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Missed Opportunities for Chlamydia Screening in Title X Family Planning Clinics

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Abstract

Background: Annual chlamydia (CT) screening is recommended for women younger than 25 years, yet less than half of young women seeking health care are screened annually. We analyzed Title X family planning service data from the Northwest United States to assess factors associated with missed opportunities for CT screening. Our primary hypothesis was screening coverage is higher during annual preventive health visits compared to other visit types. Study objectives were: (1) identify gaps in screening coverage by patient demographics, visit characteristics, and clinic measures; and (2) examine the association between visit type and CT screening by controlling for other covariates and stratifying by state.

Methods: Calendar year 2011 Title X visit records (n = 180,856) were aggregated to the patient level (n = 112,926) to assess CT screening coverage by all characteristics. Screening variation was explored by bivariate and multivariate Poisson regression. Adjusted models for each state estimated association between comprehensive examination and screening controlling for confounders.

Results: Clinic and visit characteristics were associated with CT screening. Coverage ranged from 45% in Washington to 80% in Alaska. Only 34% of patients visited for a routine comprehensive examination. Visit type was associated with screening; 75% of patients who had a comprehensive examination were screened versus 34% of those without a comprehensive examination (unadjusted PR, 2.18; 95% confidence interval, 2.16–2.21). The association between comprehensive examination and CT screening varied significantly by state (interaction term, $P < 0.001$).

Conclusions: Missed screening opportunities are common among women who access brief appointments for specific needs but do not seek routine preventive care, particularly in some states. Structural interventions may help address these systematically missed opportunities.

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Young women are at high risk of *Chlamydia trachomatis* (CT) infection. Serious health consequences of untreated CT include pelvic inflammatory disease, ectopic pregnancy, and infertility.[1] Because this sexually transmitted infection (STI) is often asymptomatic, annual screening for women younger than 25 years is necessary to identify and treat most infections.[1,2] In practice, however, less than half of sexually active young women seeking health care are screened each year.[3,4] Title X family planning (FP) clinics are major providers of reproductive health care for young women, including STI screening. Despite their reproductive health focus, only 58% of women aged 25 years or younger in Title X-funded FP clinics were screened in 2011, and screening coverage has plateaued in recent years.[5,6]

Successful interventions to improve CT screening coverage in FP, and other clinic types have included development and dissemination of national screening guidelines and performance measures, quality improvement initiatives involving data review and feedback to clinicians, laboratory requisition form modifications, required documentation of reason for screening, and changes to clinical protocols, for example, placing CT specimen collection kits alongside Pap test materials.[4,7–9] Additionally, technological innovations, such as self-collected vaginal swabs, mail-in test kits, and patient and provider reminder systems, have improved screening.[10–13]

Despite these advances, experts hypothesize that large-scale structural barriers may be contributing to low screening coverage, including limited resources to support screening and unrealistic demands on clinician time.[14,15] Screening coverage varies by health plan (commercial vs Medicaid plans), as well as by provider characteristics including Title X participation, patient volume, public versus private sites, patient volume, percent urban/rural location, and percent African American patients.[3,16] Exploring variation in screening at multiple levels (ie, across states and amongst patients) may uncover missed opportunities for testing and inform future interventions to improve screening coverage.

Our study used secondary analysis of Title X patient FP service data to assess factors associated with missed opportunities for CT screening among female patients aged 15 to 24 years. Our primary hypothesis was that screening coverage is higher during annual preventive health visits compared with other visit types, and our secondary hypothesis was that this relationship may vary by state. Our study objectives were (1) identify gaps in screening coverage by patient demographics, visit characteristics, and clinic measures; and (2) examine the association between visit type and CT screening by controlling for other covariates and stratifying by state, if state is determined to be an effect modifier.

MATERIALS AND METHODS

Data Sources

This study used data from US Public Health Service Region X's (Washington, Idaho, Oregon, and Alaska) Title X program from calendar year 2011 (CY2011). This data set contained patient demographic information (sex, age, races, and ethnicity), and visit characteristics (type of visit, insurance status, number of visits, and whether a CT test was performed). We also integrated 2 clinic measures from clinic lists maintained for data

management: the state in which the clinic was located, and whether the clinic participated in the national Infertility Prevention Project (IPP), a public sector STI screening and treatment program. Though these programs maintained distinct data reporting systems, over 70% of Region X Title X–funded clinics participated in IPP.

Title X FP Database—The database contained encounter (visit) records that FP agencies extracted from their administrative information systems and reported to a regional data processor. The data processor compiled and sent annual data files to Cardea Services, the Region X Title X data manager for management, analysis, and submission to the federal Office of Population Affairs (OPA).

Records contained clinic and patient identifiers, demographics, and visit characteristics. Demographics included sex, age, race(s), and ethnicity. Visit characteristics included visit type (initial medical examination, annual medical examination, positive laboratory test follow-up, counseling-only visits, contraceptive method, or pregnancy-test only visit), clinical services (eg, blood pressure, breast examination, bimanual pelvic, and so on), insurance, and laboratory tests ordered (eg, Pap, CT, gonorrhea, syphilis, and human immunodeficiency virus), and contraception, counseling, and referral services.[17]

During data collection, patients' principal insurance was documented as "private," "public" (defined as either "Medicaid or Medicare"), "uninsured," or "unknown." In accordance with OPA guidelines, insurance through Medicaid FP expansion programs was documented differently depending on services provided. Family planning expansion programs covering a broad set of primary care benefits—including FP—were documented as "public insurance," whereas those only covering FP services, but excluding broader primary care, were documented as "uninsured."

Title X—IPP Clinic List—The Title X—IPP clinic list database was developed by Cardea staff for data management purposes, as Cardea served as data manager for both the Title X and IPP programs. The database contained a list of clinics participating in the Title X and IPP programs and established a common unique identifier for each clinic.

Data Management and Statistical Analyses

The Title X data set contained 180,856 encounter records from female patients aged 15 to 24 years, CY2011. Region X IPP guidelines recommended annual CT screening for females aged 24 years or younger. We aggregated Title X visit records to patient level (n = 112,926) to estimate annual screening coverage (number of women tested for CT at least once in the calendar year/number of women accessing services in the calendar year). Measures in the aggregate data set included clinic ID, patient ID, date of birth, age at most recent visit, race/ethnicity, insurance type, number of CY2011 clinic visits, visit types, and any CT test during CY2011 (dichotomous yes/no). Clinic IPP participation and state where clinic was located was merged from clinic lists.

When aggregating to the patient level, a binary variable was created from visit type to indicate whether or not the patient had any preventive health visit at any point during the year. The resulting variable in the aggregate data set was called "comprehensive

examination." Visits were considered comprehensive if they included blood pressure, height/weight, thyroid examination, heart and lung auscultation, breast examination, abdominal palpation, extremities, bimanual/speculum pelvic examination, and appropriate laboratory services.[17]

Item frequency distributions were generated; cross-tabulations were computed for CT screening. To investigate our hypothesis for an association between visit type and screening, we used Poisson regression to determine bivariate and multivariate prevalence ratios and 95% confidence intervals (CIs) for CT screening. Effect modification was assessed by including an interaction term for visit type by state. Because the interaction term was significant, we constructed separate multivariate models for each state and assessed confounding for each model using a 10% change-in-estimate approach for covariates significant at the bivariate level. Given the large sample size, P values <0.001 were considered statistically significant for all statistical tests. Analyses were conducted using SPSS version 19. Data were collected as part of routine surveillance activities related to FP service provision and sexually transmitted disease control among women. All data used for analysis were deidentified. Centers for Disease Control and Prevention determined this project was nonresearch.

RESULTS

In 2011, Region X Title X clinics served 112,926 female patients aged 15 to 24 years (Table 1). Median age was 20 years; 70% were non-Hispanic (NH) white, 16% Hispanic, and all other racial groups ≤3%. Over half (52%) were uninsured. Almost two thirds (66%) visited the clinic only once, and 34% had a comprehensive examination. About half (48%, n = 54,325) were tested for CT at least once during 2011.

Screening coverage varied significantly by patient demographics, but absolute differences were modest (Table 2). Coverage was highest among women aged 20 to 24 years, American Indian/Alaska Native, and NH white patients. Coverage was substantially higher in Alaska (80%) and Idaho (62%) compared with Oregon (46%) and Washington (45%). Publicly insured patients were significantly less likely to be screened than privately insured or uninsured patients (39% compared with 52% and 50%, respectively). Screening was associated with number of clinic visits (67% screened among patients that visited 3 or more times compared with 41% of patients that visited only once) and was modestly higher in IPP clinics (50% IPP vs 43% non-IPP clinics). Comprehensive examination was associated with screening; 75% of patients who had a comprehensive examination were screened versus 34% of those without a comprehensive examination during 2011 (unadjusted PR, 2.18; 95% CI, 2.16–2.21).

The prevalence of a comprehensive examination varied by state (Alaska, 21%; Idaho, 60%; Oregon, 30%; Washington, 34%). The association between comprehensive examination and CT screening also varied by state (interaction term, $P < 0.001$) (Table 3). In Washington's adjusted model, age, race/ethnicity, state, number of clinic visits, and clinic participation in IPP confounded the association between comprehensive examination and CT screening by greater than 10%. In the remaining states, none of the factors explored confounded the effect

of comprehensive examination on CT screening, so unadjusted PRs were used. In Idaho, the prevalence of screening at a comprehensive examination was nearly 4 times the prevalence of screening at other visit types, whereas in Alaska, screening coverage was about the same regardless of visit type.

DISCUSSION

This analysis used a large regional administrative information database to explore missed opportunities for CT screening from a multilevel perspective that considered characteristics of individual patients as well as the systems in which they sought care. Clinic and visit characteristics (state and visit type, followed by type of insurance and number of clinic visits) were predictive of CT screening, whereas patient demographics were not.

Overall, patients were more than twice as likely to be screened for CT if they had a comprehensive examination during the year. This finding likely reflects clinical protocols that only include routine CT screening during annual preventive care visits. Most clinical interventions to increase CT screening have deliberately tied it to other preventive health services, such as cervical cytology screening.[9,18] Although these interventions did increase screening coverage, our finding that only 45% of patients visited the clinic for a comprehensive examination (when, by definition, most preventive health services should be provided) suggests that linking CT screening to cervical cytology screening is inherently problematic. Other recent research revealed additional reasons why this linkage is problematic. Moyer observed that a recent change in federal guidance reducing the recommended frequency of cervical cytology screening unintentionally lead to a reduction in CT screening coverage.[19] Thus, interventions that dissociate CT screenings from other preventive health services may warrant exploration.

An alternative option for a CT screening protocol could include adding a flag or pop up to electronic health records to screen women the first time they visit each calendar year regardless of visit type rather than waiting for their annual preventive care examination. To be successful, such a protocol would require appropriate resources and system changes, for example, providing vaginal swab self-collection kits during intake and issuing standing orders enabling midlevel practitioners to order CT tests.[15,20,21]

The large differences we observed in screening coverage by state have been documented in federal Title X reports.[5] Our results expanded the scope of this issue by examining states' variation in screening by visit type. In 3 of 4 states, patients who had received comprehensive examinations were consistently screened for CT (81.8%–88.7%). However, most visits did not involve a comprehensive examination and likelihood of screening during other visit types varied considerably among states, even after adjusting for observed confounders.

Further research is needed to better explain whether observed differences in CT screening by state reflect state-level policy differences and/or variation among the constellations of individual programs, agencies, clinics, and providers operating within each state. Differences in reimbursement policies for CT tests among Medicaid waiver programs, state

funds allocated for CT testing, and the size and level of centralization of the state FP program could cause differences in screening by state. However, variation in clinical protocols and practices among programs, agencies, clinics, and individual providers within states could also explain our findings. A recent study found Region X Title X clinic screening coverage ranged from 11–92%.[22] Additionally, Chow et al[16] found that screening coverage among women aged 25 years or younger was higher among Title X providers than non–Title X public and private providers in California.

Not surprisingly, screening increased with number of clinic visits, as higher-risk patients and patients diagnosed with STIs may visit more frequently for follow up. Additionally, the more frequently a patient visits the clinic, the greater the number of opportunities her provider has had to screen her. Nevertheless, our results showed that one third of patients visiting 3 or more times were never screened for CT, which underscores the need to address missed screening opportunities.

Lastly, we were surprised to find that publicly insured patients were least likely to be screened. Others have documented CT screening differences by insurance. The National Committee for Quality Assurance consistently reports higher screening coverage in Medicaid compared to commercial plans.[3] Pourat et al[23] reported higher screening coverage among publicly insured versus uninsured individuals, though this was based on a self-report survey of the general population. One possible explanation for our finding is that clinical screening protocols were developed to align with billing and reimbursement opportunities that may vary by patient mix and state Medicaid waivers. Because some states have implemented Medicaid expansion under the Affordable Care Act whereas others have not, assessing the impact of billing and reimbursement opportunities on CT screening coverage will remain important.[24]

Our study had a number of limitations. First, our data came from an administrative database where CT screening may be underreported.[25] It is possible that underreporting could differ by visit type or other visit characteristics, though it is unlikely to eliminate the large difference we observed in screening coverage by visit type. Second, we did not have a measure to remove nonsexually active patients, though the percentage is likely small in FP clinics. Third, Region X results are not generalizable nationwide. Fourth, visits covered by the Medicaid Expansion program for FP-only services were documented as “uninsured” in the regional database during data collection. Thus, there was no way for the authors to assess the volume of visits covered by the Medicaid Expansion program or to explore this group separately from patients whose visits were not covered by any type of insurance. Fifth, the data used for this analysis are from 2011 (the latest year for which visit- or patient-level data were available), and it is possible that screening practices could have changed as a result of improved insurance coverage or declined due to the ending of the IPP program which focused particular attention on CT screening for young women. Although patient-level data are not available later than 2011, aggregate screening coverage data presented in more recent Family Planning Annual Reports published by OPA indicates crude screening coverage rates have been stable, 2011 through 2015. Additionally, the 10 federal regions have maintained the same administrative functions, and programmatic guidelines for Title X clinics regarding CT screening have remained consistent. Finally, we caution readers not to interpret our

univariate results as total effect estimates for each covariate, because these were exploratory analyses not informed by causal models.[26] Our interest was comparing approximate strengths of associations across covariates, not precisely estimating each association.

This study has several strengths. First, although there is a significant amount of national, regional, and state data on crude screening coverage rates over time, this has not been examined at a more granular level. The Region X data set included a robust set of covariates that enabled a more detailed exploration of screening coverage. Our study revealed very large differences in service provision in some states, which has significant programmatic implications for how clinical interventions could be designed to maximize screening.

After 25 years of national efforts to increase CT screening coverage, screening coverage among women aged 24 years and younger remains suboptimal. This study suggests that multiple factors contribute to low screening coverage in FP clinics. Most significantly, we found that the majority of missed screening opportunities occur among patients who seek care for specific needs but do not receive routine preventive care, and that these patients constitute more than half of the Title X patient population. We also found that this differential in screening coverage varied significantly by state, suggesting that there may be more complex factors underlying this association. Further research is needed to understand whether structural interventions that dissociate CT screening from visit type could increase screening coverage across all visit types. Looking at policies and procedures in Alaska where screening coverage is high across all visit types could identify replicable models. However, additional structural interventions may also be needed to address larger system and policy issues such as insurer reimbursement that may create barriers to screening.

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TABLE 1.

Distribution of Characteristics Within Study Sample (n = 112,926)

Characteristic	n	% of Sample
Demographics		
Age, y		
15–17	20,413	18.1
18–19	25,772	22.8
20–24	66,741	59.1
Race/ethnicity		
NH White	79,745	70.6
NH Black	3021	2.7
American Indian/Alaskan Native	1682	1.5
Asian	3442	3.0
Native Hawaiian/Other Pacific Islander	880	0.8
Hispanic	18,281	16.2
Other, >1 race, or missing *	5875	5.2
Visit characteristics		
Insurance Status		
Public	21,058	18.6
Private	18,371	16.3
Uninsured	59,156	52.4
Unknown/missing	14,341	12.7
No. clinic visits		
1	74,350	65.8
2	22,124	19.6
3+	16,452	14.6
CE		
No	74,213	65.7
Yes	38,713	34.3
CT test done		
No	58,601	51.9
Yes	54,325	48.1
Clinic measures		
State		
Alaska	3970	3.5
Idaho	10,594	9.4
Oregon	56,916	50.4
Washington	41,446	36.7
Participates in IPP		
No	23,715	21.0
Yes	89,211	79.0

*Included 2362 (2.1%) patients that reported “other race,” 99 (0.1%) that reported more than 1 nonwhite race, and 3414 (3.0 %) with unknown/missing race.

CE, comprehensive examination.

TABLE 2.

Rates and Prevalence Ratios of CT Screening Among Female Family Planning Patients Ages 15–24 (n=112,926)

	Screened for CT		Prevalence Ratio of CT Screening	
Characteristic	**n**	**%**	**PR**	**95% CI**
Total	54,325	48.1	—	—
Demographics				
Age, y				
15–17	9427	46.2	0.95	(0.93–0.96)
18–19	12,325	47.8	0.98	(0.97–0.99)
20–24	32,573	48.8	Reference	
Race/ethnicity				
NH white	38,663	48.5	Reference	
NH black	1416	46.9	0.97	(0.93–1.00)
American Indian/Alaskan Native	876	52.1	1.07	(1.03–1.13)
Asian	1535	44.6	0.92	(0.89–0.96)
Native Hawaiian/other Pacific Islander	413	46.9	0.97	(0.9–1.04)
Hispanic	8610	47.1	0.97	(0.96–0.99)
Other, >1 race, or missing	2812	47.9	0.99	(0.96–1.01)
Visit characteristics				
Insurance status				
Public	8163	38.8	Reference	
Private	9280	50.5	1.30	(1.27–1.33)
Uninsured	30,980	52.4	1.35	(1.33–1.38)
Unknown/missing	5902	41.2	1.06	(1.03–1.09)
No. clinic visits				
1	30,645	41.2	Reference	
2	12,705	57.4	1.39	(1.37–1.41)
3+	10,975	66.7	1.62	(1.60–1.64)
CE				
No	25,417	34.2	Reference	
Yes	28,908	74.7	2.18	(2.16–2.21)

	Screened for CT		Prevalence Ratio of CT Screening	
Characteristic	**n**	**%**	**PR**	**95% CI**
Clinic measures				
State				
Alaska	3186	80.3	1.79	(1.76–1.82)
Idaho	6563	62.0	1.38	(1.36–1.41)
Oregon	25,994	45.7	1.02	(1.00–1.03)
Washington	18,582	44.8	Reference	
Clinic participates in IPP				
No	10,135	42.7	Reference	
Yes	44,190	49.5	1.16	(1.14–1.18)

TABLE 3.

Rates and Prevalence Ratios of CT Screening Among Female Patients Ages 15–24 Years by CE Visit Type, Stratified by State (n=112,926)

States	% Screened		Prevalence Ratios for Direct Effect of CE on CT Screening		
	CE	No CE	Unadjusted PR (95% CI)	Adjusted PR* (95% CI)	Covariates Remaining
Alaska (n = 3970)	85.7%	78.8%	1.09 (1.05–1.12)	1.09 (1.05–1.12)	None
Idaho (n = 10,594)	88.7%	22.6%	3.92 (3.70–4.14)	3.92 (3.70–4.14)	None
Oregon (n = 56,916)	81.8%	29.4%	2.78 (2.74–2.83)	2.78 (2.74–2.83)	None
Washington (41,446)	58.6%	37.9%	1.55 (1.51–1.58)	1.76 (1.73–1.80)	Age, race/ethnicity, state, number of clinic visits, and IPP participation
All states (n = 112,926)	74.7%	34.2%	2.18 (2.16–2.21)	Not adjusted	Not adjusted

*Separate models developed for each state initially included the following covariates: age, race/ethnicity, state, insurance type, number of visits, and IPP participation. Covariates were removed if they changed the direct effect estimate by <10%.