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Five-year budget impact of community-based HIV testing strategies for oral Pre-Exposure Prophylaxis scale-up in western Kenya: a modeling analysis

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BACKGROUND

- Oral pre-exposure prophylaxis (PrEP) has high efficacy in preventing HIV acquisition, but uptake remains low.
- Community-based delivery of oral PrEP may increase uptake.
- HIV self-testing (HIVST) can facilitate PrEP delivery outside of clinics and may be an important tool for expanding PrEP access.
- However, HIVST may have lower field sensitivity than provider HIV testing, which could lead to inappropriate PrEP provision and be more costly.

OBJECTIVE

To model the undiscounted budget impact of oral PrEP provision utilizing different HIV testing modalities in a community-based setting in Western Kenya, including costs incurred and averted.

METHODS

Model: Parameterized agent-based network model, EMOD-HIV, to assess budget impact of community-based PrEP scale-up in western Kenya.[1-2]

3 HIV test scenarios compared to counterfactual of no PrEP:
1) provider-administered rapid diagnostic tests detecting antibodies (*Ab RDT*)
2) capillary whole blood-based HIVST (*Blood HIVST*)
3) oral-fluid HIVST (*Oral HIVST*)

Perspective: Healthcare payer
Time horizon: 2022 - 2026

Key assumptions:
- Individuals 18-49 years in ≥1 heterosexual partnership and screening HIV-negative eligible to initiate PrEP.
  - 20% initiate PrEP; 75% continue PrEP quarterly
- HIV test performance (Figure 1) and financial costs (Table 1) based on literature review and expert opinion.

Figure 1. HIV test sensitivity by days since HIV acquisition

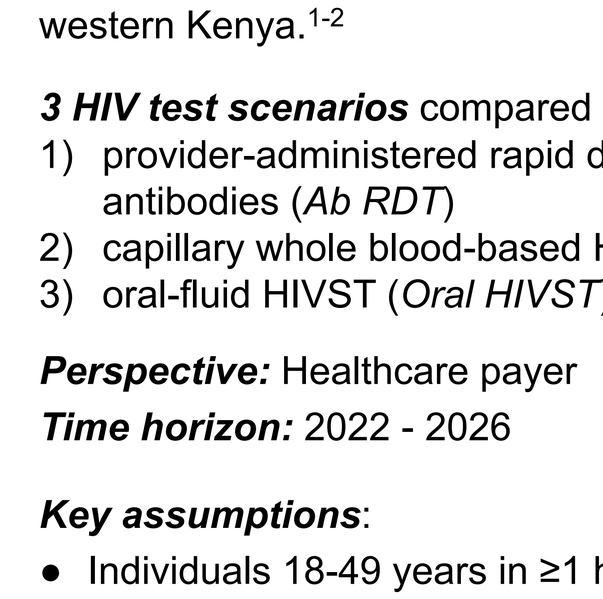


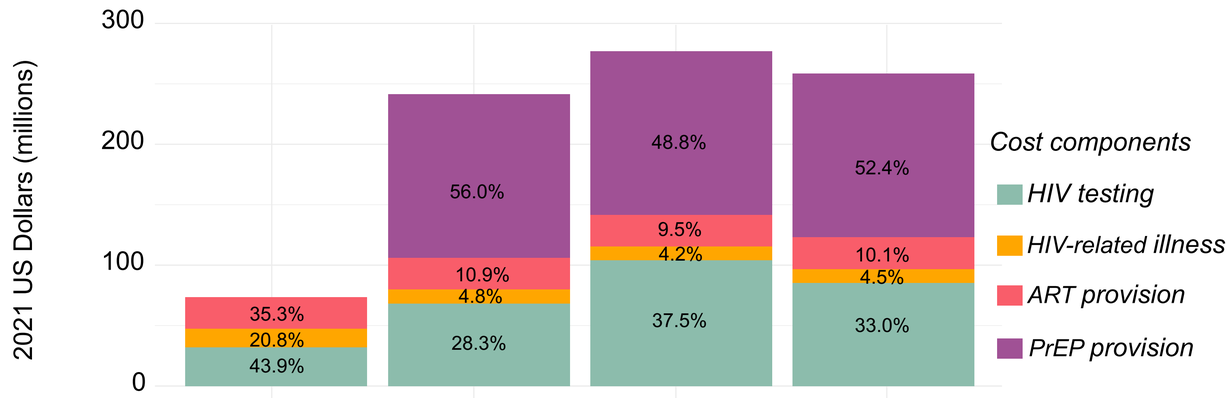
Table 1. Costs inputs

Cost input	2021 USD
Annual health care costs *(among those not on ART)*	
HIV-positive CD4 Under 200	$110.30
HIV-positive CD4 200 To 349	$30.38
HIV-positive CD4 350 Plus	$8.59
Annual ART provision costs	$140.89
End of life care	$105.68
PrEP provision *(monthly)*	$10.66
Facility-based HIV-positive test	$3.68
Facility-based HIV-negative test	$2.64
HIV Ab RDT	$1.21
Blood-based HIVST	$5.00
Oral fluid HIVST	$3.00

RESULTS

- At 5% PrEP coverage, 17% of new HIV acquisitions were averted among adults 18-49 years across test scenarios.
- Population prevalence of nucleoside reverse transcriptase inhibitor resistance was 5%.

Figure 2. 5-year budget impact of PrEP scale-up by HIV testing modality in a population of 3.1 million individuals



	No PrEP (baseline)	Ab RDT	Blood HIVST	Oral HIVST
Budget impact	$73.3	$241.6	$277.1	$258.5
95% UI*	($62.3 - $82.5)	($229.9 - $252.8)	($265.0 - $289.4)	($246.5 - $269.8)

** 95% uncertainty interval calculated by by computing the 2.5th and 97.5th percentiles across the 100 parameter sets*

- Largest component costs of PrEP scale-up were PrEP drug and provision costs (49%-56%).
- Healthcare costs for HIV-related illness were lower in PrEP scenarios (4-5%) compared to the no PrEP scenario (21%).

CONCLUSION

The estimated budget impacts of PrEP scale-up were comparable across HIVST and RDT testing modalities.

- Although we project PrEP scale up with blood-based HIVST is slightly more costly than oral HIVST, commodity costs are rapidly changing (e.g., blood HIVST cost has decreased from $5 to $1).
- As lower cost HIVST kits are approved, there will likely be little difference between blood and oral HIVST.
- Results can inform stakeholder decision-making for HIV testing for PrEP implementation in community settings.

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