The limits of success

Only 1253 people received an HIV diagnosis in Australia in 2012, a testament to nearly 3 decades of aggressive prevention efforts. But there’s a troubling caveat: The number of new diagnoses jumped 10% from the preceding year, and cases have steadily risen since 1999. And 70% of the new infections occurred in men who have sex with men (MSM).

Every country in the world has struggled to slow the spread in MSM. But the growing problem in Australia has highlighted the limitations of one of the most promising new prevention tools. A landmark 2011 study proved that if infected people faithfully took their antiretroviral (ARV) drugs and had undetectable viral levels on standard tests, the risk of transmission via heterosexual sex was nearly eliminated, falling by 96% (Science, 23 December 2011, p. 1628). Hopes soared that adding treatment as prevention to the arsenal of proven interventions could bring AIDS epidemics in communities to a halt.

Australia has universal health care and access to the latest ARVs, and most people who learn they are infected promptly start treatment. In a study published in the July 2012 issue of PLOS Medicine, epidemiologist David Wilson of the Kirby Institute for Infection and Immunity in Society in Sydney noted that as many as 75% of MSM in Australia reported taking an HIV test annually, and 70% of infected people received ARVs. In 90% of those, viral levels were fully suppressed. But that has not stopped the rise in new cases among MSM. “Why’s there a disconnect with ‘test and treat?’” asks David Cooper, who heads the Kirby Institute.

One possible answer is that treatment as prevention simply doesn’t work as well with MSM. Anal intercourse has an 18-fold higher probability of transmitting HIV than vaginal intercourse, according to a 2010 study. MSM also tend to have more partners, increasing the odds that the virus will spread.

Wilson, a mathematical modeler and head of the Kirby’s surveillance division, also notes that more treatment means more HIV-infected people survive who can potentially spread the infection, as some undoubtedly will remain infectious. Treated people may also engage in riskier behavior that, in a population sense, overwhelms the benefits of the drugs. And the virus is often transmitted by recently infected people who have yet to develop high enough antibody levels to be detected on standard tests.

Clearly, if every infected person took ARVs every day and had undetectable viral levels, transmission would likely plummet in MSM communities. But that’s unrealistic. So Wilson and his team published a modeling exercise online on 7 February in Sexual Health that explored what it would take to lower new HIV infection rates in Australia’s MSM population. The researchers looked at the impact of earlier detection of infection and initiation of treatment. But the factor that stood out most was the effect that treatment has on transmission.

If ARVs indeed lower the risk of transmission in MSM by 96%—as much as it does in heterosexuals—then treating 90% of people would cut new infections by 55% in 5 years. On the other hand, if ARVs offer a mere 26% protection in MSM, the same scenario would avert a measly 9% of infections. “The jury is still out with regard to how much treatment decreases infectivity in MSM,” Wilson says.

Even if it does work as well in MSM, which the Kirby Institute is now studying, the country still must substantially increase the number of people on ARVs—and it’s notoriously difficult to improve on success.
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