

# Rural-Urban and Racial Disparities in HIV and STIs in South Carolina from 2019 to 2021

Giannouchos, T.<sup>1,2</sup>, Crouch, E.<sup>1,2</sup>, Merrell, M.<sup>1,2</sup>, Brown, M.<sup>3</sup>, Harrison, S.E.<sup>4</sup>, Pearson, W.<sup>5</sup>

<sup>1</sup> Dept. of Health Services Policy & Management, Arnold School of Public Health, University of South Carolina <sup>2</sup> Rural & Minority Health Research Center, University of South Carolina <sup>3</sup> Dept. of Epidemiology & Biostatistics, Arnold School of Public Health, University of South Carolina <sup>4</sup> Dept. of Psychology, College of Arts and Sciences, University of South Carolina <sup>5</sup> Division of STD Prevention, Centers for Disease Control and Prevention

## BACKGROUND AND PURPOSE

- Sexually transmitted infections (STIs) reached an all-time high in the United States (US) in 2019, totaling almost \$16 billion in direct medical costs<sup>1</sup>
- Increasing rates of STIs are not distributed equally across racial and ethnic groups
- Rates of STIs among racial/ethnic minority populations, particularly African Americans, are up to eight times higher compared to non-Hispanic white populations<sup>1,2</sup>
- In 2018, Black individuals accounted for 13% of the US population but made up 42% of new HIV cases, while Hispanic individuals accounted for 18% of the population but made up 26% of new HIV diagnoses<sup>3</sup>
- STIs have also disproportionately increased among rural residents compared to urban residents in the past two decades<sup>4</sup>
- South Carolina is among the top five states with the highest rates of STIs in the US, while an estimated 1 in 86 residents will acquire HIV in their lifetime<sup>5,6</sup>

### Purpose:

- To estimate the associations between three notifiable STIs (chlamydia, gonorrhea, syphilis), HIV, racial and ethnic identity, and rurality in South Carolina

## METHODS

- Retrospective study using the South Carolina Medicaid administrative claims data for the two most recent and complete state fiscal years of data available (fiscal year 1: July 2019 to June 2020; fiscal year 2: July 2020 to June 2021)
- All Medicaid beneficiaries with at least one claim for STIs or HIV services during the study period were included in our analysis
- Using a unique identifier, we identified all claims for unique beneficiaries across each fiscal year
- Main outcomes were ICD-10-CM confirmatory diagnoses for chlamydia, gonorrhea, syphilis, and HIV claims
- Current Procedural Terminology (CPT) codes for services and procedures related to these diseases were used in conjunction with ICD-10-CM codes to increase accuracy when available
- Any patient with at least one claim for a relevant diagnosis throughout the two-year study period was considered to have one of these diseases
- Two main independent variables of interest were:
  - Race/ethnicity (non-Hispanic white, non-Hispanic Black, and other/unknown)
  - Rurality (Urban vs Rural according to the rural-urban commuting area codes)
- Multivariable logistic regressions controlling for patient-level demographic & clinical characteristics and county-level variables

## RESULTS

- 158,731 Medicaid beneficiaries with at least one claim for STIs and/or HIV
  - Average age was 27.0 years (standard deviation =10.1), females (86.6%)
  - Non-Hispanic Black race/ethnicity (42.6%), urban areas residents (66.6%)
  - Common comorbidities:
    - Congestive heart failure (3.6%), Hypertension (2.9%), Obesity (2.2%)
- Medicaid beneficiaries with at least one encounter for:
  - Chlamydia: 9,985 (6.3%), Gonorrhea: 5,009 (3.2%)
  - Syphilis: 870 (0.5%), HIV 1,281 (0.8%)
- Non-Hispanic Black beneficiaries had higher proportions of each type of STIs and HIV, compared to their non-Hispanic White counterparts
- Chlamydia and gonorrhea were more prevalent among rural residents
- Syphilis and HIV were more prevalent among urban residents

Table 1: Stratified analyses of Medicaid beneficiaries' characteristics by STIs and HIV claims

	All	Chlamydia		Gonorrhea		Syphilis		HIV	
		Yes	No	Yes	No	Yes	No	Yes	No
N	158,371	9,985	148,746	5,009	153,722	870	157,861	1,281	157,450
%		6.3%	93.7%	3.2%	96.8%	0.5%	99.5%	0.8%	99.2%
Age – average (SD)	27.0 (10.1)	22.4 (6.2)	27.3 (10.4)	24.2 (7.6)	27.1 (10.3)	33.2 (14.1)	26.9 (10.2)	45.8 (12.8)	26.8 (10.1)
Age groups (%)									
0 to 17	17.3	20.9	17.1	16.7	17.3	5.4	17.4	1.3	17.4
18 to 24	29.9	52.0	28.4	44.9	29.4	25.1	29.9	6.0	30.1
25 to 34	33.2	22.7	33.9	29.6	33.4	34.9	33.2	16.1	33.4
35 to 44	13.5	3.6	14.2	6.8	13.7	14.9	13.5	19.4	13.5
45+	6.0	0.8	6.4	2.0	6.2	19.7	5.9	57.2	5.6
Gender (%)									
Male	13.4	11.4	13.5	15.0	13.3	35.5	13.3	48.3	13.1
Female	86.6	88.6	86.5	85.0	86.7	64.5	86.7	51.7	86.9
Race/ethnicity (%)									
Non-Hispanic White	24.5	17.2	25.0	15.6	24.8	18.8	24.5	8.2	24.6
Non-Hispanic Black	42.6	50.4	42.1	53.5	42.2	46.8	42.6	56.4	42.5
Other	32.9	32.5	32.9	30.9	33.0	34.4	32.9	35.4	32.9
Area of residence (%)									
Urban	66.6	61.4	66.9	62.2	66.7	73.2	66.5	69.1	66.5
Rural	33.4	38.6	33.1	37.8	33.3	26.8	33.5	30.9	33.5
Top comorbidities (%)									
CHF	3.6	2.1	3.7	3.3	3.6 <sup>Y</sup>	8.4	3.6	11.7	3.5
Hypertension	2.9	1.5	2.9	2.6	2.9 <sup>Y</sup>	6.9	2.8	10.5	2.8
Obesity	2.2	2.5	2.2 <sup>Y</sup>	2.6	2.2 <sup>Y</sup>	3.0	2.2 <sup>Y</sup>	2.0	2.2 <sup>Y</sup>

Notes: All bivariate comparisons were statistically significant at the p<0.01 level, except for associations with <sup>Y</sup>p<0.05

Table 2: Multivariable regression analyses

	Chlamydia		Gonorrhea		Syphilis		HIV	
	aOR	p-value	aOR	p-value	aOR	p-value	aOR	p-value
Race/ethnicity								
Non-Hispanic White	Ref.		Ref.		Ref.		Ref.	
Non-Hispanic Black	1.88	<0.001	1.99	<0.001	1.25	0.077	2.51	<0.001
Other	1.34	<0.001	1.39	<0.001	1.22	0.069	2.31	<0.001
Area of residence								
Urban	Ref.		Ref.		Ref.		Ref.	
Rural	1.14	0.002	1.14	0.007	0.80	0.042	0.74	0.031

Notes: All models control for patient and county-level covariates, aOR: Adjusted Odds Ratio

## Key Findings

- Non-Hispanic Black and other racially and ethnically minoritized individuals were significantly more likely to have at least one claim for chlamydia, gonorrhea, and HIV compared to non-Hispanic whites
- Rural residents were significantly more likely to have at least one claim for chlamydia and gonorrhea compared to urban residents
- In contrast, rural residents had a lower likelihood of having a medical claim for syphilis and HIV compared to those residing in urban locations

## DISCUSSION

- Our findings highlight the need for programming and interventions specific to both rural and racial/ethnic minority residents, particularly in the rural South
- The findings from this study can be used to maximize efforts to address inequalities and to minimize the health impact of STIs and HIV particularly on minorities and rural residents

## ACKNOWLEDGEMENTS & REFERENCES

- <https://www.cdc.gov/std/statistics/prevalence-2020-at-a-glance.htm>
- <https://www.cdc.gov/nchhstp/newsroom/2021/2019-STD-surveillance-report.html>
- <https://www.cdc.gov/hiv/group/raciaethnic/africanamericans/diagnoses.html>
- Pinto CN, Dorn LD, Chinchilli VM, Du P. Chlamydia and gonorrhea acquisition among adolescents and young adults in Pennsylvania: A Rural and urban Comparison. Sexually transmitted diseases. 2018 Feb 1;45(2):99-102.
- <https://worldpopulationreview.com/state-rankings/std-rates-by-state>
- [https://www.cdc.gov/nchhstp/newsroom/images/2016/CROI\\_lifetime\\_risk\\_state.jpg](https://www.cdc.gov/nchhstp/newsroom/images/2016/CROI_lifetime_risk_state.jpg)

Funding: CDC Foundation/ National Foundation for the Centers for Disease and Control and Prevention, Inc. 1/1/2021-7/31/2022, PI: Elizabeth Crouch