Prevalence of Syphilis and HIV/Syphilis Coinfection in an Inner-City Emergency Department

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Joanne H. Hunt[1], Oliver Laeyendecker[1]*, Richard Rothman[2]*, Reinaldo E. Fernandez[3], Gaby Dashler[2], Patrizio Caturegli[4], Bhakti Hansoti[2], Thomas C. Quinn[1,2,4], Yu-Hsiang Hsieh[2]

[1]Laboratory of Immunoregulation, National Institute of Allergy and Infectious Diseases, National Institutes of Health, Bethesda, Maryland, USA; [2]Department of Emergency Medicine, School of Medicine, Johns Hopkins University, Baltimore, MD, USA; [3]Department of Medicine, Division of Infectious Diseases, Johns Hopkins University School of Medicine, Baltimore, Maryland, USA; [4]Department of Pathology, Johns Hopkins University School of Medicine, Baltimore, Maryland, USA

BACKGROUND

- Primary and secondary syphilis infections have risen 80% since 2018
- Emergency departments (EDs) could serve as sentinel sites to implement screening strategies among patients who might otherwise lack access to screening

METHODS

- Deidentified, unlinked remnant blood samples from adults (≥18 years) who attended the Johns Hopkins Hospital ED between January 10, 2022, and February 9, 2022, were included in this sero-surveillance study
- Socio-demographic and medical clinical data were abstracted from an administrative database to characterize the study population
- A three-tier reverse algorithm was used to determine patients' serology for syphilis infection (**Figure 1**)
- Patients with presumed active syphilis infection (PAI) were defined with treponemal antibody positive and Rapid plasma reagin (RPR) non-treponemal antibody titer ≥1:8
- Exact logistic regression and classification and regression tree (CART) analyses were performed to determine factors associated with PAI and derive screening strategies

RESULTS

Characteristics	Syphilis Serologic Status n (%)			
	Total (n=1951)	Seronegative (n=1848)	PNAI (n=80)	PAI (n=23)
Age (years)				
Mean	47.9±18.6	47.8±18.7	52.8±14.7	38.6±12.3
18–24	202	194 (96.0)	5 (2.5)	3 (1.5)
25–34	387	374 (96.6)	5 (1.3)	8 (2.1)
35–44	321	305 (95.0)	11 (3.4)	5 (1.6)
45–54	290	271 (93.5)	16 (5.5)	3 (1.0)
55–64	344	313 (91.0)	28 (8.1)	3 (0.9)
≥65	405	389 (96.1)	15 (3.7)	1 (0.3)
Missing	2	2 (100.0)	0 (0.0)	0 (0.0)
Sex				
Male	936	873 (93.3)	49 (5.2)	14 (1.5)
Female	1015	975 (96.1)	31 (3.1)	9 (0.9)
Race and Ethnicity				
White, non-Hispanic	556	544 (97.8)	6 (1.1)	6 (1.1)
Black, non-Hispanic	1108	1032 (93.1)	63 (5.7)	13 (1.2)
Other Race, Non-Hispanic	134	131 (97.8)	2 (1.5)	1 (0.8)
Hispanic	153	141 (92.2)	9 (5.9)	3 (2.0)
Chart reported PCP				
No	761	707 (92.9)	36 (4.7)	18 (2.4)
Yes	1190	1141 (95.9)	44 (3.7)	5 (0.4)
ED Disposition				
Discharge	1022	955 (93.4)	50 (4.9)	17 (1.7)
Hospital Observation	475	455 (95.8)	18 (3.8)	2 (0.4)
Admit	298	286 (96.0)	9 (3.0)	3 (1.0)
Other	156	152 (97.4)	3 (1.9)	1 (0.6)
HIV Infection				
Yes	87	69 (79.3)	13 (14.9)	5 (5.8)
No	1864	1779 (95.4)	67 (3.6)	18 (1.0)

Table 1. Socio-demographic Characteristics and Seropositivity of Syphilis Antibody Positive Johns Hopkins Hospital ED patients.

Approximately 1% of patients attending an urban emergency department had a *"presumed active infection"* with syphilis. Lack of primary care physician, living with HIV, and being a woman of reproductive age are suggested risk factors to include in an ED-specific screening strategy.

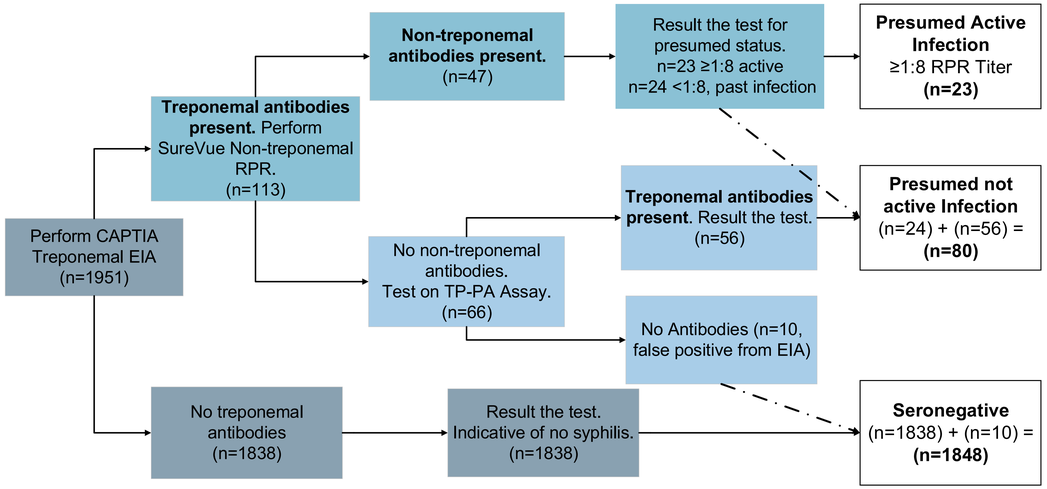


Figure 1. Three-Tier Reverse Algorithm for serological detection of syphilis infection.

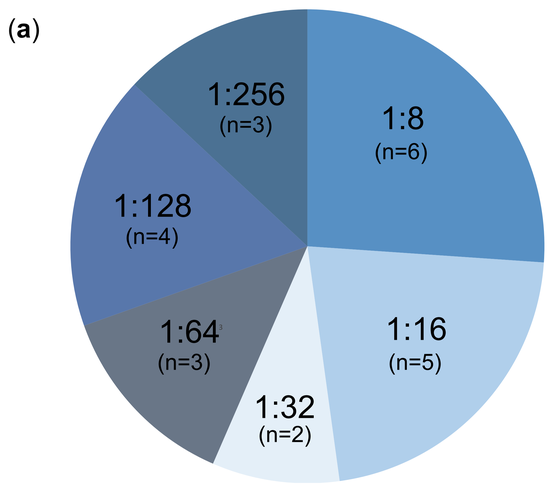


Figure 2. (**a**) RPR Titers and (**b**) Characteristics for Twenty-Three Johns Hopkins Hospital Emergency Department Patients with Active Syphilis (RPR Titer ≥1:8).

RESULTS

- 5.3% (95% CI: 4.3,6.4) had treponemal antibodies indicating past or current syphilis infection (**Table 1**)
- 1.2% (95% CI: 0.8,1.8) had PAI (**Figure 2**) [18 (78%) lacked primary care physician; 5 (22%) were HIV positive; 8 (35%) were women of reproductive age (18-49 years)]
- CART analysis showed screening all PWH and those without a PCP would identify 20 of the 23 (87%) ED patients with PAI (AUC=0.73, [95%CI: 0.64,0.81]) (**Figure 3**)
  - If women of reproductive age were included, 21 of 23 PAI would have been identified (AUC=0.67, [95%CI: 0.58,0.76])

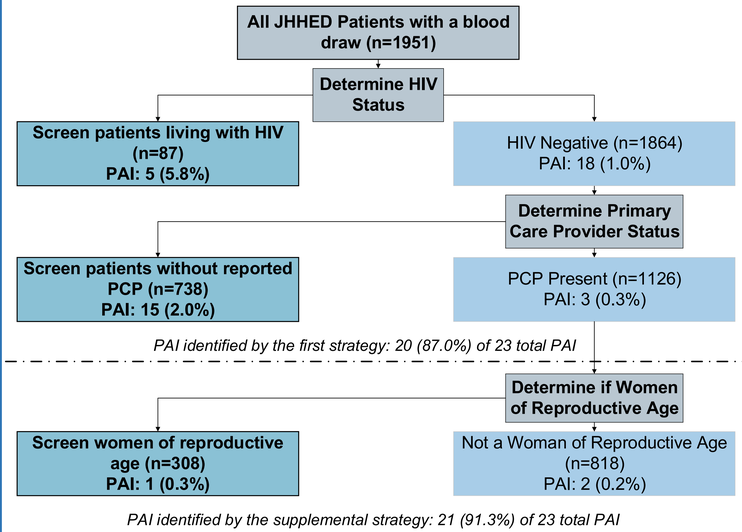


Figure 3. Screening strategy to identify patients with PAI.

CONCLUSIONS

- Our findings raise public health and clinical concerns regarding underdiagnosis of syphilis in this ED
- Our study reveals the need for an ED-specific screening protocol to identify undiagnosed, asymptomatic syphilis infections

STUDY LIMITATIONS

- Only ED patients requiring blood draws as their standard medical care during their ED visit were included in this study
- The extracted socio-demographic variables were limited and not necessarily optimized for a syphilis study

ADDITIONAL KEY INFORMATION

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Author Contact: Joanne "Joey" Hunt
Email: jhunt42@jhmi.edu

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NIH National Institute of Allergy and Infectious Diseases

CENTER FOR AIDS RESEARCH JOHNS HOPKINS UNIVERSITY