

# Incidence of Syphilis among Persons with Recent HIV Diagnoses – Connecticut, 2012 - 2016

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## INTRODUCTION

- Syphilis and HIV construct a dangerous combination. For instance, syphilis significantly increases the risk of contracting HIV infection, and HIV can alter the natural course of syphilis.<sup>1</sup>
- For those living with HIV, syphilis has a negative impact on their HIV infection, resulting in increasing viral loads and decreasing CD4 cell counts during syphilis infection.<sup>2, 3</sup>

## OBJECTIVES

- The purpose of this study was to evaluate the incidence of syphilis (primary and secondary) among persons before and after their HIV diagnosis by using historical data to track future HIV infections; assist to come up a targeted message for STD prevention and better health outcome for the affected populations

## METHODS

- A retrospective population-based epidemiologic study was performed among persons reported to the Connecticut Department of Public Health with a new HIV diagnosis from January 1, 2012–December 31, 2016.
- This group was cross-referenced in the STD surveillance database to determine if they ever had a syphilis (primary and secondary). Incidences of syphilis were recorded for these cases from 1988 through 2018.
- Demographic and clinical information including first detectable and latest viral load and CD4 count results were analyzed. Categorical data were analyzed with use of the chi-square goodness-of-fit test for the comparison of syphilis infection after an HIV diagnosis and overall syphilis results. Unadjusted and adjusted odds ratios were calculated using logistic regression for association.
- All analyses were performed using Statistical Analysis System, v9.4, software (SAS Institute, Inc., North Carolina).

## RESULTS

- Between January 1, 2012–December 31, 2016, 85.66% (221/258) of syphilis case-patients had their infection after HIV diagnosis, and no significance difference between syphilis infection after HIV diagnosis and overall syphilis infections for age ( $p = 0.47$ ), sex-at-birth ( $p = 0.15$ ), risk factors ( $p = 0.19$ ), first ( $p = 0.79$ ) and recent ( $p = 0.88$ ) viral load, first ( $p = 0.96$ ) and recent ( $p = 0.68$ ) CD4 count, and race/ethnicity ( $p = 0.71$ ) were observed (Table 1).
- Factors associated with increased odds of syphilis infection after HIV diagnosis were: Age group 45-54 (AOR=6.2, 95% CI 1.17 – 37.7), Age group 55+ (AOR=8.6, 95% CI 1.38 – 60.06), Injection drug use (AOR=30.9, 95% CI 1.92–>999.99), and Black/African American Race/Ethnicity (AOR=4.8, 95% CI 1.08– 26.8). Odds were lower for females (AOR=.09, 95% CI .01–.59) in comparison to males and Recent CD4 count-Stage 2 (AOR=.04, 95% CI .00–.62) in comparison to Recent CD4 count-Stage 3 AIDS . (Table 2).

**Table 1. Descriptive statistics of syphilis incidences after HIV diagnosis Connecticut, 2012 - 2016**

Variable	Syphilis After HIV (n =221)		Pop. Total (N=258)	P-value*
	No (%)	No (%)	No (%)	
<b>Age at diagnosis (yr)</b>				0.47
13-24	66 (29.86)	73 (28.29)		
25-34	67 (30.32)	73 (28.29)		
35-44	44 (19.91)	47 (18.22)		
45-54	30 (13.57)	42 (16.28)		
55+	14 (6.33)	23 (8.91)		
<b>Sex at birth</b>				0.15
Male	208 (94.12)	236 (91.47)		
Female	13 (5.88)	22 (8.53)		
<b>Risk factors</b>				0.19
Injection drug use	1 (0.48)	6 (2.46)		
Male-to-male sexual contact	169 (80.48)	185 (75.82)		
Male-to-male sexual contact and injection drug use	8 (3.81)	10 (4.10)		
Heterosexual contact**	32 (15.24)	43 (17.62)		
<b>First viral load</b>				0.79
VL >=200	189 (90.48)	222 (91.36)		
VL <200	19 (9.13)	21 (8.64)		
<b>Recent viral load</b>				0.88
VL >=200	20 (9.13)	24 (9.41)		
VL <200	199 (90.87)	231 (90.59)		
<b>First CD4 count</b>				0.96
>=500 (Stage 1)	77 (35.32)	92 (36.22)		
200-499 (Stage 2)	91 (41.74)	105 (41.34)		
<200 (Stage 3 AIDS)	50 (22.94)	57 (22.44)		
<b>Recent CD4 count</b>				0.68
>=500 (Stage 1)	159 (72.94)	189 (74.41)		
200-499 (Stage 2)	51 (23.39)	54 (21.26)		
<200 (Stage 3 AIDS)	8 (3.67)	11 (4.33)		
<b>Race/ethnicity</b>				0.71
White	56 (25.96)	61 (23.92)		
Black/African American	90 (41.28)	112 (43.92)		
Hispanic/Latino†	72 (33.03)	82 (32.16)		

\*Significant P-value (<0.05)

\*\*Heterosexual contact with a person known to have, or to be at high risk for, HIV infection.

Note: Two 12 years old few months away from becoming 13 years old; Number may not sum to totals due to missing data, and column percentages may not sum to 100% due to rounding

† Hispanics/Latinos can be of any race.

## CONCLUSIONS

- Almost all syphilis infections occurred after HIV diagnosis, which is a high risk among this population.
- Older male HIV infected individuals, individuals injecting drugs and African Americans were more likely to be infected with syphilis after HIV diagnosis.
- Recent CD4 count of stage 2 was associated with individuals infected with syphilis after HIV infection.

## IMPLICATIONS

- Persons with recent HIV diagnoses might benefit from an intervention focused on syphilis prevention and other sexually transmitted diseases.
- Because of decreasing resources to address HIV infections and high-risk sexual behaviors, identifying and describing risk factors, and characteristics at the local level associated with HIV and syphilis co-infection can help produce targeted public health intervention strategies for high risk groups.

**Table 2. Unadjusted and adjusted odds ratio of syphilis incidences after HIV diagnosis Connecticut, 2012 - 2016 (N = 221)**

Variable	Unadjusted OR (CI)	Adjusted OR (CI)
<b>Age at diagnosis (yr)</b>		
13-24	1.00 (reference)	1.00 (reference)
25-34	0.84 (0.25, 2.67)	0.68 (0.17, 2.49)
35-44	0.64 (0.13, 2.44)	0.46 (0.07, 2.23)
45-54	3.77 (1.37, 11.05)*	6.23 (1.17, 37.75)*
55+	6.06 (1.92, 19.7)*	8.64 (1.38, 60.06)*
<b>Sex at birth</b>		
Female	1.00 (reference)	1.00 (reference)
Male	0.19 (0.07, 0.49)*	0.09 (0.01, 0.59)*
<b>Risk factors</b>		
Heterosexual contact**	1.00 (reference)	1.00 (reference)
Injection drug use	14.54 (2.05, 29)	30.91 (1.92, >999.99)*
Male-to-male sexual contact	0.27 (0.11, 0.66)*	1.76 (0.26, 15.23)
Male-to-male sexual contact and injection drug use	0.72 (0.10, 3.47)	2.03 (0.05, 42.06)
<b>First viral load</b>		
VL <200	1.00 (reference)	1.00 (reference)
VL >=200	1.65 (0.45, 10.71)	3.10 (0.56, 30.28)
<b>Recent viral load</b>		
VL <200	1.00 (reference)	1.00 (reference)
VL >=200	1.24 (0.39, 3.87)	1.25 (0.21, 5.35)
<b>First CD4 count</b>		
<200 (Stage 3 AIDS)	1.00 (reference)	1.00 (reference)
200-499 (Stage 2)	1.09 (0.42, 3.06)	2.01 (0.47, 10.93)
>=500 (Stage 1)	1.39 (0.54, 3.86)	2.68 (0.59, 14.78)
<b>Recent CD4 count</b>		
<200 (Stage 3 AIDS)	1.00 (reference)	1.00 (reference)
200-499 (Stage 2)	0.15 (0.02, 0.97)*	0.04 (0.00, 0.62)*
>=500 (Stage 1)	0.50 (0.12, 2.00)	0.46 (0.04, 5.60)
<b>Race/ethnicity</b>		
White	1.00 (reference)	1.00 (reference)
Black/African American	2.78 (1.05, 8.54)*	4.85 (1.08, 26.8)*
Hispanic/Latino†	1.55 (0.52, 5.23)	4.6 (0.96, 26.88)

\*Significant P-value (<0.05)

\*\*Heterosexual contact with a person known to have, or to be at high risk for, HIV infection.

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† Hispanics/Latinos can be of any race.

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