PrEP Is Cost-Effective and May Even Save Money in Many Scenarios

Because PrEP can avert the need for expensive lifelong HIV treatment, its own considerable expense often makes good economic sense.

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Depending on variables such as average adherence to the daily regimen, the cost of the medication and a local HIV prevalence rate, the use of Truvada (tenofovir disoproxil fumarate/emtricitabine) as pre-exposure prophylaxis (PrEP) is cost-effective among men who have sex with men (MSM) in many scenarios, aidsmap reports. Sometimes, in fact, PrEP may save money.

Publishing their findings in PLOS ONE, researchers used mathematical modeling to weigh various factors affecting PrEP's potential to be cost-effective or cost-saving. These included the population-level effectiveness of PrEP (the factor by which giving Truvada to a group of HIV-negative MSM lowers their HIV infection rate); the background prevalence of the virus in the local MSM population; the cost of Truvada; and the degree to which, if any, going on PrEP leads MSM to take greater sexual risks, a phenomenon known as risk compensation.

Cost-effectiveness calculations in the medical and public health field take into account the amount of money necessary to gain what is known as a quality-adjusted life-year (QALY). A QALY is one year of life in ideal health or more than one year of life spent in less than ideal health, inversely proportional to the reduction in health. So if health is 50 percent of ideal, an individual would half to live two extra years to gain one QALY. Or if his or her health quality doubled, going from 50 percent to 100 percent, then the individual would gain QALYs equal to the remaining years of his or her life.

The dollar figure considered the upper limit for cost-effectiveness of a gained QALY can vary widely but often centers around $100,000. Kidney dialysis is considered cost-effective if it costs less than $150,000 per QALY gained, while cervical cancer screening's threshold is just $19,530.

The researchers created a base-case scenario in which PrEP reduced HIV risk by 44 percent overall (the reduction seen in the 2010 iPrEx trial of PrEP among MSM), 10 percent of local MSM have HIV and a year of Truvada is $10,711, the current price. The analysis was based on a single year of PrEP use by a population of MSM. In this case, it would cost $415,000 to prevent one HIV transmission with Truvada, or $64,000 per QALY gained.

If the investigators raised PrEP's population-level effectiveness to 92 percent or lowered the price of Truvada by 80 percent, PrEP would actually save money. PrEP still saved money if PrEP was 44 percent effective overall, the HIV prevalence rate was 20 percent and the cost of Truvada was reduced by only 40 percent.

Looking at how increased sexual risk taking prompted by PrEP might affect these calculations, the researchers found that risk compensation could make PrEP less cost-effective if Truvada's population-level effectiveness sat at the relatively low rate of 44 percent. Recent studies have found that many MSM do take greater sexual risks after starting Truvada for prevention, such as by using condoms at lower rates. However, considerable data suggest that overall PrEP adherence among MSM is quite high. After 5,000 cumulative years of PrEP use among those receiving it through Kaiser Permanente Northern California, no one has tested positive for HIV while maintaining an active prescription.

The authors of the new study found that if PrEP is 92 percent effective on a population level and is not discounted and the background HIV prevalence is 20 percent, it would always save money, regardless of any increased sexual risk taking.

A major problem with the investigators' mathematical model is that it presumes that just 33 percent of the local HIV-positive MSM have an undetectable viral load and therefore are extremely unlikely to transmit the virus (considerable data support the hypothesis that those with full viral suppression cannot transmit to others). The Centers for Disease Control and Prevention recently estimated that about half the national HIV population has a fully suppressed viral load. Furthermore, viral suppression rates tend to be higher among MSM compared with other risk groups. So the model may overestimate PrEP's role in reducing local HIV infections and therefore also underestimate how much Truvada would be needed to prevent a single infection.

On the flip side, the model does not take into account the downstream infections PrEP may prevent by preventing new infections in individuals who may then transmit to others. Nor does the model consider scenarios in which PrEP is used by members of highly interconnected sexual networks in which the HIV prevalence may be much higher than in the overall MSM population. PrEP may be particularly effective at preventing downstream infections in such networks.

To read the aidsmap article, click here.

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