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Publishing Title: Community Viral Load: Geographic, Clinical and Risk-Related Disparities in a Novel Population-Based Biomarker of HIV Prevention and Treatment

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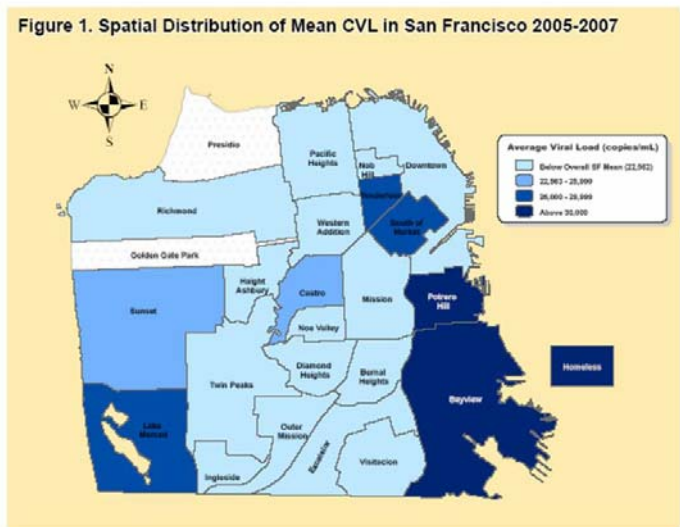
Abstract Body: **Background:** We propose a novel biomarker, community viral load (CVL), to measure a community's viral burden or infectiousness. In individuals, HIV viral load (VL) is related to infectiousness. A cohort study showed that VL among injection drug users predicts HIV incidence. However, no jurisdiction has used population-level data to characterize overall CVL and its spatial distribution.

Methods: We used San Francisco's (SF) surveillance registry to calculate CVL, defined as the mean of the most recent VL of all HIV-infected individuals in a particular community from 2005-2007. We tested differences in CVL by various characteristics using the Kruskal-Wallis test. We mapped the distribution of CVL by neighborhood (ArcGIS 9.3) to visually explore spatial differences.

Results: Overall SF CVL was 22,562 copies/mL for 11,598 unduplicated individuals. There were statistically significant variations ($p < 0.0001$) in CVL by sex, race/ethnicity, HIV transmission risk, insurance, CD4 count, socioeconomic status (SES), and neighborhood. The neighborhood with highest AIDS case density, the Castro, did not have the highest CVL (22,922 copies/mL), whereas the Bayview, an African-American neighborhood with low AIDS case density, had a high CVL (38,963 copies/mL) (Fig.1). Overall, neighborhoods with the highest CVL had the lowest median household income. Homeless individuals had the highest overall CVL (41,978 copies/mL).

Conclusion: Even in richly-resourced San Francisco, the differences in CVL are consistent with well-characterized disparities in the HIV epidemic such as race/ethnicity, homelessness, and SES. CVL may be a useful surveillance indicator that reflects the effectiveness of HIV prevention and treatment interventions and could be used to target communities at greatest risk.

Figure 1. Spatial Distribution of Mean CVL in San Francisco 2005-2007



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