

BACKGROUND

Observations at the Houston Health Department revealed that syphilis infection has potentially emerged beyond Human Immunodeficiency virus (HIV) infection as a highly relevant indicator of susceptibility to sexually transmitted Hepatitis C Virus (HCV) infection. Identification of syphilis as a relevant predictive indicator of HCV infection susceptibility may facilitate optimization of diagnostic algorithms for HCV detection among targeted populations.

METHODS

A multifaceted proof of concept study comprised of 811 remnant samples and over 2000 abstracted results compared the prevalence of syphilis co-infection to HIV co-infection among individuals with Hepatitis C Virus antibody (HCVab).

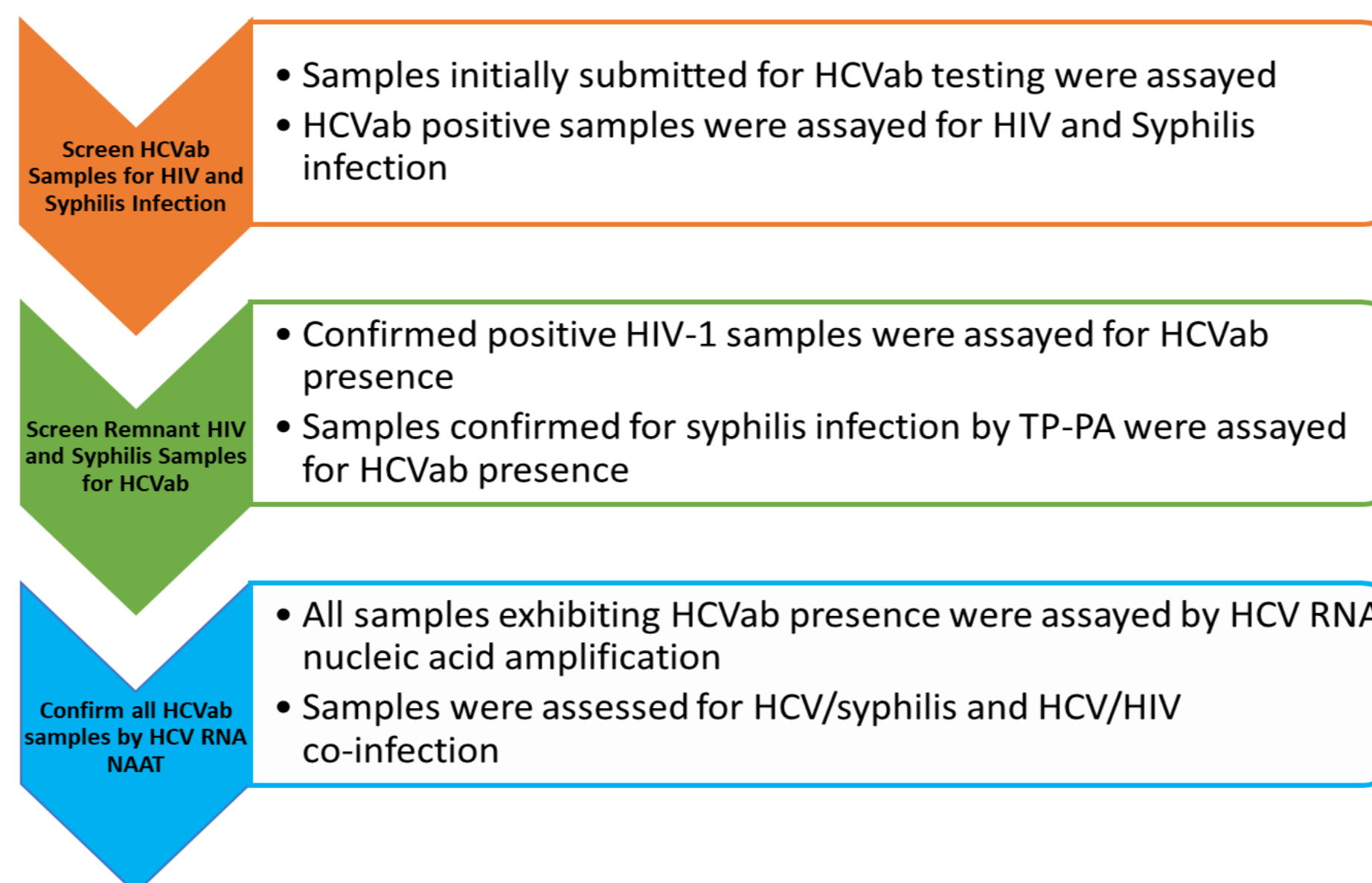
Remnant serum samples previously tested for HIV and syphilis were analyzed for HCVab presence using an enzyme-linked immunosorbent assay. HCVab positive samples were confirmed for HCV infection by HCV RNA nucleic acid amplification. Conversely, remnant HCVab positive samples were analyzed for syphilis and HIV infection using conventional diagnostic assays and algorithms.

The independent associations between data sources of positive cases and demographic characteristics (gender, age category, and race/ethnicity) were determined using the Chi-square test (χ^2) or Fisher Exact test where cases were less than five. The prevalence of HCV, HIV, and Syphilis mono-infections, and the associated co-infections by demographic characteristics were assessed using the Chi-square test. Predictive screening and ranking of independent factors and the associated relative risks of HCV, HIV and Syphilis infection diagnoses and coinfections with HCV were also determined.

All statistical tests performed were 2-tailed with a probability value of 0.05 used as the threshold for declaring statistical significance. Data management and statistical analyses were conducted using SAS JMP Statistical Discovery™ Software version 14.3 (SAS

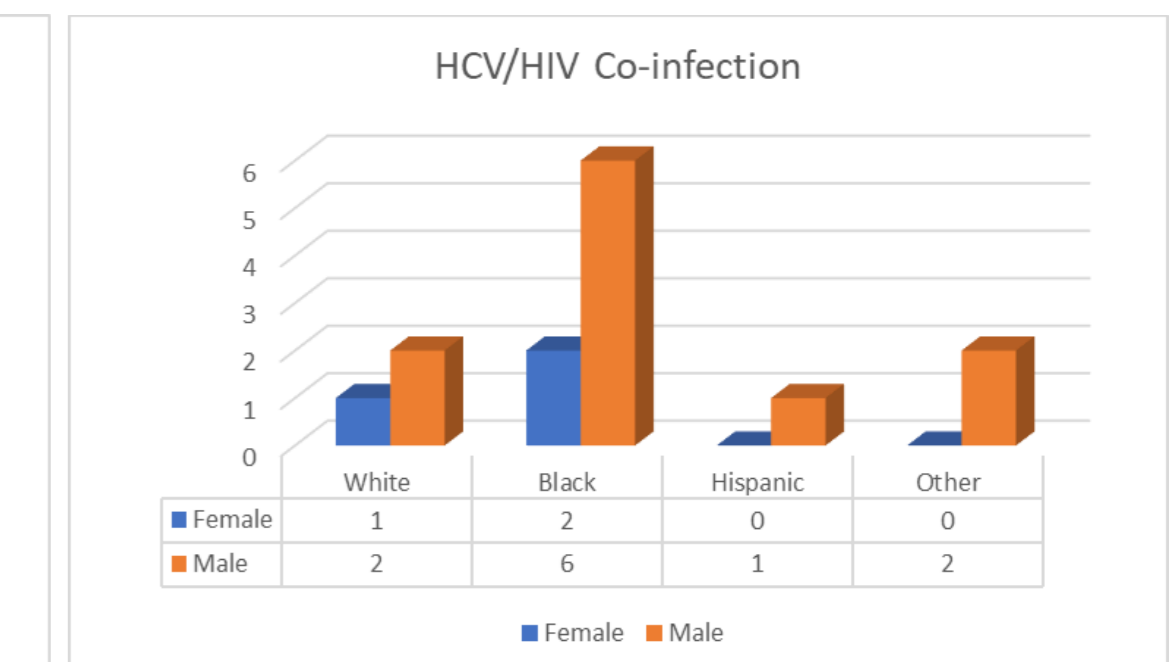
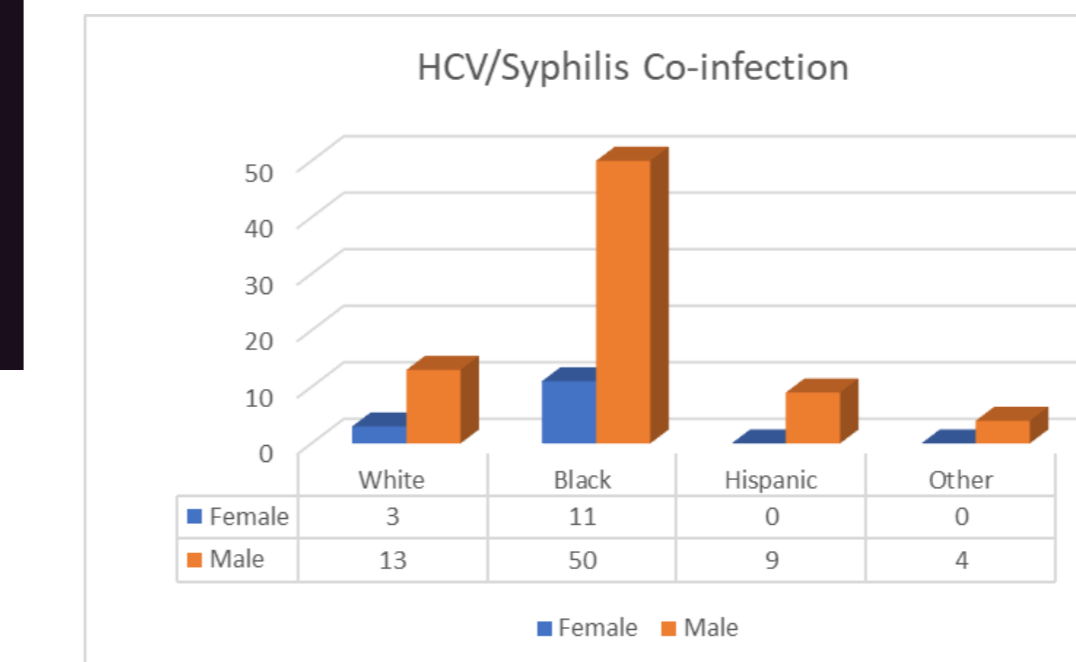
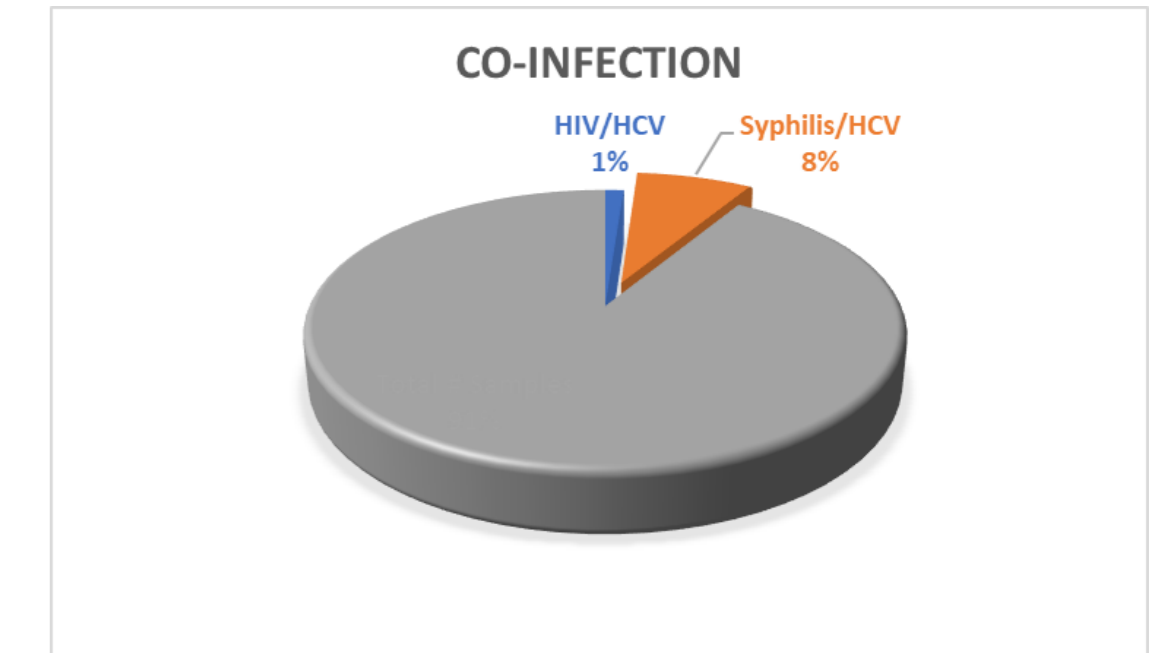
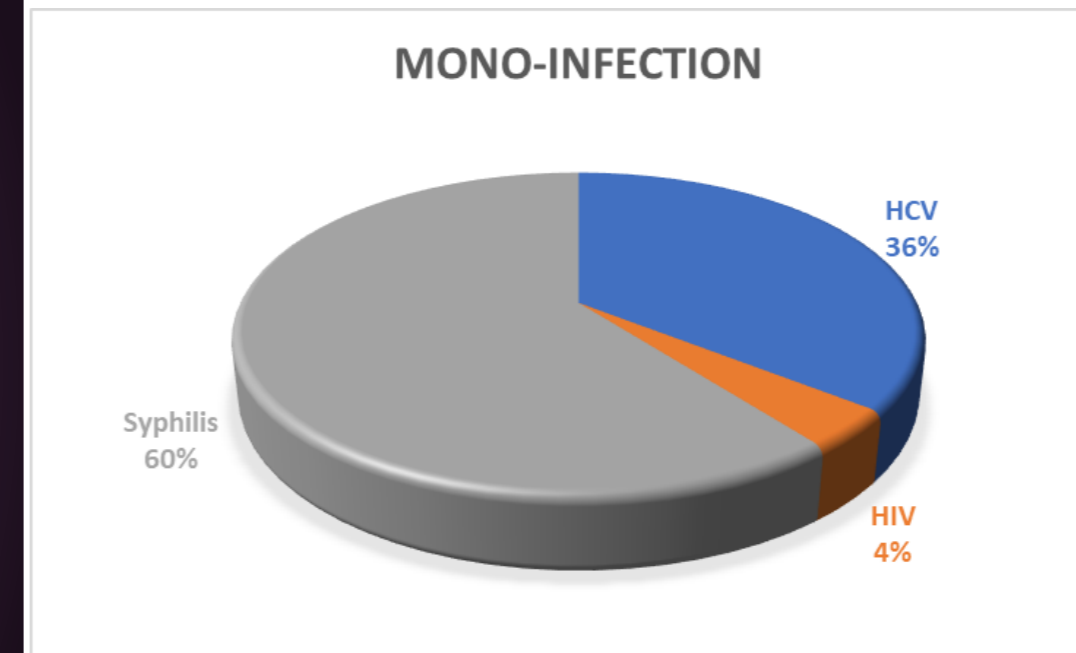
Institute, Cary, North Carolina, USA).

Assessment of HIV infected samples and Syphilis infected samples for co-infection with HCV revealed HCV/Syphilis co-infection was detected at a significantly higher rate than HCV/HIV co-infection across the demographics of age, gender and race/ethnicity



RESULTS

Assessment of the association of mono-infection and co-infections with HIV, Syphilis, and HCV among the study individuals was statistically relevant ($p < 0.0001$). Overall, 8.22% of the study samples were HCV/syphilis co-infected compared to 1.37% HCV/HIV co-infected.



CONCLUSIONS

The prevalence of HCV/syphilis co-infection far exceeded prevalence of HCV/HIV co-infection in this study. This may be attributed, in part, to advances in HIV treatment which lead to undetectable levels of HIV. Identification of syphilis infection, confirmed by *T. pallidum* seropositivity, may serve as a highly relevant predictor of HCV infection susceptibility in the absence of identifiable HIV infection; thereby proving to be an efficacious diagnostic tool in the early detection, intervention, and treatment of HCV infection.

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