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PREVALENCE AND CORRELATES OF *TRICHOMONAS VAGINALIS* INFECTION AMONG FEMALE U.S. FEDERAL PRISON INMATES

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SUMMARY

The prevalence of *Trichomonas vaginalis* infection at two federal, female-only prisons was 8.5%. Positive women were more likely to report a lower income before arrest than negative women.

ABSTRACT

Background: Previous studies have observed high prevalences of *Trichomonas vaginalis* infection among women entering U.S. jails and state prisons (22-47%). We sought to determine the prevalence among women incarcerated in two U.S. female-only federal prisons.

Methods: Female inmates were recruited at two prisons (n=624). Participants completed a self-administered questionnaire and provided self-collected first-catch urine and vaginal swab specimens. Specimens were tested for *T. vaginalis* DNA.

Results: 8.5% of participants at the first prison, and 8.3% at the second prison had a positive urine result, vaginal swab result or both, for a combined prevalence of 8.5%. Using positivity in either specimen as the reference standard, urine PCR had a sensitivity of 66.7% and vaginal swab PCR had a sensitivity of 84.4%. The only significant positive correlate of *T. vaginalis* infection was lower household income before arrest. Other variables non-significantly positively correlated with *T. vaginalis* were being employed at the time of arrest, having experienced sexual, physical or emotional abuse by a family member, having a parent who had not had a drug or alcohol addiction, never exchanging sex for money or drugs, ever being pregnant, having abnormal vaginal bleeding/spotting, and having concurrent chlamydia or gonorrhea.

Conclusions: Although not as high as in other studies of women entering U.S. jails and state prisons, our observed *T. vaginalis* prevalence of 8.5% was much higher than in the general U.S. population. Therefore, screening for *T. vaginalis* infection may be warranted at federal prison entry, as well as sexual health education during prison stay.

Key words: *Trichomonas vaginalis*, female, prison, prevalence, epidemiology

INTRODUCTION

Previous studies have observed high prevalences of sexually transmitted infections (STIs) among women entering jail and juvenile corrections facilities.[1] In a study of adult women entering correctional facilities in several U.S. states and Puerto Rico, the median prevalence of chlamydia was 6.4%, and those of gonorrhea and syphilis were 2.9% and 2.1%, respectively.[1] Less is known about the prevalence of *Trichomonas vaginalis* infection among incarcerated women. *T. vaginalis* is a common, sexually transmitted protozoan known to cause vaginitis and adverse birth outcomes, such as premature rupture of the membranes, in women, and increased risk and transmission of human immunodeficiency virus infection.[2] In the two surveys of *T. vaginalis* conducted to date among incarcerated women, high prevalences of infection have been observed, ranging from 22% among non-pregnant inmates[3] to 47% among newly-incarcerated pregnant inmates.[4]

We previously investigated prevalences of chlamydia and gonorrhea in female U.S. federal prison inmates, and found the prevalence of chlamydia to be high among women <30 years of age (prison 2: 3.5%), but low among all participants combined (prison 1: chlamydia=1.2%, gonorrhea=0.3%; prison 2: chlamydia=2.3%, gonorrhea=0.0%).[5] This finding was not entirely unexpected because women at the first prison were screened for chlamydia and gonorrhea at entry, and women at the second prison may have been screened and treated before being transferred to federal prison, or treated earlier in their prison stay. Additionally, federal prison inmates tend to be older than those in jails and corrections facilities, and are thus at possibly lesser risk for chlamydia and gonorrhea and greater risk for *T. vaginalis* infection, as the risk of chlamydia and gonorrhea typically decreases with age, and that of *T. vaginalis* infection

typically increases with age beyond adolescence.[6] Therefore, we investigated the prevalence and correlates of *T. vaginalis* infection in this older female incarcerated population.

MATERIALS AND METHODS

Study population

Study participants were recruited from two U.S. female-only federal prisons. The first prison, located in the Midwest, screened all inmates for chlamydia and gonorrhea at entry (screening prison, SP), while the second prison, located in New England, only tested inmates for STIs if they presented with signs or symptoms of infection (non-screening prison, NSP). Female inmates learned about the study at gatherings for group announcements ("call-outs") held from August-October, 2001 at each prison. Only women 18-45 years of age were invited to attend call-out. Women who consented to participate in the study completed a self-administered questionnaire and provided self-collected urine and vaginal swab specimens. No incentives were provided for participation. Further details of study procedures were described elsewhere.[5]

This study was approved by the institutional review boards of the Uniformed Services University of the Health Sciences, the Federal Bureau of Prisons, and the Johns Hopkins Medical Institutions.

Data collection

On the questionnaire, women were asked to provide information on demographics; reason and length of incarceration; substance use, sexual and reproductive history; and current STI symptoms. This questionnaire was developed based on focus groups and group-based cognitive interviews with female federal prison inmates,[7] and was available in English and Spanish. Following completion of the questionnaire, women were asked to provide approximately 20 mL of first-catch urine and a vaginal swab. Specimens were stored at 4°C and

transported to the laboratory for processing within four days of collection. They were then maintained frozen at -80°C until testing.

Laboratory methods

Urine and vaginal swabs were tested for *T. vaginalis* DNA by BTUB FRET real-time PCR. In a previous validation study, this assay had a sensitivity of 90.5% in male and female thawed urine specimens, and a specificity of 100%.[8]

Statistical analysis

Proportions of women positive for *T. vaginalis* by urine PCR, swab PCR and combinations of these two methods were calculated separately for each prison, and for both prisons combined. *T. vaginalis* correlates were investigated by calculating medians or proportions of each covariate by *T. vaginalis* status, and comparing these estimates by Wilcoxon rank sum tests or Chi-squared/Fisher's exact tests, as appropriate. *T. vaginalis* positivity was defined as a positive urine result, swab result, or both. Sensitivity analyses were performed using two alternate case definitions: 1) a positive urine result, and 2) a positive swab result. Stratified analyses were performed by race (African-American, non-African-American) and duration of incarceration (<2, ≥2 years).

RESULTS

Of the approximately 1,344 female inmates eligible for the study, 1,230 (91.5%, 90% at the SP and 93% at the NSP) attended call-out. Reasons for not attending call-out included confinement in a secure housing unit, illness, inability to be released from work, or personal choice. 988 inmates (80.3%) who attended call-out volunteered to participate in the study and completed the self-administered questionnaire, 363 from the SP and 625 from the NSP. Of those who volunteered at the SP, 331 provided urine and swab specimens, 27 provided only urine, and

5 provided only swabs. Due to time constraints at the SP, 117 additional women were unable to complete the questionnaire, but did provide either urine (n=17), swabs (n=2) or both (n=98) for testing. Thus, 473 urine and 436 swab specimens were available for testing at the SP. At the NSP, 614 participants originally provided either urine or swabs. However, several boxes of these specimens (77% of specimens) were discarded after chlamydia and gonorrhea testing to create additional freezer space before the decision was made to perform *T. vaginalis* testing. Boxes were originally filled in order of participation, and were discarded at random; therefore, it is unlikely that discarded specimens differed from non-discarded specimens by *T. vaginalis* or correlate status. After discarding specimens, 142 urine and 79 swab specimens remained from the NSP, 77 urine and swab specimens from the same participant, 65 individual urine specimens and 2 individual swabs.

At the SP, 27 (5.7%) participants had a positive urine result and 35 (8.0%) had a positive vaginal swab result, for a total of 41 (8.5%, 95% confidence interval (CI): 6.0-11.0%) participants positive by either test. At the NSP, 11 (7.7%) participants had a positive urine result and 3 (3.8%) had a positive swab result, for a total of 12 (8.3%, 95% CI: 3.8-12.8%) positive using either specimen. When information from both prisons was combined, 53 (8.5%, 95% CI: 6.3-10.7%) participants had a positive urine result, swab result or both. Considering only women who provided both specimens (n=506), 7 (1.4%) were positive by urine results only, 15 (3.0%) by swab results only, and 23 (4.6%) by both specimens (Table 1). Among these women, the sensitivity of urine PCR was 66.7% (95% CI: 52.9-80.4%) and that of swab PCR was 84.4% (95% CI: 73.9-95.0%) using positivity in either specimen as the reference standard.

As the total number of positive participants was low and as similar prevalences were observed at each prison, *T. vaginalis* correlates were investigated using the combined data for

both prisons. In this analysis, *T. vaginalis* positivity was defined as a positive urine result, swab result, or both. No differences were observed between *T. vaginalis*-positive and -negative women by age, race/ethnicity, education or marital status. Positive women were non-significantly more likely to have been born outside the continental U.S. than negative women, although this finding was driven by urine results. No correlation was observed when infection was defined by a positive swab result (Table 2 and data not shown).

T. vaginalis-positive women were significantly more likely to have had a legal or illegal household income ≤$15,000, and non-significantly more likely to have been legally employed before their arrest than -negative women, irrespective of the case definition. No differences were observed by type of crime committed (only one participant reported incarceration for prostitution), or length of incarceration. Additionally, no differences were observed by cigarette smoking or use of illegal drugs or controlled substances in the 12 months before arrest. Among women who reported using illegal drugs or controlled substances during this time, positive women tended to be more likely to have used marijuana, and less likely to have used methamphetamines or other drugs, such as LSD, PCP or barbiturates. Positive women were non-significantly more likely to report sexual, physical or emotional abuse by a family member, and less likely to report parental drug or alcohol addiction. No differences were observed by parental incarceration (Table 2).

With respect to sexual history, no differences were observed between *T. vaginalis*-positive and -negative women by lifetime history of vaginal intercourse with a male partner, or recent history before prison entry. No differences were also observed by lifetime history of any form of sexual intercourse with a female partner. Null results were observed both before and after taking into consideration consistency of participant responses across related sexual history

questions. Positive women were non-significantly less likely to have ever exchanged sexual activity for money or drugs, and non-significantly more likely to have ever been pregnant. No differences were observed by method of birth control or reported pelvic examination in the twelve months before arrest (Table 3).

With respect to current symptoms, *T. vaginalis*-positive women were non-significantly more likely to report an abnormal/unusual discharge and vaginal bleeding/spotting other than their normal period than -negative women. The correlation between abnormal/unusual discharge and infection was more pronounced for positive urine results. When only swab results were considered, positive women were more likely to report lower abdominal/pelvic pain. Finally, positive women were non-significantly more likely to have concurrent chlamydia or gonorrhea, a finding that was more pronounced for positive swab results. Generally similar correlates were observed when the analyses were stratified by race and two years' incarceration. Too few positive women were incarcerated for <1 year to stratify by one year's incarceration (Table 3 and data not shown).

DISCUSSION

The prevalence of *T. vaginalis* infection among female prison inmates at two U.S. federal prisons was 8.5%. More infections were detected by self-collected vaginal swab than urine. The only significant positive correlate of *T. vaginalis* was lower income. Other variables that appeared to be positively correlated with infection, but that were not statistically significant, included being employed at the time of arrest, having experienced sexual, physical or emotional abuse by a family member, having a parent who had not had a drug or alcohol addiction, never exchanging sexual activity for money or drugs, ever being pregnant, having abnormal vaginal bleeding/spotting, and having concurrent chlamydia or gonorrhea. A positive urine result was

additionally correlated with being born outside the continental U.S. and having an abnormal/unusual discharge, while a positive swab result was additionally correlated with a greater likelihood of lower abdominal/pelvic pain. Interestingly, length of incarceration and sexual history were not correlated with infection by any definition.

Relative to other incarcerated populations, in which prevalences as high as 22-47% have been observed,[3, 4] our observed prevalence of 8.5% is low. This finding is not surprising because a lower proportion of women in our federal prison population reported exchanging sexual activity for money/drugs than in other incarcerated populations (17% versus 27-29%[3, 4]), and because women in our population had been incarcerated for a longer period of time (median=19 months versus at entry[3, 4]), allowing for greater opportunity for screening, treatment for symptoms, or spontaneous cure. However, when compared to general population estimates (2.8-3.1%[9, 10]), our observed prevalence of 8.5% is high. One possible explanation for this difference may be the greater likelihood of high-STI risk correlates/behaviors, such as African-American race,[11] lower education,[10, 12-14] lower income,[10, 13, 14] greater sexual experience/history,[10, 12-15] illegal drug use,[4, 14-19] and previous or concomitant STIs,[4, 9, 12-14, 17, 20] in our prison population than in the general population. Within our study population, however, these high-STI risk correlates/behaviors were not correlated with *T. vaginalis*, with the exception of lower income and possibly concomitant STIs. The reasons for these differing correlations are unclear, but perhaps once incarceration is held constant, factors such as race/ethnicity, lower education, sexual experience/history and illegal drug use are no longer as correlated with infection as in less highly-selected populations, although correlations have been observed in other highly-selected populations.[4, 12-18, 20, 21] The interpretation of the positive correlation with lower income in our study population is also difficult because no correlation was observed with education, which is

typically correlated with income, and a non-significant positive correlation was observed with full- or part-time employment, which is typically correlated with higher income. However, perhaps in our study population, full- or part-time employment was correlated with lower total family income because it represented the need for employment by female single heads of households, or a lesser likelihood of illegal contributions to household income.

As stated earlier, no correlation was observed for length of incarceration, which ranged from 1 month to almost 11 years among positive women (median=18.5 months). This lack of correlation raises the question as to whether detected infections were long-term infections acquired before incarceration, short-term infections acquired in prison, or possibly misreported lengths of incarceration. *T. vaginalis* has been observed to persist for at least 12 weeks to 1 year in women;[16, 22, 23] therefore, it is possible that some infections may have been acquired before incarceration and persisted until the study date. Alternatively, although no evidence of within-jail infection was observed at a county correctional center,[24] some infections may potentially have been acquired in our prison population through sexual relationships with prison staff members or fellow inmates, as infection has been observed following lesbian sexual activities.[25, 26] Therefore, detected *T. vaginalis* infections may represent a combination of infections acquired before prison and during prison stay, making it difficult to identify correlates of prevalent infection. We attempted to investigate possible differing correlates for infections acquired before or during prison stay by stratifying the analyses by length of incarceration, as participants incarcerated for a lesser amount of time may have been more likely to have been infected before prison entry, and participants incarcerated for a greater amount of time may have been more likely to have been infected in prison. However, no additional correlates were identified when we stratified the

analyses by two years' incarceration, and too few positive women were incarcerated for <1 year to stratify by one year's incarceration.

Another factor that may have contributed to difficulties in identifying *T. vaginalis* correlates is some inconsistencies in participants' self-reported responses, particularly those related to sexual history. One possible reason for these inconsistencies, which emerged in focus group discussions, is a general mistrust of how study information might be used, particularly information on sensitive or illegal topics, such as sexual activity in prison.[7] To reduce this concern, we limited sexual activity questions to the period of time before prison entry, or inquired about participants' entire sexual history. Nevertheless, some questions that incorporated information on sexual activity during prison stay may not have been answered truthfully. Another possible reason for inconsistencies is the distinction between consensual sexual relationships, and sexual abuse or rape, which was reported by a large proportion of inmates in group discussions. Whether participants included sexual abuse/rape in their responses to questions on sexual history is unclear. We attempted to address inconsistencies in participants' responses to sexual history questions by investigating both participants' original responses and those found to be consistent across related questions, neither of which was correlated with *T. vaginalis* in overall, race-specific or duration of incarceration-specific analyses.

With respect to assessment of the outcome, the PCR assay used had a high sensitivity and specificity for *T. vaginalis*,[8] and use of two different specimens should have increased the sensitivity further. However, some infections may still have been missed due to use of thawed rather than fresh specimens, as *T. vaginalis* DNA is less stable in thawed specimens. Therefore, the actual prevalence of *T. vaginalis* in our prison population may have been even higher than observed. When we considered the sensitivity of each of the two specimens/methods separately,

we found that vaginal swab PCR had a higher sensitivity than urine PCR. This finding is consistent with the results from several previous studies,[27-30] and the more frequent localization of *T. vaginalis* to the vagina than the urethra.[2] It may also possibly be explained by lower stability of *T. vaginalis* DNA in urine than swabs both before and during storage.[31] Despite these differences, most identified correlates were similar for urine and swab PCR. One exception was symptoms; women positive by urine PCR were non-significantly more likely to report an abnormal/unusual vaginal discharge, whereas women positive by swab PCR were non-significantly more likely to report lower abdominal/pelvic pain than negative women. The reasons for these differences are unclear. Perhaps, in the case of the stronger positive correlation between abnormal/unusual vaginal discharge and urine positivity, urine PCR is better at detecting infections associated with discharge because of contamination of the urethral area by vaginal discharge, whereas vaginal swab PCR may be equally good at detecting infections with or without discharge. For the positive correlation between abdominal/pelvic pain and vaginal swab positivity, possibly higher vaginal parasite load in women with *T. vaginalis*-associated abdominal/pelvic pain may make it easier to detect infections by swab than urine.

As a final consideration and possible limitation, our ability to detect statistically significant correlations may have been low due to the relatively small number of positive women in our study population. Additionally, some observed correlations, particularly those that were not statistically significant and those that were not observed for both urine and swab PCR, may have been observed by chance.

In conclusion, although our observed *T. vaginalis* prevalence of 8.5% was not as high as in other studies of women entering U.S. jails and state prisons, it was still considerably higher than in the general U.S. population. It was also higher than prevalences of chlamydia and

gonorrhea in the same study population, even among the subgroup of women with the highest prevalence, i.e., those <30 years of age (3.5% for chlamydia) for whom the Federal Bureau of Prisons modified their screening protocol to a more targeted age-based approach.[5] Therefore, given the higher observed prevalence of *T. vaginalis* infection in this population, we believe that universal *T. vaginalis* screening at federal prison entry may also be warranted, as well as sexual health education during prison stay.

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Table 1: Detection of *Trichomonas vaginalis* by PCR in urine and vaginal swabs from 624 female inmates at two U.S. federal prisons, 2001

Screening prison[1]				**Non-screening prison[2]**				**Both prisons**			
Urine	Swab	N	n (%)	Urine	Swab	N	n (%)	Urine	Swab	N	n (%)
Positive	*	473	27 (5.7)	Positive	*	142	11 (7.7)	Positive	*	615	38 (6.2)
*	Positive	436	35 (8.0)	*	Positive	79	3 (3.8)	*	Positive	515	38 (7.4)
Positive or	**Positive**	**480**	**41 (8.5)**	**Positive or**	**Positive**	**144**	**12 (8.3)**	**Positive or**	**Positive**	**624**	**53 (8.5)**
Negative	Negative	429	391 (91.1)	Negative	Negative	77	70 (90.9)	Negative	Negative	506	461 (91.1)
Positive	Negative	429	3 (0.7)	Positive	Negative	77	4 (5.2)	Positive	Negative	506	7 (1.4)
Negative	Positive	429	14 (3.3)	Negative	Positive	77	1 (1.3)	Negative	Positive	506	15 (3.0)
Positive	**Positive**	**429**	**21 (4.9)**	**Positive**	**Positive**	**77**	**2 (2.6)**	**Positive**	**Positive**	**506**	**23 (4.6)**

* Positive, negative or not tested.

[1] All women were screened for chlamydia and gonorrhea upon entry at the screening prison.
[2] Women were tested for sexually transmitted infections if they presented with signs or symptoms of infection at the non-screening prison.

Table 2: Demographic, incarceration, substance use and familial characteristics of female inmates at two U.S. federal prisons by *Trichomonas vaginalis* status, 2001

	All participants (n=507[1])	*T. vaginalis* -positive (n=48[1])	*T. vaginalis* -negative (n=459[1])	p-value[2]
Age (years, %):				
<25	15.0	10.4	15.4	
25-34	41.7	47.9	41.1	0.53
≥35	43.3	41.7	43.5	
Race/ethnicity (%):				
African-American	41.4	41.7	41.3	
Caucasian	38.8	33.3	39.3	
Hispanic	10.0	12.5	9.8	0.79
Other race/ethnicity	6.6	8.3	6.4	
Mixed race/ethnicity	3.2	4.2	3.1	
Education (%):				
Elementary school or less	7.3	6.2	7.4	
Some high school or high school degree	56.0	52.1	56.5	0.74
Some college or higher	36.6	41.7	36.1	
Marital status (%):				
Never married	42.6	42.6	42.6	
Married	34.6	27.7	35.4	0.40
Divorced, separated or widowed	22.8	29.8	22.0	
Birth outside the continental U.S. (%)	14.4	23.4	13.5	0.07
Household income (%):				
≤$15,000	30.4	47.9	28.5	
>$15,000	52.3	37.5	53.8	0.02
Don't know or missing information	17.4	14.6	17.6	
Full- or part-time employment (%)	66.1	78.3	64.8	0.07
Type of crime committed (%):				
White collar	13.9	13.3	13.9	
Drug or violence-related	82.9	84.4	82.8	0.92
Other	3.2	2.2	3.3	
Median length of incarceration (range, months)	19.0 (1-181)	18.5 (1-131)	19.0 (1-181)	0.92
Any cigarette smoking in the 12 months before arrest (%)	65.0	66.0	64.9	0.88
Any drug use in the 12 months before arrest (%)	70.3	63.8	71.0	0.30
Drugs used in the past 12 months before arrest (%)[3]:				
Marijuana	74.4	86.7	73.2	0.11
Crack/cocaine	52.1	50.0	52.3	0.81
Heroin	12.2	6.7	12.8	0.56
Methamphetamines	19.9	10.0	20.9	0.15

Other drugs	25.1	13.3	26.2	0.12
Ever been a victim of sexual, physical or emotional abuse by a family member (%)	36.1	45.8	35.1	0.14
Either parent ever had a drug or alcohol addiction (%)	44.2	33.3	45.4	0.11
Either parent ever been incarcerated (%)	20.7	21.3	20.6	0.92

[1] Total number may vary slightly for each characteristic due to missing responses.
[2] P-values were calculated by Wilcoxon rank sum tests for continuous variables, and Chi-squared or Fisher's exact tests for binary and categorical variables.
[3] Among women who used drugs in the twelve months before their arrest.

Table 3: Sexual and reproductive characteristics of female inmates at two U.S. federal prisons by *Trichomonas vaginalis* status, 2001

	All participants (n=507[1])		*T. vaginalis*-positive (n=48[1])		*T. vaginalis*-negative (n=459[1])		p-value[2]	
Ever had vaginal sexual intercourse with a man (%):								
No	1.4	(1.4)[3]	0.0	(0.0)[3]	1.5	(1.5)[3]		
Yes	64.3	(97.4)[3]	58.3	(97.9)[3]	64.9	(97.4)[3]	0.39	(0.53)[3]
Missing or inconsistent information	34.3	(1.2)[3]	41.7	(2.1)[3]	33.6	(1.1)[3]		
Number of lifetime male sexual partners (%):								
None	1.4	(34.7)[3]	0.0	(39.6)[3]	1.5	(34.2)[3]		
1-4	28.6	(28.6)[3]	29.2	(29.2)[3]	28.5	(28.5)[3]	0.51	(0.69)[3]
≥5	33.9	(33.9)[3]	27.1	(27.1)[3]	34.6	(34.6)[3]		
Missing or inconsistent information	36.1	(2.8)[3]	43.8	(4.2)[3]	35.3	(2.6)[3]		
Number of male sexual partners in the 3 months before arrest (%):								
None	9.7	(15.4)[3]	8.3	(18.8)[3]	9.8	(15.0)[3]		
1	32.2	(54.6)[3]	33.3	(52.1)[3]	32.0	(54.9)[3]	0.82	(0.55)[3]
≥2	21.1	(29.0)[3]	16.7	(27.1)[3]	21.6	(29.2)[3]		
Missing or inconsistent information	37.1	(1.0)[3]	41.7	(2.1)[3]	36.6	(0.9)[3]		
Ever had a non-regular (short-term or one time) male sexual partner (%):								
No	34.3	(34.3)[3]	35.4	(35.4)[3]	34.2	(34.2)[3]		
Yes	34.5	(61.9)[3]	35.4	(60.4)[3]	34.4	(62.1)[3]	0.95	(0.97)[3]
Missing or inconsistent information	31.2	(3.8)[3]	29.2	(4.2)[3]	31.4	(3.7)[3]		
Ever had vaginal sexual intercourse with a woman (%):								
No	66.9	(68.0)[3]	72.9	(70.8)[3]	66.2	(67.8)[3]		
Yes	8.3	(28.0)[3]	6.2	(25.0)[3]	8.5	(28.3)[3]	0.64	(0.89)[3]
Missing or inconsistent information	24.8	(3.9)[3]	20.8	(4.2)[3]	25.3	(3.9)[3]		
Ever exchanged sexual activity for money or drugs (%)	16.8		8.7		17.6		0.12	
Ever pregnant (%)	88.0		93.8		87.4		0.20	
Birth control in the 12 months before prison entry (%):								
None	33.9		31.2		34.2			
Condoms	29.3		35.4		28.6		0.62	
Other form of birth control	36.8		33.3		37.1			
Pelvic examination before prison entry (%):								
Never or ≥12 months	54.2		54.2		54.2			
<12 months	31.0		37.5		30.3		0.33	

Don't know/missing information	14.8	8.3	15.5	
Current symptoms (%):				
Abnormal or unusual vaginal discharge	19.1	25.5	18.5	0.24
Vaginal irritation, itch or unusual odor	16.9	14.9	17.1	0.70
Lower abdominal or pelvic pain	18.5	21.3	18.2	0.61
Vaginal bleeding or spotting other than normal period	6.4	12.8	5.7	0.11
Pain during urination	4.8	4.3	4.8	1.00
Current chlamydia or gonorrhea (%)	1.8	4.2	1.5	0.21

[1] Total number may vary slightly for each characteristic due to missing responses.
[2] P-values were calculated by Chi-squared or Fisher's exact tests.
[3] Based on original participant responses without taking into consideration consistency of responses across related questions.