Health and economic impact of geographically prioritized long-acting PrEP delivery in southern and eastern Africa

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BACKGROUND

Long-acting injectable HIV pre-exposure prophylaxis (PrEP), including Lenacapavir, has the potential to accelerate HIV incidence declines in eastern and southern Africa (ESA). However, high product and delivery costs and constrained budgets necessitate efficient prioritization strategies to maximize impact and cost-effectiveness.

METHODS

We used district-level HIV incidence estimates published by UNAIDS to estimate the direct health and economic impact of prioritizing Lenacapavir delivery according to geography, age, and sex across 837 districts in 11 high-burden ESA countries. Infections and disability-adjusted life years (DALY) averted, number needed to treat (NNT), cost per DALY averted, and price thresholds to achieve cost-effectiveness were estimated across geographic prioritization scenarios. Cost-effectiveness was assessed against a $500 per DALY averted threshold, assuming $5,000 discounted lifetime HIV treatment costs and 10 DALYs per HIV infection. Sensitivity analyses varied Lenacapavir costs (commodities + delivery) per person per year (pppy) ($125 versus $55), DALYs per HIV infection (7.5), and the risk differentiation among those who uptake long-acting PrEP.

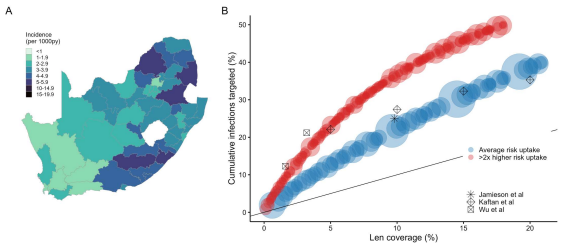


Figure 1. (A) Incidence (adults 15–49) map of South African districts (B) Cumulative percent of new infections within an increasingly inclusive HIV negative population (stratified by age and sex) comparing a scenario with average risk uptake versus uptake in those with >2x district-level risk. Symbols indicate coverage and impact estimates from prior mathematical modeling of Lenacapavir implementation strategies based on country level allocation prioritizing discrete high-risk populations (e.g., FSW, their clients, AGYW with 2+ sex partners, and men who have sex with men)

geographically prioritized delivery of Lenacapavir can achieve substantial impact and cost-effectiveness in high-burden settings

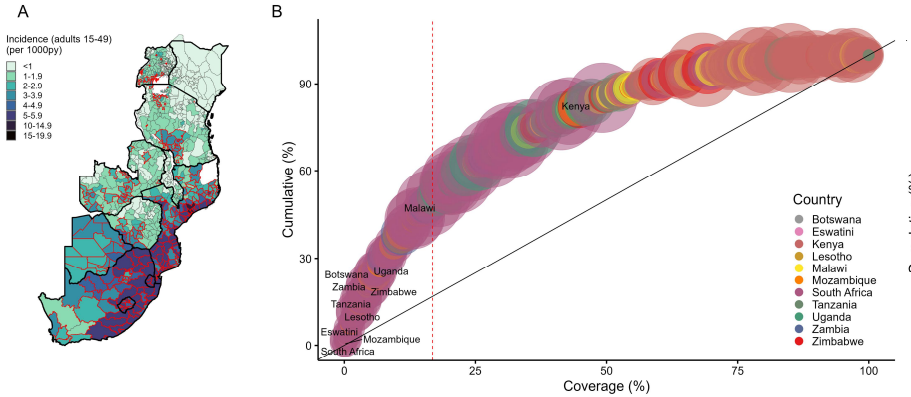


Figure 2. (A) District-level incidence (per 1000py) among adults aged 15–49 years, with red highlighted districts indicating where incidence of any age (15–24, 25–34, 35–49) and sex (men and women) group is above 3.8 per 1000py, representing 50% of new infections and 17% of the HIV negative population. (B) Cumulative percent of new infections with increasingly inclusive age and sex stratified HIV negative population. Points are ordered from highest to lowest incidence; color represents country and point size represents the age- and sex-specific HIV negative population size

RESULTS

HIV incidence varied substantially across ESA, with 50% of new infections in districts containing less than 20% of at-risk adults. Lenacapavir cost-effectiveness varied accordingly, with high-incidence districts exhibiting substantially lower NNT and higher price thresholds for cost-effective delivery. In high-incidence districts, [>5/1,000 person-years (py)], of South Africa, Mozambique, Lesotho, and eSwatini, Lenacapavir would be cost-effective at $50-100 pppy. In South Africa, at annual cost $55 pppy, Lenacapavir was cost-effective in all 52 districts when provided to women aged 15–24 years with incidence exceeding twice the district average and could reach approximately 18–20% of new infections while covering 4% of the full HIV-negative adult population aged 15–49 years. Geographically optimized prioritization in South Africa achieved efficiency comparable to country-level prioritization to high-risk groups and key populations (~20% incidence reduction with 3–5% coverage). Impact and cost-effectiveness were sensitive to assumptions about risk heterogeneity.

CONCLUSIONS

Lenacapavir impact and cost-effectiveness varies substantially across geographic settings, driven primarily by variation in HIV incidence. Simple incidence-based models can identify where universal provision to certain demographic groups is both impactful and cost-effective, particularly in high-incidence districts and age groups.

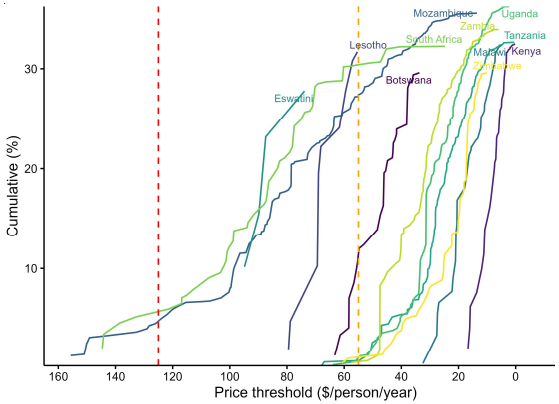


Figure 3. Cumulative infections reached by price threshold for each country.

PLAIN LANGUAGE SUMMARY

Geographic allocation (universal offer) of Lenacapavir to is both impactful and cost-effective in high-incidence districts and age groups.

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