What can modelling tell us about the scale-up of CAB for PrEP?

AVAC
Global Health Advocacy, Access & Equity

November 2023

Injectable Cabotegravir (CAB) for PrEP is an antiretroviral drug developed by ViiV Healthcare and formulated to be administered by injection once every two months. It was found to be safe and effective at preventing HIV transmission in two large clinical trials and has been approved by the US Food and Drug Administration, the European Medicines Authority, and more than ten other countries across Africa, Asia, Latin America, and Oceania, with further approvals expected in the coming months. See AVAC's Advocates' Primer on Injectable Cabotegravir for PrEP: Trials, Approvals, Rollout and More for additional background.

While the introduction and scale-up of CAB for PrEP is only just starting, mathematical modelling exercises undertaken by researchers affiliated with the HIV Modelling Consortium can help understand what to expect and guide early policy decisions to ensure CAB for PrEP is able to have maximum impact on reducing the HIV epidemic. Current modelling efforts have focused on four important questions:

1. What is the predicted impact of the introduction of CAB for PrEP on HIV incidence?

The EMOD-HIV model found that rapid, widespread introduction of CAB for PrEP, defined as starting in 2025 and covering 20% of the population at highest risk of HIV by 2030, could reduce HIV incidence to <0.1% by 2030 in Kenya's Nyanza Region and in Zimbabwe. While rapid, widespread CAB for PrEP introduction alone was not found to be sufficient to reduce HIV incidence in South Africa to <0.1% by 2030, EMOD-HIV, the HIV Synthesis model, and Thembisa all found that adding CAB for PrEP as an option may reduce the HIV epidemic in South Africa substantially more than expanding oral PrEP would.

In Thailand, the TEAMS model found that introducing CAB for PrEP over the period 2023- 2025 to the same number of people as those who currently use oral PrEP will reduce HIV incidence amongst gay and bisexual men who have sex with men by 3.5%.

The Atlanta Model developed by the HIV Prevention Trials Network, looking at CAB for PrEP introduction in Atlanta, GA, USA, found that if CAB for PrEP led to an 11 percentage point increase in PrEP coverage (from 29% to 40%), 36% of new infections could be averted, while switching of existing oral PrEP users to CAB for PrEP had only a small impact on infections averted.

2. What is the maximum CAB for PrEP could cost while still being cost-effective?

In South Africa, the Thembisa and CEPAC models, looking at CAB for PrEP use in general and at use by adolescent girls and young women respectively, both found that CAB for PrEP would need to cost no more than twice the cost of oral PrEP to be as cost-effective as oral PrEP. HIV Synthesis found for settings in sub-Saharan Africa that CAB for PrEP introduction is likely to be cost-effective if it can be delivered at a similar fully loaded cost as oral PrEP, and that there is approximately a 50% chance of being cost-effective if the cost is double that of oral PrEP.

3. What is the appropriate HIV testing approach for people on CAB for PrEP?

The Thembisa model, looking at the South African context, found that requiring a PCR test at every CAB for PrEP injection would mean CAB for PrEP would never be as cost-effective as oral PrEP, but that CAB for PrEP could be as cost-effective as oral PrEP with annual PCR testing at a cost of up to $36 USD.

The HIV synthesis model, looking at settings across sub-Saharan Africa, found that the increase in INSTI resistance from use of rapid testing rather than PCR testing was small enough that rapid testing would be sufficient.

4. What potential is there for increased drug resistance to INSTIs due to the introduction of CAB for PrEP?

The HIV synthesis model, looking at settings across sub-Saharan Africa, found that while CAB for PrEP introduction could lead to a five to ten fold increase in INSTI resistance, it is likely to reduce both HIV incidence and HIV-related deaths overall.

The TEAMS model, looking at the context of Thailand, found that scaling up CAB for PrEP to the current level of oral PrEP in the country would have a limited impact on INSTI resistance.

CAB for PrEP and HIV Drug Resistance

HIV rapid tests, used widely in low-resource settings, may not be sensitive enough to detect early HIV infection in people intending to start PrEP. As a result, people who have acquired HIV close in time to initiating PrEP may not test positive. In the case of CAB for PrEP, initiating PrEP after acquiring HIV increases their risk of developing HIV that is resistant to a class of drugs called Integrase Strand Transfer Inhibitors (INSTIs) to which CAB belongs. INSTIs include dolutegravir, a common first-line treatment. More sophisticated Polymerase Chain Reaction (PCR) testing could detect infections earlier, but is more expensive and resource-intensive. There are also potential concerns around INSTI resistance arising from breakthrough infections, occurring while a user is taking CAB for PrEP, or during the pharmacokinetic tail phase, when a trace amount of CAB for PrEP remains in a user's system several months after they have stopped taking it.

To stay updated on the state of the HIV prevention field and on AVAC programs, sign up for our e-mail newsletters, follow AVAC on Twitter @HIVpxresearch and find more at www.avac.org.