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Screening and Treatment of Sexually Transmitted Infections Among Medicaid Populations—A 2-State Analysis

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Background: Chlamydia, gonorrhea, and syphilis are common, treatable sexually transmitted infections (STIs) that are highly prevalent in the general US population. Costs associated with diagnosing and treating these conditions for individual states' Medicaid participants are unknown. The purpose of this study was to estimate the cost of screening and treatment for 3 common STIs for state Medicaid program budgets in Maryland and South Carolina.

Methods: A retrospective, cross-sectional study was conducted using Medicaid administrative claims data over a 2-year period. Claims were included based on the presence of one of the 3 study conditions in either diagnosis or procedure codes. Descriptive analyses were used to characterize the participant population and expenditures for services provided.

Results: Total Medicaid expenditures for STI care in state fiscal years 2016 and 2017 averaged \$43.5 million and \$22.3 million for each year in Maryland and South Carolina, respectively. Maryland had a greater proportion of costs associated with outpatient hospital and laboratory settings. Costs for care provided in the emergency department were highest in South Carolina.

Conclusions: Diagnosis and treatment of commonly reported STIs may have a considerable financial impact on individual state Medicaid programs. Public health activities directed at STI prevention are important tools for reducing these costs to states.

Sexually transmitted infection (STI) rates for chlamydia, gonorrhea, and syphilis in the United States have steadily increased since 2014. As of 2018, the national prevalence of chlamydia was 1.8 million cases (a 14% increase since 2014); gonorrhea, 583,405 cases (63% increase); and primary and secondary syphilis, 35,063 cases (71% increase).¹ From 2017 to 2018, rates of these STIs went up among both men and women and across people who identify as a

racial-ethnic minority.¹ Generally, national estimates from the Centers for Disease Control and Prevention for direct medical costs for STIs were estimated at \$16 billion in 2010 dollars.² The cost of care for chlamydia, gonorrhea, and syphilis has previously been estimated specifically for individual states such as Illinois. In 2006, using data from the Illinois Department of Public Health, costs were estimated at \$28.8 million for chlamydia, \$7.6 million for gonorrhea, and \$66,000 for syphilis.³ Given these data are over a decade old, this research is dated.

Medicaid is a US public health insurance program financed jointly by the federal and state governments that provides coverage for 1 in 5 Americans, including low-income adults, children, pregnant women, older adults, and people with disabilities. Within specific federal parameters, states have latitude to determine program eligibility according to family characteristics and income levels, as well as the services covered and the delivery systems that provide services.⁴ Income limits for eligibility are determined in relationship to the US Federal Poverty Level (FPL), which is updated annually nationwide and varies by family size, ranging from a \$12,760 income limit for individuals up to a \$44,120 income limit for a family of 8.⁵

State-level differences in Medicaid programs provide an opportunity to examine disparities in the prevalence and cost of care for STIs. Direct medical costs for STI care may be particularly high for Medicaid programs, as Medicaid participants not only experience lower socioeconomic status but also may be disproportionately representative of people who identify as a racial-ethnic minority, both groups that are unequally burdened by STIs.^{4,6} Medicaid programs in some states also provide access to STI screenings to a larger number of individuals through limited benefit family planning programs.⁷ Medicaid programs are more likely to pay for testing and treatment of STIs than for non-STI screening and treatment.^{4,8}

Currently, the most significant difference between states with regards to Medicaid coverage is whether or not they chose to expand coverage up to 138% of the FPL, to all adults not otherwise eligible, as a result of the passage of the Patient Protection and Affordable Care Act (ACA).⁴ Two states—Maryland and South Carolina—with otherwise similar Medicaid participation and STI prevalence, are examples of states that did (Maryland in 2014) and did not (South Carolina) expand coverage.^{1,9,10} In 2020, Medicaid coverage for adults in Maryland, in addition to those covered by expansion, included parents/caretakers under 123% of the FPL or pregnant women under 259% of the FPL. In South Carolina, parents/caretakers were eligible up to 95% of the FPL and pregnant women up to 194%.¹¹ As of July 2020, Maryland Medicaid enrolled 1,387,773 individuals, or approximately 18% of the state's total population.⁹ South Carolina Medicaid enrolled 1,061,957 individuals, or about 19% of the total state population.¹⁰

The purpose of this study was to estimate the cost of STI screening and treatment for 3 common conditions (chlamydia, gonorrhea, and syphilis) in state Medicaid programs in Maryland

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and South Carolina. Our study provides insight into the current estimated costs to states of providing STI care. The findings of this study are important for encouraging the creation of stronger ties between public health and health care systems at the state level.

MATERIALS AND METHODS

Study Design and Setting

This retrospective, cross-sectional study used Medicaid administrative claims data from Maryland and South Carolina to describe the frequency of screening and treatment for common STIs, as well as costs associated with these services. These 2 states were chosen because of the similar characteristics of their Medicaid populations, relative ease of access to claims data, and the opportunity to examine differences based on Medicaid expansion status.

Medicaid services in both states are provided through private health insurance plans administered by managed care organizations. These organizations are paid a per-capita dollar amount per enrollee for all Medicaid services that they provide. This form of payment is intended to both incentivize managed care organizations to efficiently manage services delivered and to avoid high cost care. Both states have similar participant enrollment in their managed care plans.^{12,13}

Study Participants

Because Medicaid covers low-income individuals, the demographic and socioeconomic characteristics of participants differ from a state's population as a whole. With regard to age, in 2019, Maryland's nonelderly Medicaid population younger than 19 years was 47.8% compared with 23.3% of the total population.^{14,15} In South Carolina, 58.7% of the nonelderly Medicaid population was younger than 19 years compared with 23% of the total population.^{14,15} By racial and ethnic identities, in 2019, Maryland's nonelderly Medicaid population identified as 43.3% Black and 16.3% Hispanic compared with 29.6% and 10.6% of the total population, respectively.^{16,17} In South Carolina, 44.4% of the nonelderly Medicaid population identified as Black and 8.9% identified as Hispanic compared with 26.2% and 5.7% of the total population, respectively.^{16,17}

Medicaid participants from each state that had at least 1 visit for STI services from July 1, 2016, to June 30, 2018 (2 state fiscal years [SFYs]) were identified for study inclusion. Participants did not have to be continuously enrolled during the study period. Claims from inpatient, outpatient, and physician services were included. Claims for dental, outpatient pharmacy, or non-STI-related services were excluded.

Medicaid participant claims must have had at least 1 of the specified STIs in the first 3 listed International Classification of Diseases-10-CM diagnosis codes, or a Current Procedural

Terminology/Healthcare Common Procedure Coding System procedure code associated with screening, testing, or treatment for at least one of the STIs. Chlamydia, gonorrhea, and syphilis were chosen for analysis due to their prevalence in the population (see Table 1 for selected diagnosis and procedure codes).³ Claims were assigned at the participant level to 1 of 4 possible STI groups in each SFY: participants who had visits associated with chlamydia only, those who had visits associated with gonorrhea only, those who had visits associated with syphilis only, and those who had visits associated with multiple STIs.

Outcome Variables

The primary study variable of interest was Medicaid program spending. For claims with a listed payment amount, payments were considered equal to Medicaid cost for that visit. Maryland managed care organizations do not report payment amounts on encounters; therefore, these encounters were matched to the Maryland Medicaid fee-for-service fee schedule and a cost was assigned. Because there is no equivalent database for South Carolina encounters, claims with listed payments of zero dollars in this data set ($n = 1558$) were excluded (representing less than 10% of the sample).¹⁸ Because claims associated with multiple STIs accounted for most of the sample, Medicaid spending was analyzed across provider type and patient characteristics for all claims rather than by specific condition. Emergency department (ED) claims were identified as those where revenue codes beginning with 045 or equal to 0981 were recorded.

Other Study Variables

Demographic characteristic data for participants with STI diagnoses were obtained from the respective states' enrollment databases. Maryland and South Carolina reported the distribution of patients by age, gender, and STI diagnosed. Because Maryland data did not report race separately from ethnicity, and because large proportions of participants in either state did not report their race or ethnicity, the 2 states harmonized their race and ethnicity reporting categories into Black, White, Hispanic, and other or unknown.

Data Sources and Statistical Methods

Data for Maryland were obtained from the Maryland Department of Health's (the Department's) Medicaid Management Information System data warehouse, which is maintained for the Department by The Hilltop Institute at the University of Maryland, Baltimore County. Data for South Carolina were obtained from the South Carolina Department of Health and Human Services through agreement with the South Carolina Revenue and Fiscal Affairs Office. Descriptive analyses were performed using SAS 9.4. Institutional review boards at the University of South Carolina

TABLE 1. Diagnosis and Procedure Codes Used to Create Inclusion Criteria for Study

	ICD-10	CPT/HCPCS
Chlamydia	A56 (A56.00, A56.01, A56.02, A56.09, A56.11, A56.19, A56.2, A56.3, A56.4, A56.8) A74.9	87491, 86631, 86632, 87110, 87270, 87320, 87490, 87492, 87801, 87810
Gonorrhea	A54 (A54.00, A54.01, A54.02, A54.03, A54.09, A54.1, A54.21, A54.22, A54.23, A54.24, A54.29, A54.6, A54.9)	87590, 87591, 87592, 87801, 87850
Syphilis	A51 (A51.0, A51.1, A51.2, A51.31, A51.32, A51.39, A51.41, A51.42, A51.43, A51.44, A51.45, A51.46, A51.49, A51.5, A51.9) A53 (A53.0, A53.9)	86592, 86593

ICD, International Classification of Diseases; CPT, Current Procedural Terminology; HCPCS, Healthcare Common Procedure Coding System.

TABLE 2. Characteristics of Medicaid Participants Screened or Treated for Chlamydia, Gonorrhea, and Syphilis, by State, by Fiscal Year

	South Carolina SFY 2016 (n = 97,593)		South Carolina SFY 2017 (n = 99,712)		Maryland SFY 2016 (n = 170,617)		Maryland SFY 2017 (n = 182,244)	
	n	%	n	%	n	%	n	%
Age, y								
0–17	14,036	14.4%	16,119	16.2%	10,792	6.3%	11,364	6.2%
18–24	32,554	33.4%	31,600	31.7%	41,470	24.3%	44,744	24.6%
25–34	33,955	34.8%	34,202	34.3%	58,687	34.4%	62,768	34.4%
35–44	11,442	11.7%	12,256	12.3%	28,743	16.8%	31,268	17.2%
45+	5606	5.7%	5535	5.6%	30,925	18.1%	32,100	17.6%
Gender								
Female	88,260	90.4%	88,749	89.0%	135,331	79.3%	141,331	77.6%
Race/Ethnicity								
Black*	50,529	51.8%	51,691	51.8%	90,358	53.0%	94,755	52.0%
White*	28,115	28.8%	28,708	28.8%	34,962	20.5%	36,313	19.9%
Hispanic	2004	2.1%	2431	2.4%	673	0.4%	415	0.2%
Other/unknown/missing	16,945	17.3%	16,882	17.0%	44,624	26.1%	50,761	27.9%
STI								
Chlamydia only	1381	1.4%	1523	1.5%	11,341	6.6%	12,163	6.7%
Gonorrhea only	394	0.4%	463	0.5%	826	0.5%	1030	0.6%
Syphilis only	4079	4.2%	4226	4.2%	27,176	15.9%	27,467	15.1%
Multiple	91,379	94.0%	93,500	93.8%	131,274	76.9%	141,584	77.7%

*Note: Maryland Black and White race categories may include people who also identify as Hispanic. People who identify as Hispanic are shown separately in South Carolina data.

and University of Maryland, Baltimore County approved this study as not human subjects research.

RESULTS

Demographic Characteristics of STI Service Users

Compared with South Carolina, Maryland Medicaid provided STI services to a larger number of participants (Table 2). For SFY 2016, 170,617 persons were tested and/or treated for suspected STI in Maryland Medicaid; in SFY 2017 this number was 182,244. This represented 16.1% and 17.2% of the total Maryland Medicaid population and 2.9% and 3.0% of the total population of the state, respectively, for each SFY.¹⁹ For South Carolina, the total number of the population tested and/or treated for suspected STI in SFY 2016 was 97,593 and for SFY 2017, 99,712. This represented 10.5% and 10.7% of the total Medicaid population and 2.0% and 2.0% of the total state population, respectively, for each SFY.¹⁹

Overall, Medicaid participants receiving STI services during this period in both states were majority women and younger than 35 years (Table 2). In Maryland, women were 79.3% and 77.6% of this population in SFYs 2016 and 2017, respectively, compared with 90.4% and 89.0% in South Carolina. In both

states, STI services were highest among Black participants, representing 52% to 53% of those receiving services.

Reported STI diagnoses differed between the 2 states. A large proportion of the South Carolina participants with STI claims had multiple diagnoses: 94.0% in SFY 2016 and 93.8% in SFY 2017. Maryland also had a high proportion of multiple diagnoses, but the percentages were lower: 76.9% in SFY 2016 and 77.7% in SFY 2017. Syphilis was the most common STI in both states among persons with a single diagnosis, followed by chlamydia. Gonorrhea was the least common individual diagnosis.

Medicaid Program Spending for STI Care

In both SFY 2016 and SFY 2017, Maryland exceeded South Carolina in the number of services for STI screening and treatment and in total expenditures for these services (Table 3). Maryland Medicaid spent \$41.5 million in SFY 2016 and \$45.4 million in SFY 2017, compared with South Carolina's spending of \$22.0 million in SFY 2016 and \$22.6 million in SFY 2017. For each of the SFYs, these costs represented about 0.4% of Maryland's total Medicaid budget and approximately 0.3% of South Carolina's total Medicaid budget.²⁰

TABLE 3. Estimated Medicaid Payments by Provider Type, by State, by Fiscal Year for Chlamydia, Gonorrhea, and Syphilis Screening or Treatment

Provider Type	South Carolina SFY 2016 (n = 170,305)		South Carolina SFY 2017 (n = 175,471)		Maryland SFY 2016 (n = 500,959)		Maryland SFY 2017 (n = 547,674)	
	n	\$	n	\$	n	\$	n	\$
Inpatient hospital	88	\$448,996	72	\$399,514	58	\$471,021	105	\$1,108,521
Outpatient hospital	32,492	\$7,598,595	33,699	\$7,997,308	20,027	\$26,369,761	19,912	\$27,434,018
ED	19,012	\$8,332,101	18,805	\$8,226,648	1254	\$735,332	1622	\$1,059,950
Physicians	8056	\$560,235	9368	\$666,827	18,858	\$764,513	28,983	\$1,174,308
Medical clinics	5461	\$287,014	6179	\$316,494	4468	\$193,116	5581	\$222,820
Independent laboratory	104,331	\$4,724,333	105,890	\$4,861,863	454,144	\$12,155,278	490,215	\$13,411,425
Other/missing	865	\$75,394	1458	\$107,773	2150	\$852,314	1256	\$976,712
Total		\$22,026,668		\$22,576,427		\$41,541,335		\$45,387,754

Comparing expenditures by provider type, the highest costs for services provided to South Carolina Medicaid participants occurred in the ED (\$8.3 million in SFY 2016 and \$8.2 million in SFY 2017). By contrast, Maryland had only \$0.7 million in ED claims in SFY 2016 and \$1.1 million in SFY 2017. The highest costs by provider type among services provided to Maryland Medicaid participants were observed for claims from the outpatient hospital setting (\$26.4 million in SFY 2016 and \$27.4 million in SFY 2016). By comparison, South Carolina had expenditures of \$7.6 million in SFY 2016 and \$8.0 million in SFY 2017 in the outpatient hospital setting.

DISCUSSION

This research is the first to estimate the cost of providing STI screening and treatment services for 3 common conditions (chlamydia, gonorrhea, and syphilis) for Medicaid participants in 2 states: one that expanded Medicaid (Maryland in 2014) and one that did not (South Carolina). Sexually transmitted infection screening and treatment services among Medicaid participants in Maryland were performed in higher numbers and at a higher total expenditure as compared with South Carolina, despite services provided to South Carolina Medicaid participants largely occurring in a high cost setting (the ED). Findings from this study illuminate the estimated costs to various states of providing STI care and establish the need to further promote public health activities directed at STI prevention.

Expected differences in the demographic characteristics of populations receiving STI care in Maryland and South Carolina were observed based on broader eligibility criteria for Maryland Medicaid because of its program expansion. The percentage of STI service users that identified as male was higher in Maryland (20.7% in SFY 2016, 22.4% in SFY 2017) versus South Carolina (9.6% in SFY 2016, 11.0% in SFY 2017). Men are only eligible for Medicaid coverage in South Carolina if they meet the income requirements and are a child younger than 19 years, a parent/caretaker, a senior adult, or a person with a disability.²¹ As of 2014, South Carolina Medicaid's limited family planning benefit was additionally made available to men and women with income up to 194% of the FPL.²² Maryland's family planning benefit, which covers individuals with income up to 264% of the FPL, expanded to include men on July 1, 2018.^{23,24}

Likewise, the proportion of service users in South Carolina skewed overall younger than service users in Maryland. A little over one third of Maryland STI service users were ages 35 years or older, whereas less than one fifth of South Carolina users were 35 years or older. Overall, Maryland serves a slightly larger share of adults ages 19 to 64 years (1 in 7 vs 1 in 8 in South Carolina), while South Carolina serves a higher proportion of children (3 in 7 vs 1 in 3 in Maryland).¹⁹ As of SFY 2018, 313,600 adults were newly enrolled into Maryland Medicaid; this expansion population must receive STI screenings, among other services, at no cost per the requirements of the ACA.^{7,25}

On average, Maryland provided 524,317 STI services each SFY, whereas 172,888 were provided in South Carolina. The relatively larger volume of services in Maryland may be associated with its expansion of Medicaid benefits as other states have shown increases in access to primary and outpatient care after program expansion.²⁶ Medicaid spending for STI medical care likewise reflected higher total expenditures in Maryland. However, both states' spending was similar in proportion to their overall state Medicaid budgets (0.4% in Maryland and 0.3% in South Carolina).²⁰

Differences between Maryland and South Carolina costs were most pronounced when looking at spending categorized by health care provider type. Maryland's costs reflected greater

payments to independent laboratories and to outpatient hospital services, which may also include hospital-based laboratories in the state (Table 3). South Carolina had much higher utilization and expenditures for STI screening and treatment associated with care performed in the ED. South Carolina Medicaid reported an average of 18,907 (10.9% of total) claims across the 2 years associated with an ED visit compared with 1438 claims (0.3% of total) in Maryland. The contrast in expenditures for ED services between the 2 states showed an average of 37.1% of total expenditures in South Carolina versus an average of only 2.1% of Maryland's total. Because the ED is a costly location to provide STI screening and treatment, with the potential for under or over treatment, avoiding service delivery in this location is desirable.²⁷

Maryland and South Carolina have dissimilar health service delivery systems, which may help explain differences in utilization and costs by provider type beyond that which may be the result of Medicaid expansion. Greater primary health care provider shortages may drive Medicaid participants in South Carolina to preferentially use the ED.²⁸ Existing efforts to increase the availability of primary health care providers should be coupled with activities that encourage regular STI screening in primary care settings including procedures for routine specimen collections and utilization of electronic health record reminders.²⁹

Further, Maryland Medicaid participants began mandatory enrollment into managed care organizations in 1991 and thus may be more accustomed to visiting a primary care provider rather than the ED when having symptoms of an STI.³⁰ By contrast, mandatory enrollment into South Carolina Medicaid managed care organizations did not begin until 2011.^{31s} Related, this change to Medicaid coverage provided by private managed care organizations fundamentally shifted STI service delivery from a public health response to one led by health care systems. In taking on STI management, however, managed care organizations have faced many barriers to developing adequate systems including competing priorities, lack of time, and lack of organizational support.^{32s}

Hospitals in Maryland and South Carolina may also have different billing procedures. Maryland differs from other states in having regulated hospital payment rates under a federal government waiver whereby each hospital has a cap on its revenue.^{33s} Maryland Medicaid administrative regulations require hospitals to bill as independent laboratories for analysis of specimens collected outside the hospital.^{34s} This may account for hospitals billing for STI tests as laboratory services instead of as ED visits.

STI treatment policies are dissimilar between the 2 states, which may also drive different utilization and thus cost patterns in Maryland versus South Carolina. For example, Maryland encourages expedited treatments for a patient's partner without first examining the partner, whereas South Carolina prohibits this.^{35s} Maryland allows minors younger than 18 years to consent to STI services; in contrast, South Carolina only allows minors 16 years or older to consent to STI care.^{36s} Where children and adolescents are covered for STI testing and treatment, higher rates of testing may be observed even if the prevalence rates may be lower among youth.^{37s}

Together, these characteristics of health care delivery in Maryland, combined with its decision as a state to expand Medicaid, indicate potential improvements in access to care for STI services for the state's Medicaid participants. This is helpful for populations that are disproportionately impacted by STIs, including people with low socioeconomic status or those who identify with a racial-ethnic minority group. Costs to state Medicaid programs associated with improvements in access to care may result in early detection and treatment of STIs that will outweigh potential future costs for more expensive treatment associated with undetected disease.^{32s} Given recent trends of increasing numbers of STI cases, programs may need to budget for increased

expenditures for providing STI screening and treatment services in state Medicaid programs moving forward.

Limitations were apparent in this study. First, since this was a cross-sectional study, there was no ability to compare utilization and costs over time, especially as it concerned the effect of implementation of Medicaid expansion as a result of the ACA. A recent study comparing pre-post expansion utilization of STI screenings among Oregon Medicaid participants found slightly lower utilization of and less likelihood of receiving these services among the population that was newly insured.^{38s}

Challenges with the available data also limited this study. Because the counts of individuals served included people with tests that had negative STI results, an incidence rate for STIs in either states' Medicaid program could not be calculated. Because of the nature of the data and required methodologies used, statistical comparisons of findings between the 2 states were not possible. Therefore, any differences noted between the 2 states here are not necessarily statistically significant. Also, as described in the methods section, the 2 states are not consistent in the way data on race and ethnicity are collected. The number of persons identifying with Hispanic ethnicity was lower in Maryland than in South Carolina, although this may be the result of a lack of separate ethnicity indicators in the Maryland data. Both states also had large percentages of missing data on race and ethnicity.

The findings in this study suggest that diagnosis and treatment of the most commonly reported STIs—chlamydia, gonorrhea, and syphilis—may have a considerable financial impact on individual state Medicaid programs. In order for states to reduce the costs associated with providing STI services, a continued focus on prevention of these infections is necessary. Primary prevention, coupled with continuously improving access to STI care, can reduce the burden of these diseases. Public health agencies and managed care organizations have an opportunity to partner to address their mutual goal of reducing STIs through sharing of resources and coordinating patient care.^{32s} Managed care organizations may also be financially incentivized to reduce STI rates, which in turn also incentivizes health systems to play an active role in reducing rates using, for example, quality improvement techniques.^{32s,39s} Further reinforcement from state public health departments' STI surveillance and prevention efforts, including contact tracing and distribution of prophylactics to prevent disease spread, may have effects on reducing disease burden as well. Although the recent COVID-19 public health emergency may have temporarily diverted attention from these more traditional public health concerns, it would benefit each state to concurrently address other preventable diseases as noted here in this work.

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For further references, please see "Supplemental References," <http://links.lww.com/OLQ/A605>.