Is the U.S. HIV Epidemic in Much Better Shape Than We've Thought?

New research suggests that the United States' dismally low rate of viral suppression may have been quite the underestimate.

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Here's the good news: There may be considerably fewer people living with HIV in the United States, and the HIV population may have a much higher rate of viral suppression than the Centers for Disease Control and Prevention (CDC) has estimated. The bad news is that the CDC's potentially faulty estimates may have thrown off various other presumptions about the state of the U.S. HIV epidemic and what efforts are needed to drive down new infections.

Throughout the current decade, the concept of the HIV treatment cascade, also known as the care continuum, has been at the forefront of framing the overall comprehension of the state of the epidemic. According to CDC estimates, which are based on 2011 data, 1.2 million people are living with HIV in the United States. Out of that total, an estimated 86 percent have been diagnosed, 40 percent are engaged in regular medical care, 37 percent have been prescribed antiretrovirals (ARVs) and just 30 percent have an undetectable viral load.

The viral suppression rate is of particular significance, first as a barometer of the success, or lack thereof, in treating HIV in the United States and second as an indicator of how far the nation has to go toward preventing transmission through ARV treatment. Research suggests that it may be virtually impossible for HIV-positive individuals to transmit the virus if they have an undetectable viral load. And of course Truvada (tenofovir/emtricitabine) as pre-exposure prophylaxis (PrEP) can prevent the acquisition of the virus among those who are exposed to replicating virus from HIV-positive individuals not on successful treatment.

Along comes a new paper, published ahead of print in April in the Journal of Acquired Immune Deficiency Syndromes (JAIDS), that estimates that in 2011 only 819,200 people were living with HIV in the United States, of whom 86 percent were diagnosed, 72 percent were in care, 68 percent were on ARVs and a much more impressive 55 percent were virally suppressed.

This estimate puts the U.S. treatment cascade figures more in the ballpark of those seen in other Western nations, rather than trailing distantly in last place.

The paper, which was written by a team of researchers at the New York City Department of Health

and Mental Hygiene (DOHMH), employed different, arguably more reliable, means of estimating key points of the U.S. treatment cascade than the CDC has used. Nevertheless, in their paper, the JAIDS authors stress that they did not attempt to "precisely quantify" the U.S. HIV population, but rather to examine how different methods of arriving at treatment cascade figures affect such estimates. The authors conclude that they have provided sufficient evidence to suggest that the CDC has indeed overestimated the size of the HIV population.

To estimate the number of people living with diagnosed HIV in 2011, the CDC researchers used HIV case reporting data, counting all those who have tested positive for the virus and who were not known to have died by the end of that year. To avoid artificially inflating the HIV-diagnosed population, surveillance researchers attempt to "deduplicate" records; but this process is by no means foolproof.

"The CDC method risks overestimating the number of [people] living with HIV/AIDS if duplicate cases were not identified through the deduplication process and deaths were missed by routine death registry matches," says Qiang Xia, MD, MPH, a research scientist at the New York City DOHMH and the lead author of the JAIDS paper. "Our method is not subject to these limitations and provides a more accurate estimate of the number of persons diagnosed with HIV."

Xia and his team relied on HIV laboratory reporting data to make their own estimate of the size of the HIV-diagnosed population. First, to measure the number of people in care for the virus, they looked at reports from New York City and 19 other jurisdictions, counting as in care all those who had at least one CD4 and viral load test in 2011. Next, they relied on observed patterns of individuals who were lost to and later returned to HIV care in order to extrapolate the number of those not in care during 2011. Then they added that figure to their estimate of the in-care population to arrive at an estimated number of people diagnosed with the virus. Last, to estimate the total HIV population, they presumed an 86 percent diagnosis rate, just as the CDC has, and extrapolated accordingly.

To arrive at their own estimate of the number of people with HIV who were retained in care in 2011, the CDC researchers looked at a sample of individuals who had at least one HIV care visit between January and April 2011.

"This method risks underestimating the number of HIV-infected persons retained in care because not all patients retained in care in 2011 had care visits during the first four-month period," says Xia.

As for the last two steps in the treatment cascade, the JAIDS paper authors assumed that the same proportion of those in care were prescribed ARVs and were virally suppressed, respectively, as the CDC has estimated.

"Are we really only 30 percent virally suppressed in this country?" asks Jennifer Kates, PhD, director of global health and HIV policy at The Kaiser Family Foundation. "We know that in some cities it's much higher than that. Is [the national figure] as high as 55 percent? I don't know the answer to that."

If the national viral suppression rate really is considerably higher than 30 percent, expanding the use of PrEP could yield less of an impact on transmission rates than previously assumed. At a CROI presentation this year, the CDC estimated that expanded PrEP could cut new HIV cases by 20 percent in five years. But this estimate is based on the presumption that only about a third of all Americans are currently virally suppressed.

Edward Gardner, MD, medical director of The Center for Positive Health in Denver, who coined the concept of the treatment cascade in 2011, believes that care continuum figures were underestimates from the start. His own research has shown that in just two and a half years, 15 percent of newly diagnosed people with HIV in Denver moved out of state. A system that failed to take such out-migration into account would have incorrectly counted those people as lost to care. Recently, health officials in places like Seattle, New York City and San Francisco have made similar efforts to keep more precise tabs on their own HIV populations.

The CDC's care continuum estimate has also grown increasingly stale, failing to account for any recent improvements in HIV care and treatment rates. At the February 2016 Conference on Retroviruses and Opportunistic Infections (CROI) in Boston, CDC epidemiologist Heather Bradley, PhD, presented findings suggesting that viral suppression rates among those in HIV care are steadily increasing in the United States.

"There are so many different groups that you get data from that we need to do better in coalescing all of the data," says Anthony S. Fauci, MD, director of the National Institute of Allergy and Infectious Diseases "I think we need to recalculate the country average."

At a CROI press conference, Bradley said that efforts are indeed underway at the CDC to improve the care continuum estimate. In 2013, when the last CDC cascade figures came out, 27 states plus Washington, DC, reported CD4 and viral load test results to the CDC's National HIV Surveillance System. The number of jurisdictions providing such reports is increasing over time, and CDC officials are looking to rely on such laboratory data when making care continuum estimates.

"The more states that we have reporting complete information on CD4s and viral loads," Bradley said, "the better estimate we can get nationally."

According to CDC spokesperson Paul Fulton, the agency will publish updated HIV surveillance data later in the year that will include new estimates of the proportions of those living with the virus who are retained in care and who are virally suppressed.
