

# Recent syphilis infection among high-risk men who have sex with men (MSM) in Lima, Peru

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## BACKGROUND

- Syphilis is an ulcerative, sexually transmitted infection (STI) caused by the bacteria *Treponema pallidum pallidum*.
- In Peru, syphilis is concentrated among high-risk groups, especially among men who have sex with men (MSM) and male-to-female transgender women (TW).
- Population-based surveys of Peruvian young-adults reported 0.5% as the prevalence of recent syphilis, defined as rapid plasma reagin (RPR)  $\geq 1:8$  [1].
- A study of HIV-negative MSM/TW in Lima reported high prevalence of RPR reactivity, 21.6%, and of recent syphilis 7.8% (defined as RPR $\geq 1:16$ )[2].
- Previous studies of recent syphilis (defined as RPR  $\geq 1:8$ ) in Peru reported a prevalence of 10.5% and found recent syphilis to be significantly associated with age, prevalent HIV and HSV infection [3].

## METHODS

### Study Sites and Procedures

- The PICASSO study is an on-going clinic-based cohort study in Lima, Peru that includes behavioral surveys and laboratory testing at 3 month follow-up visits targeted at participants who are at highest risk for syphilis infection. Data analyzed here were from the baseline study visit.
- There are 2 clinics; one government-run STD clinic and one community clinic. Both clinics primarily serve low-income populations.
- Behavioral surveys were conducted by trained staff members using structured computer-assisted personal interview tool. Surveys were done in private and in Spanish.

### Syphilis and HIV testing

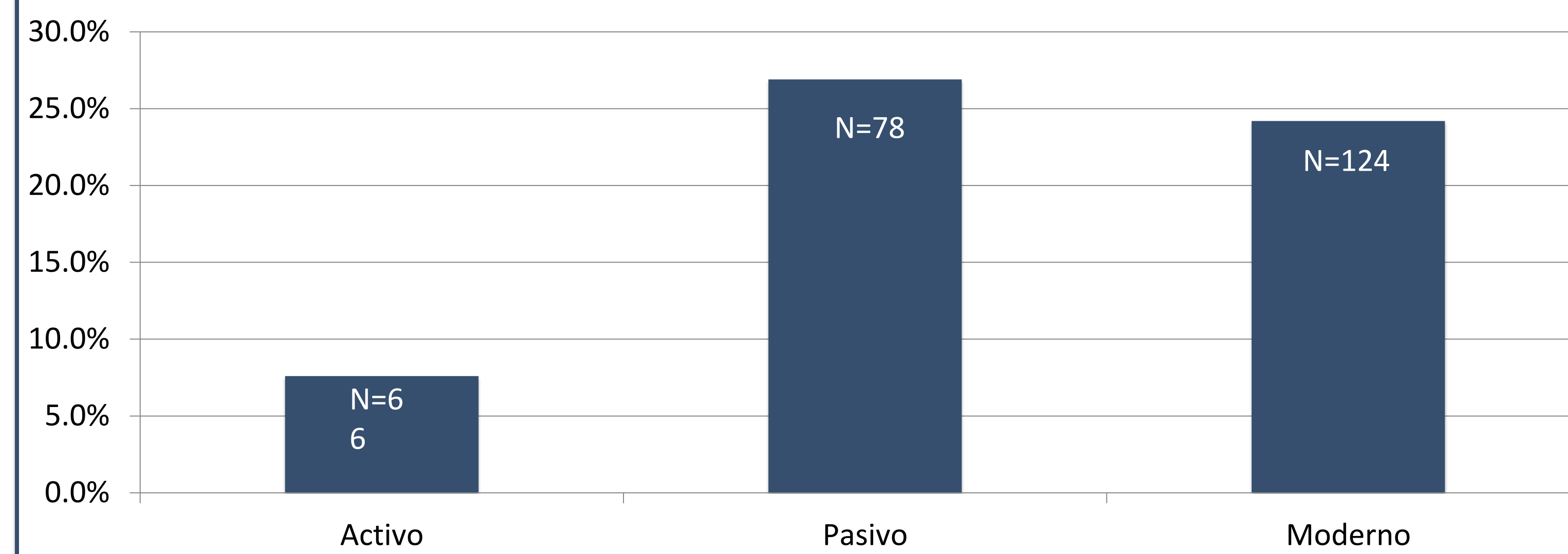
- Syphilis testing is performed with rapid plasma reagin (RPR) titers (BD Macro-Vue RPR, Beckon-Dickenson, NJ) and *Treponema pallidum* Particle Agglutination (Serodia TP-PA, Fujierbio Inc, Japan).
- HIV testing includes Ag/Ab HIV EIA serum test (Genscreen ULTRA HIV Ag-Ab, Bio Rad, Redmond, WA) and Western blot confirmation (Genetic Systems HIV-1 Western Blot, Bio Rad, Redmond, WA).
- Any active lesions are swabbed for further testing.

### Statistical Analysis

- Recent syphilis was defined as a RPR titer  $\geq 1:16$  and TPPA positivity at baseline.
- Individuals with recent syphilis at baseline were compared to participants with non-reactive titers. Participants with RPR titers 1:1-1:8 were excluded from the bivariate and multivariate analyses.
- Factors associated with recent syphilis were explored using Poisson regression to compute prevalence ratios (PR).

## RESULTS

Figure 1. Recent Syphilis and role during anal sex among MSM/TW in Lima, Peru



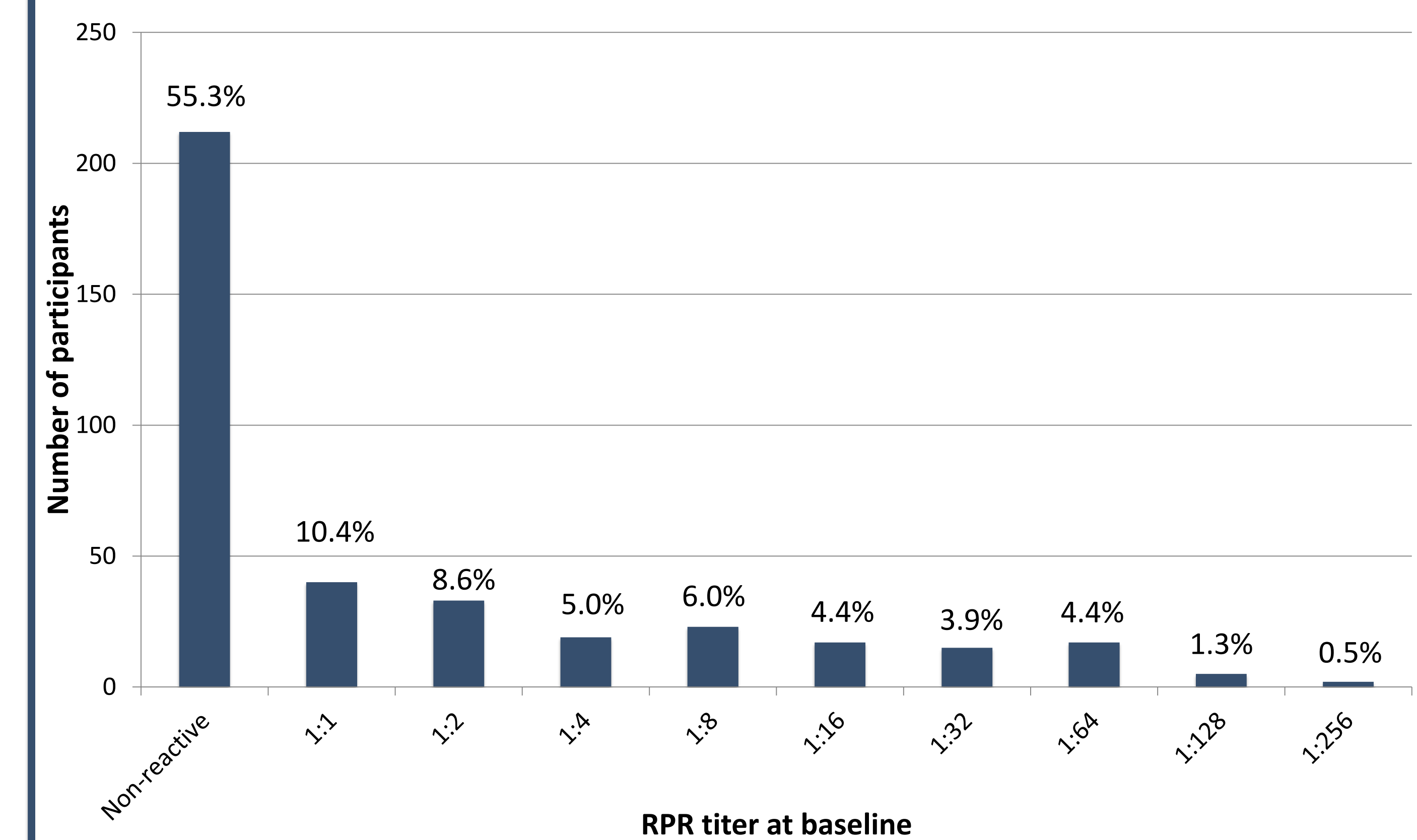
- The prevalence of recent syphilis at baseline was 14.6%. Prevalence of any reactive titers at baseline was 44.7%.
- The distribution of reactive titers is shown in Figure 2: 30.0% had RPR titers ranging from 1:1-1:8. 14.6% had RPR titers ranging from 1:16-1:256.
- 34.2% of participants with recent syphilis had positive HIV test at baseline.
- In the multivariate model, receptive anal sex or “moderno”/“versatile” anal sex role and previous syphilis diagnosis significantly associated with increased risk of recent syphilis (Figure 1).

Table 1. Recent syphilis and baseline characteristics among high-risk MSM/TW in Peru

Baseline characteristics	Recent syphilis prevalence n/N (%)	Bivariate analysis PR (CI)	P-value	Multivariate analysis PR (CI)	P-value
Overall	56/327 (14.6)				
Age		<b>0.97 (0.94-1.00)</b>	<b>0.025</b>	<b>0.97 (0.94-1.00)</b>	<b>0.018</b>
18-25	22/95 (21.2)				
26-30	12/54 (22.2)				
31-35	12/45 (26.7)				
36+	10/74 (13.5)				
No. of male/TW sex partners in the last 3 mo. (quartiles)					
0-6	13/75 (17.3)	ref		ref	
7-25	9/65 (13.9)	0.80 (0.36-1.75)	0.574	0.92 (0.44-1.94)	0.832
30-100	21/72 (29.2)	1.68 (0.91-3.10)	0.096	1.59 (0.90-2.82)	0.110
100+	13/56 (23.2)	1.34 (0.67-2.66)	0.405	1.20 (0.65-2.22)	0.554
Role during anal sex					
Activo	5/66 (7.6)	ref		ref	
Pasivo	21/78 (26.9)	<b>3.55 (1.42-8.92)</b>	<b>0.007</b>	<b>3.73 (1.59-8.75)</b>	<b>0.003</b>
Moderno	30/124 (24.2)	<b>3.19 (1.30-7.86)</b>	<b>0.011</b>	<b>2.42 (1.01-5.78)</b>	<b>0.048</b>
Unprotected anal sex in the last 3 mo.					
No	13/67 (19.4)	ref		ref	
Yes	43/201 (21.4)	1.10 (0.63-1.92)	0.731	0.87 (0.50-1.53)	0.638
Unprotected sex with stable partners in last 3 mo.					
No	19/87 (21.8)	ref		ref	
Yes	37/181 (20.4)	0.94 (0.57-1.53)	0.792	0.94 (0.56-1.58)	0.805
Anal sex partners met over the internet in last 3 mo.					
No	32/169 (18.9)	ref		ref	
Yes	24/99 (24.2)	1.28 (0.80-2.04)	0.301	1.34 (0.90-2.00)	0.151
HIV					
Negative	29/189 (15.3)	ref		ref	
Positive	8/30 (26.7)	1.74 (0.88-3.44)	0.113	1.14 (0.62-2.10)	0.669
Previous diagnosis	19/49 (38.8)	<b>2.53 (1.55-4.11)</b>	<b><math>\leq 0.001</math></b>	1.34 (0.84-2.15)	0.223
Previous syphilis diagnosis (per pt report)					
No	22/196 (11.2)	ref		ref	
Yes	34/71 (47.9)	<b>3.61 (2.29-5.71)</b>	<b><math>\leq 0.001</math></b>	<b>3.29 (2.05-5.25)</b>	<b><math>\leq 0.001</math></b>
Alcohol use disorder (AUDIT score $\geq 8$ )					
No	31/141 (22.0)	ref		ref	
Yes	25/127 (19.7)	0.89 (0.56-1.43)	0.645	0.85 (0.55-1.29)	0.439

\*Bolded data p value =  $< 0.05$

Figure 2. Baseline RPR titer distribution among MSM/TW in Lima, Peru



## DISCUSSION

- We report high prevalence of recent syphilis at baseline, with increased frequency of recent syphilis in sub-groups by reported role during anal sex.
- Rectal mucosa susceptibility to infection and sexual network issues may account for this finding.
- We also report high HIV and syphilis co-infection. We will continue to investigate the relationship between HIV and syphilis with the follow-up data from this cohort study.
- Our findings suggest integrated and innovative strategies for prevention and intervention of both HIV and syphilis.

## ACKNOWLEDGEMENTS

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