VARIATION IN SYPHILIS AMONG BISEXUAL MEN AND ASSOCIATION WITH SYPHILIS IN WOMEN

2858

Chase A. Cannon, MD[1], Breanne V. Anderson, MPH[2], Rebecca Scranton, MPH[2], Ravikiran Muvva, MBBS, MPH, MPA[3], Elizabeth Gilliams, MD, MS[3], Irina Tabidze, MD, MPH[4], David Kern[4], Dan George[5], Craig Wilson[5], Chisom Onyeuku[6], Latasha Perry, MPA[6], Juli Carlos-Henderson, MPH[7], Christie Lewis, MPH[8], Kendra Johnson, MPH[8], Angela McKee[9], Amy Lucas, MS[10], Elizabeth Kessler, MPH[10], Victoria Mobley, MD, MPH[11], Tim W. Menza, MD, PhD[12,13], Irina Kasarskis, MPH[12], Robbie Madera[14], Cherie Walker-Baban[14], Stephanie Cohen, MD, MPH[15], Rilene A. Chew Ng, DrPH, MPH[15,16], Anna Berzkalns, MPH[17], Margaret Vaaler, PhD[18], Jessica Romano[18], and Matthew R. Golden, MD, MPH[1,17] for the CORES Research Group

[1]University of Washington, Seattle, WA, [2]Arizona DOH Services, [3]Baltimore City Health Department, [4]Chicago Department of Public Health, [5]Florida DOH, [6]Georgia Department of Public Health, [7]Los Angeles County Division of HIV & STD Programs, [8]Mississippi State DOH, [9]Missouri DOH and Senior Services, [10]Nevada DOH and Human Services, [11]North Carolina DOH and Human Services, [12]Oregon Health Authority, [13]Oregon Health Sciences University, [14]Philadelphia DOH, [15]San Francisco Department of Public Health, [16]Centers for Disease Control and Prevention, [17]Public Health – Seattle & King County, [18]Texas Department of State Health Services

BACKGROUND

- US syphilis rates are now the highest since the 1990s[1]
- The syphilis epidemic predominately affects MSM, but rates are now also rising in women and children[1]
- Men who have sex with men and women (MSMW, behaviorally bisexual or "bisexual" men) have been identified as a potential "bridge" population for HIV between MSM and women[2]
- The size of the MSMW population is ill-defined and whether "bridging" may contribute to current syphilis trends is unclear

Objectives

- Determine the proportion of MSM early syphilis (ES) cases occurring in MSMW; how this varies over time, by region, and by race/ethnicity
- Evaluate the association of measures of MSMW syphilis morbidity with rates of syphilis in women

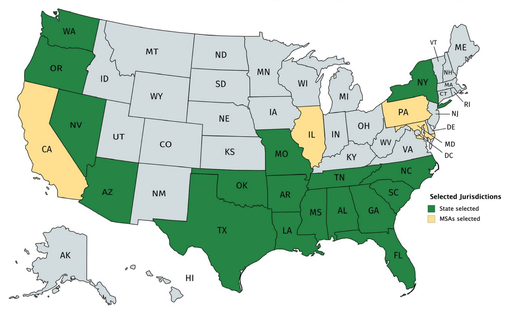
Hypotheses

- Proportion of MSMW with ES will be highest in the South and among Black men, and racial disparities in this proportion will be greatest in the South
- Measures of MSMW syphilis morbidity will be associated with rates of all-stage syphilis in women

METHODS

- **Sample**: 22 high morbidity syphilis areas (MSA or state) compiled from 2017 CDC STD Surveillance Report
  - Inclusion criteria: >50 female P&S syphilis cases in 2017*; cities selected over states if they contributed >50% of all syphilis cases to their state in 2017
- **Data**: Aggregate syphilis surveillance data, 2013-2017
- **Analysis**: ANOVA; simple linear and mixed effect regression models

**Baltimore had 39 female P&S cases in 2017*



RESULTS

- 16 of 22 (73%) jurisdictions provided data
- Mean percentage of MSM ES cases in MSMW was stable over time at ~ 11.1% and varied by region and by race/ethnicity (Table 2)
- Mean number of ES cases in MSMW per 100,000 men varied by region (P<0.01): 3.6 in the West, 2.3 in the Midwest, 3.9 in the Northeast, and 5.6 in the South
- Race and region were each independently associated with the proportion of MSM ES cases in bisexual men without interaction (P=0.98)

TABLE 1: Counts & Percentages of Syphilis Cases in Men by Stage & Sex Partner Gender, 2013-2017

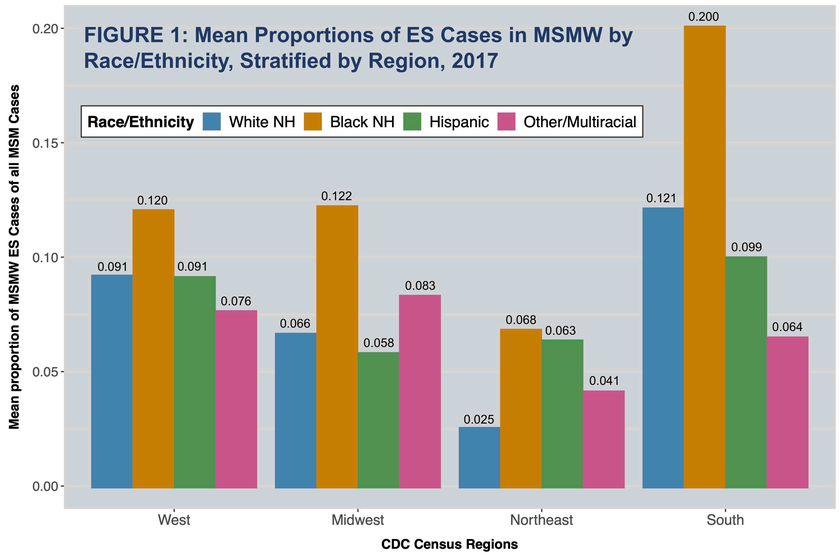
Staging	Total cases	Mean % of total cases with known gender of sex partner	MSM only, N (%)[a]	MSMW, N (%)[a]	Mean % of MSM cases in bisexual men
ES	122,226	80.8	71,083 (75.3)	9,297 (9.8)	11.4
LL/UD	62,755	58.4	22,336 (35.6)	3,609 (5.8)	13.7
All	184,981	70.0	93,419 (70.2)	12,906 (9.7)	12.5

LL/UD (late latent/unknown duration), [a]Denominator: number of male cases with available data on gender of sex partner(s)

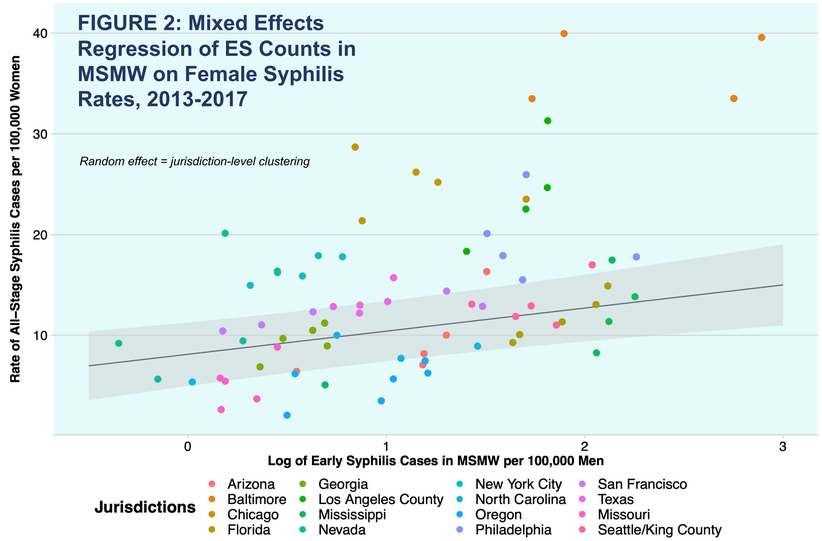
TABLE 2: Percentage of MSM ES Cases in MSMW by Region and Race/Ethnicity, 2013-2017

	Mean % of MSM ES cases in MSMW[a]	p-value[b]		Mean % of MSM ES cases in MSMW[a]	p-value[b]
Region		<0.01	**Race/Ethnicity**		<0.01
Overall	11.4[c]		Overall	11.1[c]	
West	9.0	<0.01	White NH	8.8	<0.01
Midwest	8.0	<0.01	Hispanic	10.9	0.16
Northeast	7.0	<0.01	Multiracial	8.7	<0.01
South	16.5	Ref.	Missing	12.2	0.61
			Black NH	14.7	Ref.

[a]Percent = number of MSMW cases divided by total MSM cases (MSM only + MSMW) in each category
[b]Overall - one-way ANOVA; p-value for pairwise evaluations by Tukey multiple comparisons of means
[c]Means vary due to use of collapsed vs expanded subset of data



- Mixed-effects LRM: A 10% increase in MSMW ES cases per 100,000 men was associated with mean increase of 0.53 female syphilis cases per 100,000 women (P<0.01), whereas a doubling of the measure was associated with 3.84 per 100,000 higher mean rate in women (Figure 2)



SUMMARY & CONCLUSIONS

- **12.5% of MSM with syphilis report bisexual behavior, with larger proportions of MSMW syphilis cases occurring among Black MSM and MSM in the South.**
- **In our ecological analysis, higher levels of syphilis morbidity among MSMW were associated with higher syphilis rates in women.**
- **These findings suggest that "bridging" between MSM and women may partially explain observed disparities in syphilis rates in women, highlighting how the interaction of race, region and sexual behavior may influence the epidemiology of syphilis.**

ACKNOWLEDGMENTS

- Research support from NIH T32 AI007140-41

Abbreviations: CORES (Coalition of Research Epidemiologists in Syphilis), DOH (Department of Health), US (United States), MSM (men who have sex with men), MSA (metropolitan statistical area), CDC (Centers for Disease Control & Prevention), STD (sexually transmitted disease), P&S (primary & secondary), ANOVA (analysis of variance), LRM (linear regression model), NH (non-Hispanic), Ref. (referent group)

References: 1. CDC. *STD Surveillance 2017*. U.S. Department of Health and Human Services; 2018. **2.** Doll LS, Beeker C. Male bisexual behavior and HIV risk in the United States: synthesis of research with implications for behavioral interventions. *AIDS Educ Prev*. 1996