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The Importance of Linkage and Engagement in Care in Post-HIV STD Acquisition

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Background

- It is well documented that HIV/sexually transmitted disease (STDs) coinfections have a synergistic effect on the risk of transmitting HIV.
- STDs post HIV diagnosis can serve as a proxy for ongoing high risk sexual behaviors and the need for messaging regarding secondary prevention.
- We sought to determine the role of linkage and engagement in post STI acquisition among persons with HIV.

Methods

- Matched District of Columbia Department of Health HIV diagnoses reported from 2007-2013 to newly reported chlamydia, gonorrhea and primary/secondary syphilis infections during the same time period
- Coinfection: an STD that occurred ≥3 months after HIV diagnosis
- Linkage to care: evidence of CD4 or viral load (VL) 3 months after HIV diagnosis.
- Engagement in care: ≥2 visits in 12 months at least 30 days apart; a percentage was assigned based on the number of years engaged during the study period
- Used laboratory reports as proxy for HIV care visits; used last available VL prior to STD infection, death, or end of study.
- Calculated interval between HIV infection and first STI in coinfected; for monoinfected calculated interval between HIV infection and end of follow-up or death
- Conducted descriptive analysis and chi-square tests
- Conducted survival analyses to describe the risk of STI acquisition after HIV infection; backwards selection used to fit the adjusted model regression model.

Results

Table 1: Demographic Characteristics

Characteristics	HIV only n (%) n=5079	HIV-STD n (%) n=399
Sex at birth**		
Male	3,629 (71.5)	353 (88.5)
Female	1,448 (28.5)	46 (11.5)
Age at HIV Diagnosis**		
0-18	84 (1.7)	16 (4.0)
19-30	1,223 (24.2)	208 (52.1)
31-40	1,139 (22.5)	107 (26.8)
40+	2608 (51.6)	68 (17.0)
Race/Ethnicity*		
White	710 (14)	83 (20.8)
Black	3,800 (74.8)	271 (67.9)
Hispanic	373 (7.3)	32 (8.0)
Other	196 (3.9)	13 (3.3)
Mode of Transmission of HIV**		
MSM	1,937 (38.1)	253 (63.4)
IDU	379 (7.5)	16 (4.0)
MSM/IDU	104 (2.1)	16 (4.0)
Heterosexual	1,621 (31.9)	62 (15.5)
Risk Not Identified	1,011 (19.9)	52 (13.0)
Other	27 (0.5)	0
Linkage**		
Within 3 Months	2,977 (58.6)	143 (35.8)
Later than 3 months	1,432 (28.2)	119 (29.8)
No Linkage	670 (13.2)	137 (34.3)
Engagement in Care**		
Excellent/Good Engagement	1,567 (30.8)	79 (19.8)
Moderate/Sparse Engagement	2,045 (40.3)	200 (50.13)
Not in Care	1,467 (28.9)	120 (30.1)
Viral Load (copies/ml) *		
Missing	753 (14.8)	54 (13.5)
Less than 200	2,766 (54.5)	181 (45.4)
201 to 999	299 (5.9)	29 (7.3)
1000 and greater	1,257 (24.8)	135 (33.8)

** Chi-square test signficant at p<0.0001
* Chi-square test signficant at p <0.05

Figure 1: First Time STD Distribution and Frequency of STDs

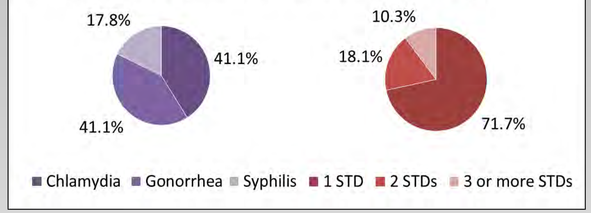


Figure 2: Survival Curves for Viral Load and Engagement in Care

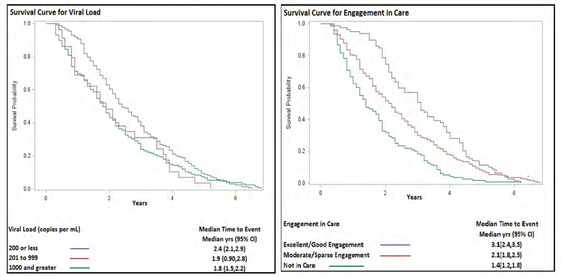


Table 2: Risk of STD Post HIV Acquisition

Characteristics	Unadjusted HR OR (95% CI)	Adjusted HR OR (95% CI)
Sex at birth		
Male	1.00	1.00
Female	0.33 (0.24,0.44)**	0.53 (0.35,0.81)*
Age at HIV Diagnosis		
0-18	6.4 (3.7,11.1)**	9.1 (5.1,16.2)**
19-30	6.0 (4.6,7.9)**	4.3 (3.2,5.9)**
31-40	3.3 (2.4,4.5)**	2.9 (2.1,4.1)**
40+	1.00	1.00
Race/Ethnicity		
White	1.6 (1.2,2.0)*	N/A
Black	1.0	N/A
Hispanic	1.2 (0.86,1.8)	N/A
Other	1.1 (0.6,1.8)	N/A
Mode of Transmission of HIV		
MSM	3.3 (2.5,4.3)**	1.8 (1.3,2.6)*
IDU	0.99 (0.57,1.7)	0.94 (0.50,1.8)
MSM/IDU	3.6 (2.1,6.2)**	3.2 (1.7,6.0)*
Heterosexual	1.00	1.00
Risk Not Identified	1.5 (1.02,2.1)*	0.93 (0.61,1.4)
Other	0	0
Linkage		
Within 3 Months	1.00	1.00
Later than 3 months	1.3 (0.99,1.6)	0.81 (0.62,1.1)
No Linkage	3.9 (3.1,4.9)**	16.5 (12.5,21.7)**
Engagement in Care		
Excellent/Good Engagement	1.00	1.00
Moderate/Sparse Engagement	1.9 (1.5,2.5)**	1.5 (1.1,1.9)*
Not in Care	2.0 (1.5,2.7)**	0.62 (0.43,0.90)*
Viral Load(copies/mL)		
200 or Less	1.00	1.00
201 to 999	1.6 (1.1,2.4)*	1.3 (0.98,1.7)
1000 and greater	1.9 (1.5,2.3)**	1.6 (1.2,2.1)*

* p-value signficant at p <0.05
** p-value significant at p<0.0001

- Among 5,478 persons newly diagnosed with HIV from 2007-2013, 14% had an STD coinfection subsequent to their HIV diagnosis.
- Compared to mono-infected persons, a significantly higher proportion of co-infected persons were male, ages 19-30, white, MSM, never linked to care, had moderate engagement in care, and had higher VLS (Table 1).
- Among co-infected persons, 71% had 1 STD post HIV diagnosis; the most common STDs post diagnosis were chlamydia and gonorrhea (41% each) (Figure 1).
- Females had a 46% reduced risk of having an STD post HIV compared to males (Table 2).
- Younger (0-18 year olds) HIV persons had an 8 times higher risk of an STD acquisition compared to those 40 and older (Table 2).
- MSM and MSM/IDU had 1.8 to 3.3 times higher risk of STD acquisition compared to those infected with HIV through heterosexual sex.
- Individuals who had never linked to care had a 16 times higher risk of STD acquisition compared to those linked within 3 months
- Persons with moderate/sparse engagement in care had a 50% higher risk of having an STD post HIV (Table 2).

Results (cont'd)

- An increase in HIV VL was associated with STD infection, those with a VL of >1000 copies/mL were at 40% higher risk of STD acquisition.
- Engagement in care and VL were the only characteristics whose median time to STD infection was statistically significant (Figure 2).
  - 3.1 years for excellent engagement vs. 1.4 years not being in care ($p < 0.0001$).
  - 2.4 years for VL <200 copies/mL vs. 1.8 years for VL >1,000 copies/mL (p=0.04).

Conclusions

- While a relatively small proportion of persons had an STD post HIV, these diagnoses are indicative on ongoing high-risk behavior which increases the risk of transmitting HIV.
- Given their higher risk of STD acquisition after an HIV diagnosis, men, younger persons, MSM, persons never linked to care, and those poorly engaged in HIV care, should be the focus of secondary prevention efforts such as safe sex messages, and screened regularly for STDs.
- Persons who had higher viral loads were more likely to contract an STD after HIV infection and may have been more likely to transmit HIV to their uninfected partners.
- Risk reduction efforts should focus on educating all HIV+ persons on the importance of regular and consistent HIV care, treatment, and adherence.

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