syphilis testing (<http://www.uspreventiveservicestaskforce.org/Page/Document/RecommendationStatementFinal/chlamydia-and-gonorrhea-screening>, accessed 2 July 2017). Because confidentiality concerns often affect sexual health,<sup>9</sup> further research is needed on how schools are protecting students' confidentiality for those on their parents' plans. Condom availability remained stable across the two studies, although declines in distribution methods were noted. This may simply indicate a shift in the most efficient means of condom distribution, thereby eliminating the need for other methods. The percentage of schools offering STI education also remained relatively constant across studies, although compared with schools in 2001, schools in 2014 offered significantly less education using certain modalities. This may be explained by possible health promotion budget cuts or that schools are being more strategic in their health promotion activities and where to focus their efforts.

We found improvements in the availability of contraceptive services and gonorrhoea and HIV testing. These findings parallel the national decrease in unintended pregnancies and the normalisation of HIV testing.<sup>10,11</sup> However, chlamydia testing rates have remained unchanged at school HCs. An opportunity for improvement may include HCs encouraging annual chlamydia testing for women under 25 years of age because research has found STI

testing to be low among college students despite high chlamydia positivity among college females.<sup>12</sup>

### Limitations

Schools sampled in 2014 were not exactly the same as those sampled in 2001. The 2014 response rate (55%) was also much lower than that in 2001 (81%), perhaps as a result of the 2014 study being unfunded and not having dedicated staff to conduct sufficient follow-up. The wording of one survey question, as well as the survey delivery mode, varied between studies, which may account for response variations. The 2014 study included an age range (women under the age of 25 years) when asking about chlamydia screening, whereas the 2001 study did not. In addition, comparisons on method of STI education were among modes assessed in both of the surveys; however, the 2014 survey included newer, additional modes (watch parties, testing events and awareness campaigns), which were not included for the purposes of the present analysis. The 2014 study asked about the availability of emergency contraceptives and long-acting reversible contraceptives, whereas the 2001 study did not, which made comparing specific offerings of contraception not possible. In the 2014 study, schools were sent the questionnaire via email; the 2001 study sent the questionnaires in the mail. Unmeasured covariates in analyses may have also confounded our results. In addition, some components of overall sexual health, such as sexual violence prevention and services, were not addressed in either of the surveys, making analysis and comparison not possible. Finally, some comparisons were not feasible because the service did not exist in 2001 (e.g. human papillomavirus vaccine), but baseline findings can be found elsewhere.<sup>7</sup>

### Public health implications

If colleges aspire to align their programs with NPS priorities, increase sexual health awareness among young adults and normalise STI testing, they may want to consider increasing the promotion of sexual health on campus and access to services in their HCs. To better evaluate and promote STI testing and education, regular assessments of HC services and sexual health best practices for colleges may also be beneficial. Further research exploring increasing access to chlamydia testing on campuses, and better understanding how schools can best protect students' confidentiality, would also help inform the next steps for colleges and may improve service delivery.

### Acknowledgements

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Table 1.

### Characteristics of the studies of Koumans *et al.*<sup>6</sup> and Habel *et al.*<sup>7</sup> among schools reporting a health centre

The weighted difference was calculated by subtracting the study estimate of Koumans *et al.*<sup>6</sup> from that of Habel *et al.*<sup>7</sup>. The weighted total including schools without a health centre is 2754 for the study of Koumans *et al.*<sup>6</sup> and 2754 for the study of Habel *et al.*<sup>7</sup>. CI, confidence interval; STI, sexually transmitted infection

	Koumans <i>et al.</i> <sup>6</sup> (n = 472; weighted n = 1814)		Habel <i>et al.</i> <sup>7</sup> (n = 354; weighted n = 1912)		Weighted difference		
	n (%)	% (95% CI)	n (%)	% (95% CI)	% (95% CI)	P-value	Z
Health centre (all)	472 (65.0)	65.9 (63.4, 68.3)	354 (76.0)	69.4 (65.1, 73.5)	3.6 (-1.3, 8.4)	0.158	1.434
Student health insurance							
Coverage mandatory for undergraduate students (full-time US students)	111 (34.7)	38.2 (32.5, 44.3)	147 (43.1)	41.9 (36.3, 47.7)	3.7 (-4.6, 11.9)	0.388	0.865
College sponsors or provides own health insurance plan	313 (66.6)	65.5 (60.5, 70.1)	185 (53.2)	49.4 (43.6, 55.3)	-16.0 (-23.6, -8.5)	<0.001	4.161
Insurance plan covers testing symptomatic students for STIs (among schools offering a plan)	229 (79.5)	78.2 (72.3, 83.2)	147 (93.0)	92.5 (85.5, 96.3)	14.3 (6.8, 21.8)	0.003	3.738
Insurance plan covers screening asymptomatic students for STIs (among schools offering a plan)	169 (59.7)	56.4 (49.8, 62.7)	133 (88.1)	87.9 (80.4, 92.8)	31.6 (22.6, 40.5)	<0.001	6.931
Any delivery of STI education	470 (99.6)	99.7 (98.7, 99.9)	350 (98.9)	98.7 (96.6, 99.5)	-1.0 (-2.3, 0.4)	0.115	1.397
Method of STI education practices							
Flyers, pamphlets, newsletters	450 (96.4)	95.9 (93.1, 97.6)	318 (89.8)	87.5 (82.7, 91.2)	-8.3 (-13.1, -3.6)	<0.001	3.446
Posters	388 (83.8)	81.5 (77.0, 85.3)	254 (71.8)	67.4 (61.6, 72.8)	-14.1 (-21.1, -7.1)	<0.001	3.943
Lectures as part of college class	373 (82.0)	86.4 (82.0, 89.9)	217 (61.3)	59.3 (53.5, 64.9)	-27.1 (-34.1, -20.2)	<0.001	7.654
Health fairs	373 (82.0)	82.3 (78.1, 85.8)	262 (74.0)	69.9 (64.0, 75.2)	-12.4 (-19.2, -5.6)	<0.001	3.584
One-on-one education in health centre	463 (98.3)	98.4 (96.8, 99.3)	332 (93.8)	91.9 (87.5, 94.8)	-6.5 (-10.3, -2.8)	<0.001	3.392
Peer education	245 (60.2)	57.7 (52.3, 63.0)	192 (54.2)	52.3 (46.5, 58.0)	-5.5 (-13.4, 2.4)	0.175	1.357
Part of orientation presentation	187 (46.3)	46.5 (41.1, 51.9)	110 (31.1)	29.8 (24.8, 35.3)	-16.7 (-24.2, -9.1)	<0.001	4.338
Part of written orientation material	140 (35.4)	32.5 (27.7, 37.6)	75 (21.2)	20.0 (15.7, 25.0)	-12.5 (-19.3, -5.7)	<0.001	3.598
School web page	180 (43.8)	41.3 (36.1, 46.6)	175 (49.4)	43.1 (37.6, 48.9)	1.9 (-5.9, 9.6)	0.637	0.473
Services available at health centre							
Health education	463 (98.5)	98.6 (97.0, 99.4)	320 (97.0)	96.4 (92.8, 98.2)	-2.2 (-5.0, 0.5)	0.075	1.575
STI diagnosis and treatment	332 (70.5)	70.8 (66.1, 75.1)	251 (77.5)	72.9 (66.8, 78.2)	2.1 (-5.2, 9.4)	0.574	0.565
Contraceptive services	278 (59.0)	56.1 (51.1, 61.0)	226 (69.8)	65.0 (58.9, 70.7)	8.9 (1.1, 16.7)	0.027	2.245
Triage and referral to other clinics	457 (96.8)	96.8 (94.6, 98.1)	314 (95.4)	93.7 (89.2, 96.4)	-3.1 (-7.0, 0.7)	0.081	1.580

	Koumans et al. <sup>6</sup> (n = 472; weighted n = 1814)	Habel et al. <sup>7</sup> (n = 354; weighted n = 1912)	Weighted difference			
	n (%)	n (%)	% (95% CI)	% (95% CI)	P-value	Z
HIV testing	269 (82.5)	222 (93.7)	92.3 (87.3, 95.4)	10.8 (4.6, 17.0)	0.002	3.419
Chlamydia testing for female students	233 (78.2)	176 (77.2)	72.2 (64.7, 78.5)	-4.2 (-13.1, 4.6)	0.347	0.933
Gonorrhoea testing	300 (91.7)	227 (96.2)	95.8 (91.9, 97.9)	5.1 (0.5, 9.8)	0.045	2.153
Herpes simplex virus testing	273 (83.5)	170 (78.7)	76.4 (69.5, 82.3)	-5.6 (-13.5, 2.5)	0.169	1.355
<i>Trichomonas vaginalis</i> testing	85 (88.8)	187 (86.2)	83.4 (76.8, 88.4)	-5.1 (-12.1, 1.8)	0.138	1.445
Syphilis testing	131 (40.9)	105 (47.5)	45.6 (38.4, 52.9)	4.1 (-5.3, 13.6)	0.390	0.860
Condom availability						
Condoms available	366 (77.7)	292 (83.4)	79.3 (73.6, 84.0)	5.1 (-1.8, 12.0)	0.153	1.455
Free in open display	234 (65.2)	201 (68.8)	71.6 (65.7, 76.7)	7.5 (-0.3, 15.3)	0.063	1.873
Free upon request	296 (81.3)	141 (48.3)	47.2 (40.9, 53.5)	-34.4 (-42.1, -26.8)	<0.001	8.776
Nominal fee	122 (34.1)	35 (12.0)	8.7 (6.1, 12.3)	-21.8 (-27.8, -15.9)	<0.001	7.180
Vending machine	94 (28.1)	24 (8.2)	6.8 (4.4, 10.4)	-18.1 (-23.8, -12.4)	<0.001	6.198
Condoms not available	105 (22.3)	58 (16.6)	20.7 (16.0, 26.4)	-5.1 (-12.0, 1.8)	0.153	1.455