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LONG-ACTING INJECTABLE CABOTEGRAVIR FOR HIV PREVENTION

WEB ANNEX D. PROJECTED POPULATION IMPACT OF EXPANDING PREP COVERAGE BY OFFERING LONG-ACTING INJECTABLE PREP IN DIFFERENT SETTINGS: MODEL COMPARISON ANALYSIS

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Abstract

Background: Long-acting injectable cabotegravir (CAB-LA) demonstrated superiority to daily oral tenofovir disoproxil fumarate/emtricitabine (TDF/FTC) for HIV pre-exposure prophylaxis (PrEP) in the HPTN 083/084 trials and was approved for HIV prevention in the United States in December 2021. We conducted a comparative modelling analysis of the potential impact of expanding PrEP coverage by offering CAB-LA to i) men who have sex with men (MSM) in Atlanta, USA and Montreal, Canada, cities with concentrated HIV epidemics dominated by MSM transmission, and ii) cisgender men and women in South Africa, a country with a generalized HIV epidemic.

Methods: Four independent age- and risk-stratified HIV transmission models were parameterized and calibrated to local data from Atlanta (HPTN model), Montreal (McGill model) and South Africa (Synthesis and Thembisa models). Achieving expansion of overall PrEP coverage to the desired targets after 5 and 10 years were simulated by recruiting additional PrEP users based on current PrEP indication criteria specific to each setting and switching different proportions of TDF/FTC users to CAB-LA starting in 2022. Population effectiveness, efficiency and cost–effectiveness of PrEP expansion were evaluated over 20 years compared to base-case scenarios with current projections of TDF/FTC use only.

MSM models: In the base-case scenarios, predicted median overall PrEP coverage rises from 30% to 32% (Atlanta) and from 6% to 10% (Montreal) between 2022 and 2042. Increasing overall PrEP coverage by 8–10 percentage points (pp) to 40% of the Atlanta MSM population by 2027 is expected to avert 35–39% of new HIV infections over 20 years. A substantially larger increase in overall PrEP coverage (~20 pp increase to 30%) is needed to avert a comparable fraction of infections in Montreal (preliminary results), where population-level viral suppression is high. Approximately 20 additional person years (PY) on PrEP are needed to prevent one infection in Atlanta where annual HIV incidence is 1.5-2% compared to more than 1000 PYs in Montreal where annual HIV incidence is below 0.2%. Averting one disability-adjusted life year is predicted to cost around US$ 200,000 in Atlanta and millions of US dollars in Montreal. Reaching 50% overall PrEP coverage in 2027 may avert close to 60% of new HIV infections over 20 years in both settings. Our analysis suggests that offering CAB-LA to MSM in the USA and Canada can impact the HIV epidemic substantially if it leads to increases in overall PrEP coverage. **PrEP expansion could be highly efficient and possibly cost-effective in places with high HIV incidence (like Atlanta) but are unlikely to be cost-effective in low-incidence settings (like Montreal).**

South Africa models: In the base-case scenarios, median overall PrEP coverage in South Africa is currently at or below 1% and not expected to increase by 2042. Increasing overall PrEP coverage to 13% of the male and female adult population in 2027 by recruiting CAB-LA users predominately from high HIV-risk groups is expected to avert ~20% of new HIV infections over 20 years (Thembisa). Achieving 5% overall CAB-LA coverage in 2027 among high-risk groups with targeted PrEP use during periods of substantial HIV risk may avert nearly 50% of new HIV infections over 20 years (Synthesis). Achieving similar expansion with oral TDF/FTC instead of CAB-LA is expected to reduce the impact by up to 20% (Thembisa) and 40% (Synthesis) due to lower efficacy and adherence. Approximately 16–25 additional PYs on CAB-LA are needed to prevent one infection in South Africa with strict risk targeting (Synthesis) compared to more than 100 if CAB-LA is available to all but mostly used by individuals at high risk (Thembisa). In the latter scenario, expanding PrEP coverage with CAB-LA could be more cost-effective than with oral PrEP only if CAB-LA is priced within 2x the price of oral PrEP (i.e., up to US$ 18.80 per injection). Our analysis suggests that offering CAB-LA in South Africa can impact the HIV epidemic substantially if adequately used by people at high risk of acquiring HIV. **PrEP expansion could be highly efficient and cost-effective if adopted mainly during periods of substantial risk.**

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