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San Francisco Researchers Develop Community Viral Load Concept

New Measure May Improve HIV Prevention and Treatment Outcomes

San Francisco, CA--As HIV/AIDS evolves, so do the measurements public health researchers need to be able to monitor the epidemic. Now, HIV researchers at the San Francisco Department of Health have developed a new measure – community viral load (CVL) –that they hope will show not just how effective HIV treatment is at a population level, but will eventually help prioritize HIV prevention strategies and interventions to the communities and individuals at greatest risk.

" Decreases in Community Viral Load are Accompanied by Reductions in New HIV Infections in San Francisco" will be published in PLoS ONE on Thursday, June 10th with the press embargo ending at 2 p.m. Pacific Time (5 p.m. Eastern) on Thursday, June 10th.

San Francisco is the first jurisdiction in the United States to calculate community viral load, examine its geographic distribution within the city, and to evaluate the relationship that exists, if any, between community viral load and new HIV infections. Other public health departments throughout the United States have expressed interest in using community viral load to help monitor the HIV epidemic.

"As a doctor who takes care of people living with HIV, I know what gets measured gets managed," said Moupali Das, MD, reciting a popular research edict. Dr. Das is currently Director of Research, HIV Prevention Section and the lead researcher and primary study author.

Das and colleagues developed the measure of community viral load as a population-based biologic marker that is temporally upstream of new HIV infections. "If you monitor the HIV epidemic by counting new cases of HIV, you've lost an opportunity to prevent those new cases," noted Mitch Katz, MD, Director of Health, SFDPH. "We know that suppressing maternal viral load reduces maternal to child HIV transmission, and there is accumulating evidence suggesting that suppressing the viral load can reduce sexual transmission as well."

"In my practice, I check a viral load in an individual patient to see how well s/he is doing on antiretroviral therapy. At the health department, we wanted a way to measure the viral load of the entire city to see how well we are caring for people living with HIV in San Francisco, ," explained Dr.

Das. "Just as a thermometer measures a temperature, community viral load is like a virometer that measures the community's viral burden."

During the time period of the study, 2004-2008, San Francisco undertook many efforts to improve HIV prevention and care, including increasing availability of rapid HIV testing, simplifying testing procedures, and improving efforts to link newly diagnosed individuals to HIV care. Antiretroviral regimens improved in potency, tolerability, and ease of dosing (i.e. one daily fixed dosed combination pill replaced older more complicated regimens.)

Das and colleagues reasoned that these changes would result in reductions in the community viral load over the five-year period they studied. She hypothesized that these reductions in community viral load would be associated with fewer recent HIV diagnoses and fewer new HIV infections. To estimate new HIV infections, researchers used the same method that the CDC employs for calculating HIV incidence.

As expected, the average community viral load was higher among the groups of people who have higher morbidity and mortality in the HIV epidemic, such as, among injection drug users and people who are homeless or transgendered. Average community viral load was also higher among those individuals who were not engaged in regular HIV care. Neighborhoods with lower socioeconomic status had higher average community viral loads.

As anticipated, community viral load decreased significantly in San Francisco from 2004-2008. This reduction in community viral load was accompanied by a decrease in the number of newly-diagnosed and reported HIV cases. There was, however, no association between the reduction in community viral load with HIV incidence; a finding that may or may not be attributable to the imprecision in the CDC methodology. A limitation of this research is whether the drop in community viral load is causally related to the reduction in new HIV infections.

"This new methodology has great potential to help us determine whether HIV treatment and prevention programs are working at the local and national level," said Grant Colfax, MD, Director of HIV Prevention and Research at the DPH and senior author of the study. "We are cautiously optimistic that CVL will eventually prove to be a good marker of our prevention efforts, and help us and our community partners to deliver optimal care and prevention services to the communities most in need. We are working with our colleagues at the CDC and other Health Departments nationally to reproduce this methodology in other jurisdictions."

The significance of community viral load as an important contribution to the HIV prevention field has been applauded by other leading researchers, advocates, and community members. "This work provides a series of analyses that, for the first time, use routinely collected surveillance and clinical data to create metrics that can track the efficacy of wider access to antiretroviral therapy in decreasing HIV spread. This San Francisco Health Department team's findings will help public health authorities around the world in tracking the efficacy of new test-and-treat strategies in mitigating HIV spread," said Kenneth Mayer, the Professor of Medicine and Community Health, at Brown University and the Director, Brown AIDS Program.

"This study suggests that access to appropriate care – including effective antiretroviral treatment -- is an essential component to improving the lives of people living with HIV and to reducing new infections in San Francisco," said San Francisco AIDS Foundation Interim CEO Barbara Kimport. "Its findings underscore the importance of promoting HIV testing and maintaining access to treatment during tight budget times like we currently are experiencing in San Francisco."

Susan Scheer, Director of HIV Surveillance, who has worked as an HIV/AIDS epidemiologist for the San Francisco Department of Public Health for the past 17 years, sees this measurement tool as a boon to her work. "Using HIV surveillance data to track trends in CVL is an exciting and novel use of information routinely collected and readily available. This adds an effective, but relatively inexpensive, tool to our efforts to track the HIV epidemic."

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