Test and Treat Success Stories: Community Viral Load Predicts HIV Transmission Declines

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When the average viral load of people known to be HIV positive drops in a community, it can result in substantial and equal declines in new HIV diagnoses, according to a series of presentations Monday, February 28, and Wednesday, March 2, at the 18th Conference on Retroviruses and Opportunistic Infections (CROI) in Boston.

One of the key HIV prevention strategies for the Centers for Disease Control and Prevention (CDC) in Atlanta and the National Institutes of Health (NIH) in Bethesda, Maryland, is to get all HIV-positive people tested, linked to care and, if appropriate, on antiretroviral (ARV) therapy. The theory is that this approach, usually dubbed "TLC+" or "test and treat," will lower the rate of new HIV infections. Though formal studies have only begun to test the feasibility of this approach in high-prevalence cities, the theory has merit.

It proceeds from several findings. First, several studies have documented that among serodiscordant couples—where one is HIV positive and the other is HIV negative—the risk of HIV transmission is exceptionally low as long as the positive partner's virus levels are undetectable. This is true even in couples where condoms are rarely used. Secondly, two cities—San Francisco and Vancouver—have achieved fairly dramatic declines in new HIV diagnoses, and health experts there have attributed the results to wide-scale ARV treatment of HIV-positive people.

Now, additional and more recent data are available from San Francisco, which stepped up its efforts to aggressively test, treat and link HIV-positive people to care during the last couple of years. In addition, a new study suggests the same approach could work among injection drug users.

Moupali Das, MD, MPH, from the University of California at San Francisco (UCSF) presented the data from that city. Das and her colleagues from UCSF and the San Francisco Department of Public Health (DPH) analyzed data collected by the DPH on people who tested HIV positive in San Francisco between 2004 and 2009. In all, data were available for just over 1,700 people.

Das's team found that the length of time between a person's diagnosis and starting ARV therapy diminished significantly between 2004 and 2009, as did the time between diagnosis and an

undetectable viral load. The time from initial diagnosis to starting ARVs declined from 19 months to 3 months, and the time from diagnosis to an undetectable viral load declined from 32 months to 5 months. Correspondingly, the percentage of HIV-positive people with an undetectable viral load within 6 months of an HIV diagnosis increased from less than 20 percent to more than 90 percent between 2004 and 2009. The authors acknowledge, however, that these results only come from people who got tested, and they estimate that up to 20 percent of HIV-positive people in San Francisco have yet to be tested.

Nevertheless, these improvements perfectly mirrored reductions in the rates of new HIV diagnoses over the same period. Just as the average maximum community viral load dropped from over 40,000 to under 20,000 in five years, the number of new diagnoses dropped from 864 in 2004 to 506 in 2009.

The vast majority of new infections in San Francisco are due to sexual transmission, and most are between men who have sex with men. Researchers looking at a much more difficult population to treat—injection drug users (IDUs)—in Baltimore—which has a raging HIV epidemic—found similar signs of success.

In this second study, Gregory Kirk, MD, PhD, MPH, from Johns Hopkins University in Baltimore, and his colleagues examined data from the AIDS Linked to the Intravenous Experience (ALIVE) cohort. ALIVE is an observational cohort that has been following about 1,103 HIV-positive and 3,443 HIV-negative injection drug users in Baltimore for more than 22 years.

Kirk’s team found that although new HIV cases among the IDUs in the study began decreasing before 1996, when combination ARVs were introduced, the drop in infections really took off after 1996. In fact, for every 1 log drop in virus levels there was a 68 percent drop in new HIV infections. Similarly, for every 1 percent increase in the proportion of people receiving ARVS, there was a 5 percent drop in new infections. New infections also dropped significantly in people who stopped injecting drugs, but not to the same degree.

“In a large, community-based urban IDU cohort, both reducing active injecting and increasing [ARV treatment] uptake appear linked to reduced HIV transmission,” the authors state.

Reflecting the experience of the San Francisco research team, Kirk and his coauthors conclude: “Reductions in [community viral load] were strongly associated with declines in HIV incidence, providing evidence to support further investigation of seek, test, treat and retain strategies to prevent HIV in IDU communities.”
