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UCLA, Danish research yields proof that treatment-as-prevention strategy could eliminate HIV

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Worldwide, about 35 million people are living with HIV. The World Health Organization and the Joint United Nations Programme on HIV/AIDS plan to use an approach called "treatment as prevention" to eliminate the global pandemic, which the WHO says will have occurred when only one person out of 1,000 becomes infected each year.

Now, a nearly two-decade analysis by researchers from UCLA and Denmark yields the first proof that the approach could work.

Reviewing Danish medical records, they found that the treatment-as-prevention strategy has brought Denmark's HIV epidemic to the brink of elimination. The study found that in 2013, the country had only 1.4 new HIV infections per 1,000 men who have sex with men, Denmark's major risk group.

"The Danes have done what nobody else in the world has been able to do," said Sally Blower, the study's senior author and the director of the Center for Biomedical Modeling at UCLA. "They have almost eliminated their HIV epidemic, and they have achieved this simply by providing treatment."

The paper notes, however, that the treatment programs in Denmark are exceptional. "Treatment makes people less infectious," said Justin Okano, the study's lead author and a statistician in Blower's research group. "In Denmark, 98 percent of patients take all of their HIV medications, which is why treatment as prevention has worked there. Unfortunately, adherence levels are nowhere near as high in other countries."

The findings, which appear online May 9 in the *Lancet Infectious Diseases*, are based on a sophisticated statistical analysis of data from the ongoing Danish HIV Cohort Study, which began in 1995. That project, which tracks all Danish men who have sex with men, and who have been diagnosed with HIV, was established and is run by Jan Gerstoft and Niels Obel, clinicians and epidemiologists in Denmark who also are co-authors of the new study.

For the current study, the researchers used an approach called CD4-staged Bayesian back-calculation to determine the number of Danish men who have sex with men, and who had become infected with HIV each year between 1995 and 2013. They found that the number of infections has been decreasing since 1996, when effective HIV treatments were introduced in Denmark. They then measured the correlation between the decrease in the number of HIV infections each year and the increase in the number of people who began treatment, and they found that the two were highly correlated.

"What we found was very exciting," said Laurence Palk, a co-author of the study and a postdoctoral fellow in Blower's lab. "Our results show treatment as prevention has been slowly but steadily working to end the Danish epidemic."

The team calculated that by 2013, when the epidemic was close to elimination, there were only approximately 600 men in Denmark who have sex with men, and who were infected with HIV but had not been diagnosed.

"Now that the number is so low, it would be fairly easy to do a social media campaign and get these men to be tested," Palk said. "If they accepted treatment, it would essentially end this epidemic."

Blower, who also is a professor in residence at the Semel Institute for Neuroscience and Human Behavior, said, "Over 15 years ago, we made predictions based on mathematical models that treatment as prevention could work and be an effective elimination tool. It's wonderful to see that this has actually happened."

The researchers chalk up Denmark's success to many factors, including the country's universal health care system and the availability of free treatment for all people who have been infected with HIV. However, the largest number of people with HIV -- 25 million -- live in sub-Saharan Africa, where health care systems are overextended and there are far fewer resources.

Blower said that for the treatment-as-prevention approach to eliminate HIV epidemics throughout the world, all countries would need to emulate Denmark's treatment programs.

"Even in resource-rich countries, this would take a huge amount of money and effort," she said. "The goal of elimination through treatment is aspirational, but Denmark has shown that -- at least in resource-rich countries -- it's achievable."

Source:

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