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Increased Gonorrhea Screening and Case Finding After Implementation of Expanded Screening Criteria—Urban Indian Health Service Facility in Phoenix, Arizona, 2011–2013

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Abstract

Background: Gonorrhea screening is recommended for women at risk and men who have sex with men; expanded screening is encouraged based on local epidemiology. In response to a substantial increase in gonorrhea cases at an urban medical center serving American Indians, gonorrhea screening of all sexually active patients aged 14 to 45 years was initiated in March 2013. We describe gonorrhea screening coverage and case finding before and after implementation of expanded screening.

Methods: In March 2013, provider training, electronic health record prompts, and bundled laboratory orders were implemented to facilitate gonorrhea screening of all sexually active patients aged 14 to 45 years. We assessed the proportions of patients screened and testing positive for gonorrhea in the 2 years before (March 2011–February 2012 [indicated as 2011], March 2012–February 2013 [2012]) and 1 year after (March 2013–February 2014 [2013]) expanded screening measures.

Results: Gonorrhea screening coverage increased from 22% (2012) to 38% (2013); coverage increased 50% among females and 202% among males. Screening coverage increased in nearly all clinics. Gonorrhea case finding increased 68% among females in 2013 (n = 104) compared with 2012 (n = 62), primarily among women aged 25 to 29 years. No corresponding increase in

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gonorrhea case finding occurred among males. Most increased case finding occurred in the emergency department.

Conclusions: After introduction of expanded gonorrhea screening, there was a significant increase in gonorrhea screening coverage and a subsequent increase in gonorrhea case finding among females. Despite increased screening in all clinics, increased case finding only occurred in the emergency department.

Keywords

Gonorrhea screening; Indian Health Service; Electronic health record prompts

Gonorrhea screening is recommended for sexually active women at risk¹ (such as women younger than 25 years or women with previous sexually transmitted infections [STIs]) and sexually active gay and bisexual men and other men who have sex with men.² However, because gonorrhea prevalence varies among communities, providers are encouraged to tailor gonorrhea screening criteria based on local epidemiology.

The Phoenix Indian Medical Center (PIMC), a United States Indian Health Service (IHS) facility, is the largest health care provider for American Indians in Arizona with more than 23,000 patients and 87,000 ambulatory care visits annually. In 2012, PIMC diagnosed almost twice as many gonorrhea cases (141 cases) as they had in 2010 (72 cases). This increase coincided with an 80% increase in the number of gonorrhea cases among persons of all races/ethnicities in Arizona between 2010 (3249 cases, 50.8 gonorrhea cases per 100,000 population) and 2012 (5856 cases, 88.6 per 100,000 population).³

In 2010 to 2012, PIMC screened sexually active females aged 16 to 25 years for gonorrhea and chlamydia and performed diagnostic testing for patients with symptoms suggestive of a gonorrhea infection. Approximately 35% of young females aged 16 to 25 years who visited PIMC outpatient clinics in 2010 to 2012 were screened annually for chlamydia and gonorrhea; routine STI screening did not occur in the emergency department or urgent care (collectively referred to as ED). The Phoenix Indian Medical Center provided gonorrhea treatment at no cost to all patients and offered no-cost expedited partner treatment. The Phoenix Indian Medical Center also employed a dedicated STI public health nurse to ensure that all patients who tested positive for gonorrhea and their partners were adequately tested and treated.

In response to the increase in gonorrhea, PIMC implemented facility-specific expanded gonorrhea screening recommendations in March of 2013 for its outpatient clinics and ED. After reviewing gonorrhea morbidity and epidemiology at PIMC and state and local STI surveillance data, PIMC developed the recommendations to ensure that gonorrhea screening would occur among the patient population comprising 80% of all gonorrhea cases at PIMC during the period 2010 to 2012. As a result, PIMC recommended expanded urogenital gonorrhea screening of all sexually active males and females aged 14 to 45 years seeking care at PIMC and deployed several interventions to facilitate gonorrhea screening. This study aimed to evaluate gonorrhea screening coverage, case finding, and positivity before and after expanded screening measures were implemented.

MATERIALS AND METHODS

Gonorrhea Test

Urine and provider-collected vaginal/cervical swabs were tested for gonorrhea using the same dual gonorrhea/chlamydia nucleic acid amplification test (NAAT; Becton Dickinson ProbeTec Qx Amplified DNA Assay) before and after expanded screening. The Phoenix Indian Medical Center did not screen for pharyngeal or rectal gonorrhea because Clinical Laboratory Improvement Amendment validation tests had not been performed to use NAATs with extragenital specimens.⁴

Interventions

Interventions to facilitate screening included electronic health record (EHR) reminder prompts, posters on walls, bundled laboratory test order sets, and provider education. In clinics that used reminder prompts (Internal Medicine and Family Practice), gonorrhea screening reminder prompts were added to the local EHR (*Resource and Patient Management System* used in all IHS facilities) in March 2013 for all male and female patients aged 14 to 45 years who had not been screened for gonorrhea at PIMC in the preceding 12 months. Reminder prompts appeared as alarm clock icons on EHR coversheet screens. Prompts could be engaged, thus activating the appearance of text boxes with screening recommendations, or bypassed. The EHR automatically deactivated prompts when it detected that tests had been ordered. Posters were also mounted by the ED triage desk reminding providers of enhanced screening criteria.

Bundled electronic laboratory order sets were developed in March 2013 that allowed outpatient and ED providers to include gonorrhea tests when ordering other urine-based tests such as urinalyses, urine cultures, pregnancy tests, or urine drug screens.

In April 2013, 50 outpatient and ED physicians and nurses attended presentations on gonorrhea epidemiology, revised gonorrhea screening guidelines, and appropriate patient/partner management.

Data Abstraction

We abstracted de-identified demographic and gonorrhea testing data for all patients aged 14 to 45 years who sought care at the PIMC ED or outpatient clinic (Obstetrics/Gynecology [including Labor and Delivery], Family Practice, Internal Medicine [including General Internal Medicine, Dermatology, Gastroenterology, Ophthalmology, and Rheumatology], Pediatrics, or Behavioral Health) during March 1, 2011–February 28, 2014. Demographic variables, including visit date, birth date, sex, and clinic visited, were abstracted from the clinic EHR. Purpose of visit was abstracted for patients who were tested for gonorrhea. Gonorrhea testing data, including test result date, test type, test result, and ordering clinic type, were abstracted from a separate electronic laboratory database.

Patients' demographic and visit EHR data were linked to gonorrhea testing data using patients' unique ID numbers. Patients' tests and results were then linked to the most recent clinic visit that matched the tests' ordering clinic type. In total, 23,161 gonorrhea tests

matched appropriate clinic visits of the same clinic type. Overall, 329 gonorrhea tests corresponded to recent visits by date but had discordant clinic visit and ordering clinic types; these were reclassified to patients' most recent clinic visit type. Sixteen gonorrhea tests were excluded because no corresponding clinic visit could be identified.

ICD-9 codes indicating patients' purpose of visit were used to classify patients into 2 categories: (1) asymptomatic patients not known to have a sexual partner with an STI who were screened or (2) patients who underwent diagnostic testing for suspected STI because of symptomatic presentation (*ICD-9* codes for chlamydia; gonorrhea; syphilis; STI in pregnancy; human papillomavirus; trichomonas; urethritis; venereal disease; orchitis/epididymitis; vaginitis; urinary dysuria; frequency, hesitancy, or urgency; urinary tract disorder or infection; hematuria; prostatitis; abnormal penile, vaginal, rectal, or cervical findings; pelvic inflammatory disease; cervicitis; discharge; abdominal, pelvic, vaginal, penile, or rectal pain; menstrual disorder [Supplemental Table 1]) or because of a partner with an STI (V01.6: sexual contact with a person diagnosed as having an STI).

Data Analysis

We calculated gonorrhea screening coverage and case finding and positivity for three 1-year periods: 2 that occurred before screening interventions were implemented (March 2011–February 2012 [2011] and March 2012–February 2013 [2012]) and one after screening interventions (March 2013–February 2014 [2013]). Gonorrhea screening coverage was calculated by dividing the number of patients aged 14 to 45 years screened for gonorrhea in PIMC's ED or outpatient clinics at least once in 1 year by the total number of people aged 14 to 45 years with at least 1 visit to those facilities that year. Only patients' first clinic visit and first gonorrhea test per month or year were included in monthly or annual analyses. Only patients' most recent visit and most recent gonorrhea test were included for overall 2011 to 2013 analyses. Percent change in screening coverage was calculated by comparing gonorrhea screening coverage in 2013 to gonorrhea screening coverage in 2012 and 2011. Case finding was based on gonorrhea test results from the electronic laboratory database. Positivity was calculated by dividing the number of patients with at least 1 positive gonorrhea test result in 1 year by the total number of patients screened for gonorrhea at least once that year. Percent change in gonorrhea case finding was calculated by comparing the number of positive tests in 2013 to the number of positive tests in 2012 and 2011; changes in positivity were calculated by comparing positivity in 2013 to positivity in 2012 and 2011.

Analyses were performed as part of a public health response and were approved by Centers for Disease Control and Prevention and Phoenix Area IHS institutional review boards; Centers for Disease Control and Prevention institutional review boards determined that the project was not human subjects research.^{5,6} Data were analyzed using SAS v. 9.3 (SAS Institute, Inc, Cary, NC).

Cost analysis

Costs were based on an estimated \$30 for performing each test. Additional costs to implement interventions were minimal because on-site staff performed educational sessions and EHR modifications.

RESULTS

Study Population

Overall, 39,437 patients aged 14 to 45 years made 263,137 visits to the ED or outpatient clinics March 1, 2011–February 28, 2014. The number of patients and visits varied slightly by year: 2011: 23,244 patients (85,801 visits), 2012: 24,088 patients (87,999 visits), and 2013: 22,672 patients (89,337 visits). Most patients made only 1 (63.2% in 2011, 64.2% in 2012, and 59.9% in 2013) or 2 (24.5% in 2011, 24.3% in 2012, 26.3% in 2013) visits to PIMC per year. Of those with 2 visits to PIMC, the majority (78.6% in 2011, 78.9% in 2012, 77.1% in 2013) had 1 ED visit in addition to 1 outpatient visit.

Gonorrhea Screening

In total, 36% (n = 14,070) of patients aged 14 to 45 years were screened for gonorrhea at least once in 2011 to 2013. Gonorrhea screening coverage increased from 21% (2011) and 22% (2012) to 38% in 2013 (Table 1). The number of patients screened for gonorrhea at least 2 times also increased from 814 (2011) and 932 (2012) to 1909 in 2013.

When analyzed by month (Fig. 1), a sharp increase in gonorrhea screening coverage occurred in April 2013 after expanded screening criteria were implemented. A larger percentage of patients was screened for gonorrhea in every month of 2013 compared with other years. In 2013, gonorrhea screening coverage peaked 2 months after the interventions were introduced and then slowly declined.

Increases in gonorrhea screening coverage occurred among both males and females of all ages (Fig. 2). Compared with 2012, gonorrhea screening coverage in 2013 increased 50% among females and 203% among males. Screening coverage increased in nearly every clinic type from 2012 to 2013: from 11% to 30% in the ED, 31% to 47% in Family Practice, 5% to 32% in Internal Medicine, 1% to 21% in Behavioral Health, and 6% to 19% in Pediatrics. In Obstetrics/Gynecology, coverage was unchanged at 77%.

Symptom data were only available for patients who were tested for gonorrhea. When stratifying by either (1) asymptomatic patients screened for gonorrhea or (2) patients who underwent diagnostic gonorrhea testing because of symptoms or partner with an STI, the number of asymptomatic patients screened for gonorrhea in 2013 increased 121% compared with 2012 (from 2537 patients in 2012 to 5619 in 2013). The number of asymptomatic males screened for gonorrhea increased 264% (from 502 to 1825); the number of asymptomatic females screened increased 86% (from 2035 to 3794). The number of patients who underwent diagnostic testing for gonorrhea because of symptoms or partner with an STI increased 11% (from 2658 in 2012 to 2947 in 2013).

Gonorrhea Case Finding and Positivity

Among all patients screened for gonorrhea in 2011 to 2013, 371 (2.6%) tested positive for gonorrhea at least once. In 2013 compared with 2012, the number of patients who tested positive at least once increased 33% but positivity decreased: 97 (2.0%) patients tested positive in 2011, 124 (2.4%) tested positive in 2012, and 163 (1.9%) tested positive in 2013

(Table 1). The proportion of patients with repeat gonorrhea infections did not change between 2012 and 2013. Among patients who tested positive, 3 (3.1%) of 97 patients in 2011, 9 (7.3%) of 124 patients in 2012, and 12 (7.4%) of 163 patients in 2013 tested positive for gonorrhea twice in 1 year.

All increased case finding in 2013 occurred among females (Fig. 2); increases occurred across all age groups. The total number of females diagnosed as having gonorrhea in 2013 ($n = 104$) increased 68% compared with 2012 ($n = 62$; Table 1), but overall positivity among females was similar in all 3 years (range, 1.4%–1.7%). The largest increase in gonorrhea case finding in 2013 occurred among women aged 25 to 29 years. However, throughout the study period, gonorrhea positivity was highest among women aged 20 to 24 years and lowest among women aged 35 years or older (Table 1).

Most of increased case finding occurred among asymptomatic females aged 14 to 35 years who were screened for gonorrhea (Fig. 3). Between 2012 and 2013, the number of asymptomatic females who tested positive for gonorrhea increased 67% (from 15 to 25) among those aged 14 to 25 years and 325% (from 4 to 17) among those aged 26 to 35 years; no increased case finding occurred among asymptomatic females aged 36 to 45 years.

No increased case finding occurred among males (Fig. 2); as a result, positivity among males was lower in 2013 (2.6%) than in 2012 (7.5%) and 2011 (4.8%; Table 1). Gonorrhea positivity was highest among men aged 20 to 24 years in 2012 and 2013 and among males aged 14 to 19 years in 2011 (Table 1).

Almost all increased case finding occurred in the ED (Table 1). In 2013 compared with 2012, the ED diagnosed 43 more females with gonorrhea, Obstetrics/Gynecology diagnosed 3 more females, and Family Practice, Internal Medicine, and Pediatrics diagnosed 7 fewer patients.

Direct Medical Costs

In 2013, PIMC performed 4744 additional gonorrhea tests compared with 2012. This increase in screening resulted in 39 additional patients diagnosed as having gonorrhea in 2013 compared with 2012; 42 additional females were diagnosed but 3 fewer males were diagnosed. At \$30 per NAAT test, PIMC spent \$142,320 on expanded gonorrhea screening, which equated to \$3649 per additional gonorrhea case detected. Because additional cases occurred only among females, when limiting the cost analysis to female screening alone (an additional 3123 tests detected an additional 42 cases), the screening cost decreased to \$2230 per additional gonorrhea case detected.

DISCUSSION

After a large urban medical center serving American Indians used provider trainings, EHR reminder prompts, and bundled electronic laboratory orders to implement expanded gonorrhea screening criteria, urogenital gonorrhea screening increased among males and females aged 14 to 45 years across nearly all clinic types. Screening coverage was unchanged only in Obstetrics/Gynecology because most of their patients were already being

screened for gonorrhea. The Phoenix Indian Medical Center's facility-wide screening increases are consistent with other studies demonstrating improved clinical practice after computer reminders, provider education, or removal of barriers to screening were introduced.⁷⁻¹¹ Electronic health record reminder prompts have an important role in improving clinical practice and have had particular success in other IHS and federal health care facilities.^{8,12} Importantly, interventions such as EHR prompts and bundled laboratory orders are scalable across many different provider types and clinics, particularly in IHS facilities using a common health IT platform.

Although large initial increases in gonorrhea screening were observed, the percent of persons screened waned over time. Given that more than 60% of PIMC patients were not screened for gonorrhea in 2013, it is unlikely that declines in screening over time were due to a lack of eligible patients. Instead, our results support other studies that have demonstrated the importance of sustained support in maintaining high STI screening rates^{13,14} and suggest that additional interventions may be required to ensure high ongoing screening coverage. Specifically, alert fatigue has been shown to occur among providers, particularly when multiple reminder prompts are used.¹⁵

Case finding in the ED increased 54% after the number of patients screened for gonorrhea doubled; the large increase may be due, in part, to ED populations being at increased risk for STIs or having a higher gonorrhea prevalence than other patient populations.¹⁶ The large increase in screening in the ED is notable given that other studies have found the implementation of STI screening in the ED challenging.¹⁶ Emergency department settings may have limited space and staffing for screening activities and clinicians may lack time for STI screening when their priority is caring for acutely ill patients. Informal discussions with ED staff suggest that increased screening was largely due to buy-in from providers responsible for ordering laboratories at triage; posters by the triage desk about enhanced screening criteria and the ease of using bundled laboratory orders were both mentioned as tools that aided triage providers to increase screening.

After expanded gonorrhea screening, overall gonorrhea case finding increased with an expected decrease in gonorrhea positivity. Given that most urogenital gonococcal infections in males are symptomatic,¹⁷ it is not surprising that case finding increased only among females despite greater increases in screening among males. Additional case finding occurred largely in women aged 25 to 34 years and primarily among asymptomatic females. Importantly, this substantial gonorrhea burden among asymptomatic older women would have been missed using traditional gonorrhea screening recommendations. Although our findings indicate limited value in expanded urogenital gonorrhea screening among males to identify asymptomatic gonorrhea, gonorrhea positivity among women in our population supports national recommendations to screen sexually active women at risk, such as those younger than 25 years. Furthermore, our results highlight the importance of understanding local gonorrhea epidemiology and tailoring screening programs to populations most affected.¹⁸ Following our analysis, PIMC further revised its screening criteria in June 2014 to exclude women 35 years or older and males, which emphasizes the importance of evaluating screening programs to guide public health interventions.

Limited data are available on costs associated with expanded gonorrhea screening. Our basic cost analysis that only includes diagnostic testing costs suggests that expanded screening was less costly when limited to women. Direct costs would have been higher if we had included costs associated with provider trainings, EHR modifications, and efforts to contact and provide follow-up for patients unaware of their infection and their partners. Conversely, overall costs would have been lower if additional chlamydia cases diagnosed by NAAT (data not shown) or savings associated with averted sequelae of gonorrhea and chlamydia infections such as infertility, pelvic inflammatory disease, and ectopic pregnancy had been included.^{19,20}

This study has a number of limitations. The primary limitation is that health care visit-based data were used to derive patient-based and clinic-based gonorrhea screening estimates. Clinic patient populations were calculated using patients' first clinic visit, whereas gonorrhea screening was assigned to the clinic that ordered the test. This may have overestimated or underestimated screening coverage by clinic. However, given that more than 85% of patients made only 1 or 2 visits to PIMC per year, our methods likely had a limited effect on screening coverage by clinic type. Limitations inherent in administrative data, such as inaccurate or incomplete coding, may also have resulted in the overestimation or underestimation of gonorrhea screening and positivity by clinic type and symptoms. We were also unable to determine whether patients were sexually active; thus, our estimates include all patients aged 14 to 45 years. This likely overestimates the proportion of patients who should have been screened for gonorrhea. Finally, although this study suggests strong temporal associations between the interventions and changes in gonorrhea screening, we are unable to prove a causal relationship. The lack of a control arm in this observational study does not allow for comparison of screening in groups exposed and not exposed to interventions.

This is the first analysis to address screening performance, case finding, and costs associated with expanded gonorrhea screening among American Indians after increases in gonorrhea rates. Gonorrhea screening increased among males and females in nearly every clinic after multifaceted interventions that addressed barriers to screening at many levels, including provider education and bundled laboratory orders to facilitate ordering tests. The Phoenix Indian Medical Center modified their routine gonorrhea screening recommendations to include only females aged 14 to 35 years because additional case finding primarily occurred among younger asymptomatic females. These findings highlight the importance of evaluating screening programs to refine program attributes and guide public health interventions.

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FIGURE 1.

Percent of patients who were screened for gonorrhea* by month and year, March 2011–February 2014. *Includes only 1 gonorrhea test per patient per month (patients' first test).

†2011: March 2011–February 2012; 2012: March 2012–February 2013; 2013: March 2013–February 2014.

FIGURE 2.

Percent of patients who were screened for gonorrhea, percent of patients who were screened for gonorrhea who tested positive, and number of gonorrhea cases diagnosed by sex and year, March 2011–February 2014. **Includes only 1 gonorrhea test per patient per year (patients' first test) and only one positive gonorrhea test result per patient per year (patients' first positive test). †2011: March 2011–February 2012; 2012: March 2012–February 2013; 2013: March 2013–February 2014.

FIGURE 3.

Symptoms of patients who tested positive for gonorrhea* by sex, age, and year, March 2011–February 2014. *Includes only 1 positive gonorrhea test result per patient per year (patients' first positive test). †2011: March 2011–February 2012; 2012: March 2012–February 2013; 2013: March 2013–February 2014.

Number and Percent of Patients by Year Who Were Screened for Gonorrhea and Who Tested Positive At Least Once, March 2011–February 2014

TABLE 1.

	2011*					2012*					2013*					2013 Compared With 2012				
	Total No.	Screened [†]		Tested Positive [‡]		Total No.	Screened [†]		Tested Positive [‡]		Total No.	Screened [‡]		Tested Positive [‡]		Screened	Change in No.	Change in No.	% Change in No.	
		No.	%	No.	%		No.	%	No.	%		No.	%	No.	%					
Female	14,178	4091	28.9	61	1.5	14,575	4373	30.0	62	1.4	13,973	6291	45.0	104	1.7	1918	42	67.7		
14–19 y	2357	547	23.2	12	2.2	2336	494	21.1	10	2.0	2023	739	36.5	13	1.8	245	3	8.3		
20–24 y	3022	1022	33.8	26	2.5	3601	1095	30.4	28	2.6	2829	1395	49.3	42	3.0	300	14	50.0		
25–29 y	2693	908	33.7	13	1.4	2796	995	35.6	11	1.1	2789	1374	49.3	25	1.8	379	14	92.3		
30–34 y	2258	667	29.5	3	0.4	2347	761	32.4	9	1.2	2313	1086	47.0	12	1.1	325	3	33.3		
35–39 y	1777	467	26.3	4	0.9	1925	475	24.7	1	0.2	1885	811	43.0	6	0.7	336	5	50.0		
40–45 y	2071	480	23.2	3	0.6	2110	553	26.2	3	0.5	2134	886	41.5	6	0.7	333	3	100.0		
Male	9066	752	8.3	36	4.8	9513	822	8.6	62	7.5	8699	2275	26.2	59	2.6	1453	–3	–4.8		
14–19 y	1699	67	3.9	7	10.4	1782	67	3.8	5	7.5	1557	239	15.4	10	4.2	172	5	42.9		
20–24 y	1637	177	10.8	15	8.5	1656	220	13.3	24	10.9	1509	397	26.3	18	4.5	177	–6	–25.0		
25–29 y	1628	177	10.9	8	4.5	1744	189	10.8	17	9.0	1598	445	27.8	15	3.4	256	–2	–11.8		
30–34 y	1429	132	9.2	3	2.3	1548	146	9.4	10	6.8	1441	397	27.6	9	2.3	251	–1	–10.0		
35–39 y	1234	87	7.1	1	1.1	1221	84	6.9	3	3.6	1151	344	29.9	2	0.6	260	–1	–33.3		
40–45 y	1439	112	7.8	2	1.8	1562	116	7.4	3	2.6	1443	453	31.4	5	1.1	337	2	66.7		
Clinic [§]																				
Emergency Medicine	12,865	1613	12.5	75	4.6	13,459	1504	11.2	79	5.3	11,909	3541	29.7	122	3.4	2037	43	54.4		
Family Practice	2233	712	31.9	4	0.6	2161	677	31.3	12	1.8	2551	1198	47.0	7	0.6	521	–5	–41.7		
Internal Medicine	2004	61	3.0	0	0.0	1915	91	4.8	1	1.1	2029	639	31.5	0	0.0	548	–1	–100.0		
Behavioral Health	1302	6	0.5	0	0.0	1329	10	0.8	0	0.0	1233	254	20.6	0	0.0	244	0	0.0		
Obstetrics/Gynecology	3374	2431	72.1	18	0.7	3747	2867	76.5	31	1.1	3631	2789	76.8	34	1.2	–78	0.4	9.7		
Pediatrics	623	20	3.2	0	0.0	754	46	6.1	1	2.2	771	145	18.8	0	0.0	99	–1	–100.0		

2011 [*]		2012 [*]			2013 [*]			2013 Compared With 2012									
Total No.	Screened [†]	Tested Positive [‡]	Total No.	Screened [†]	Tested Positive [‡]	Total No.	Screened [‡]	Tested Positive [‡]	Screened	Tested Positive							
23,244	4843	20.8	97	2.0	24,088	5195	21.6	124	2.4	22,672	8566	37.8	163	1.9	75.2	39	31.5
Total																	

^{*} 2011: March 2011–February 2012; 2012: March 2012–February 2013; 2013: March 2013–February 2014.

[†] Includes only patients' first gonorrhea test per year.

[‡] Includes only patients' first positive gonorrhea test per year.

[§] Total number of patients excludes 843 patients in 2011, 723 patients in 2012, 139 patients in 2013, and 1065 patients in 2011 to 2013 for whom clinic type could not be ascertained.