

Modeling the Impact and Cost-Effectiveness of Oral Pre-Exposure Prophylaxis (PrEP) in Mozambique

#PEPFAR15

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Background

Oral pre-exposure prophylaxis (PrEP), the use of tenofovir/emtricitabine by HIV-negative individuals to prevent HIV acquisition, was shown to be safe and effective in 2010. Global guidance has since recommended that oral PrEP policies target individuals at substantial risk of infection.

Mozambique has a generalized HIV epidemic, with a prevalence of 13.2% among adults ages 15-49 as of 2015. Its current national HIV strategic plan (PEN IV) seeks to implement “test and start” in the context of broader combination prevention efforts in alignment with Fast Track targets by 2030.

In 2017, pilot activities explored the feasibility and acceptability of oral PrEP for female sex workers (FSW) and the wives of migrant workers. To assist the national HIV program in integrating oral PrEP into the PEN IV, the USAID-funded Health Policy Plus (HP+) project developed a new mathematical modeling approach to estimate the potential impact and cost-effectiveness of different oral PrEP scale-up scenarios.

Methods

HP+ used the Incidence Patterns Model to disaggregate HIV incidence by risk group and province and the Goals model to estimate oral PrEP impact through 2030 in the context of Mozambique’s national HIV prevention program. Incidence estimates were based on the 2009 AIDS Indicator Survey.

In close coordination with the Ministry of Health and a multi-stakeholder PrEP advisory group, HP+ developed three rollout scenarios that modeled the impact and cost-effectiveness of providing oral PrEP to FSW, sero-discordant couples (SDC), and young women ages 18-24 who have multiple partners and are not FSW or female members of SDC (“medium-risk YW”) (Table 1). These risk groups have high HIV incidence and are priority populations under the PEN IV.

Table 1. Oral PrEP Rollout Scenarios

Oral PrEP Rollout Scenarios	
1	Female sex workers and sero-discordant couples
2	Populations in scenario 1 + medium-risk young women in provinces with HIV incidence that is higher than the median
3	Populations in scenario 2 + medium-risk young women ages 18-24 in all provinces

Methods (continued)

The oral PrEP unit cost of US\$122 was derived from a facility-based costing study conducted by CHAI in Kenya at three sites serving FSW and MSM. The unit cost represents estimated minimum costs if sites were functioning with optimum client load. The total cost of PrEP accounts for the incremental cost of PrEP and antiretroviral therapy (ART) costs saved due to infections prevented by PrEP. Coverage of combination prevention interventions increased linearly, so Mozambique reached the PEN IV targets by 2021 and Fast Track targets by 2030.

Table 2. PEN IV Targets at Baseline and in 2021

PEN IV Targets	2017	2021
People living with HIV on ART	63%	70%
HIV-positive pregnant women on ART	73%	76%
Circumcised males ages 10-49	71%	80%
Sexually transmitted infection management	61%	70%
Community mobilization	4%	23%
Mass media	39%	80%
Voluntary counseling and testing	27%	29%
Condom provision	28%	34%
Out-of-school reached	14%	30%
FSW programs	57%	63%
Men who have sex with men programs	7%	17%

Results

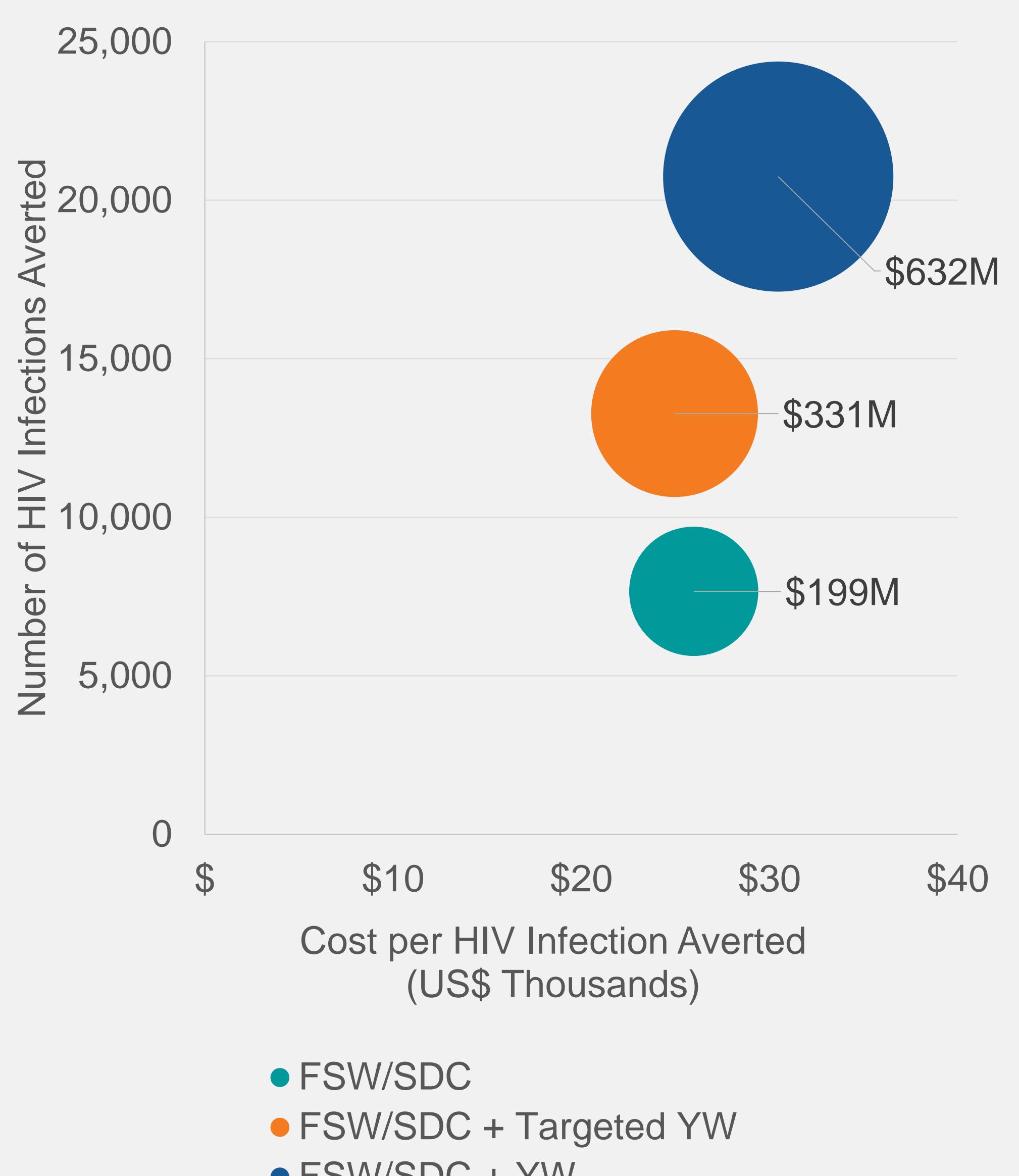
Rollout Scenarios

Our results suggest that expanding oral PrEP beyond FSW and SDC, the highest incidence groups, to include YW can increase both impact and cost-effectiveness (Figure 1).

In fact, providing oral PrEP to all risk groups is estimated to avert the most infections—nearly 21,000—without sacrificing cost-effectiveness, compared to more narrowly targeted strategies.

Results (continued)

Figure 1. Cost-effectiveness, HIV infections averted, and total cost by oral PrEP rollout scenario from 2018 to 2030. Bubble size and data labels: total cost of adding oral PrEP program, US\$ millions.

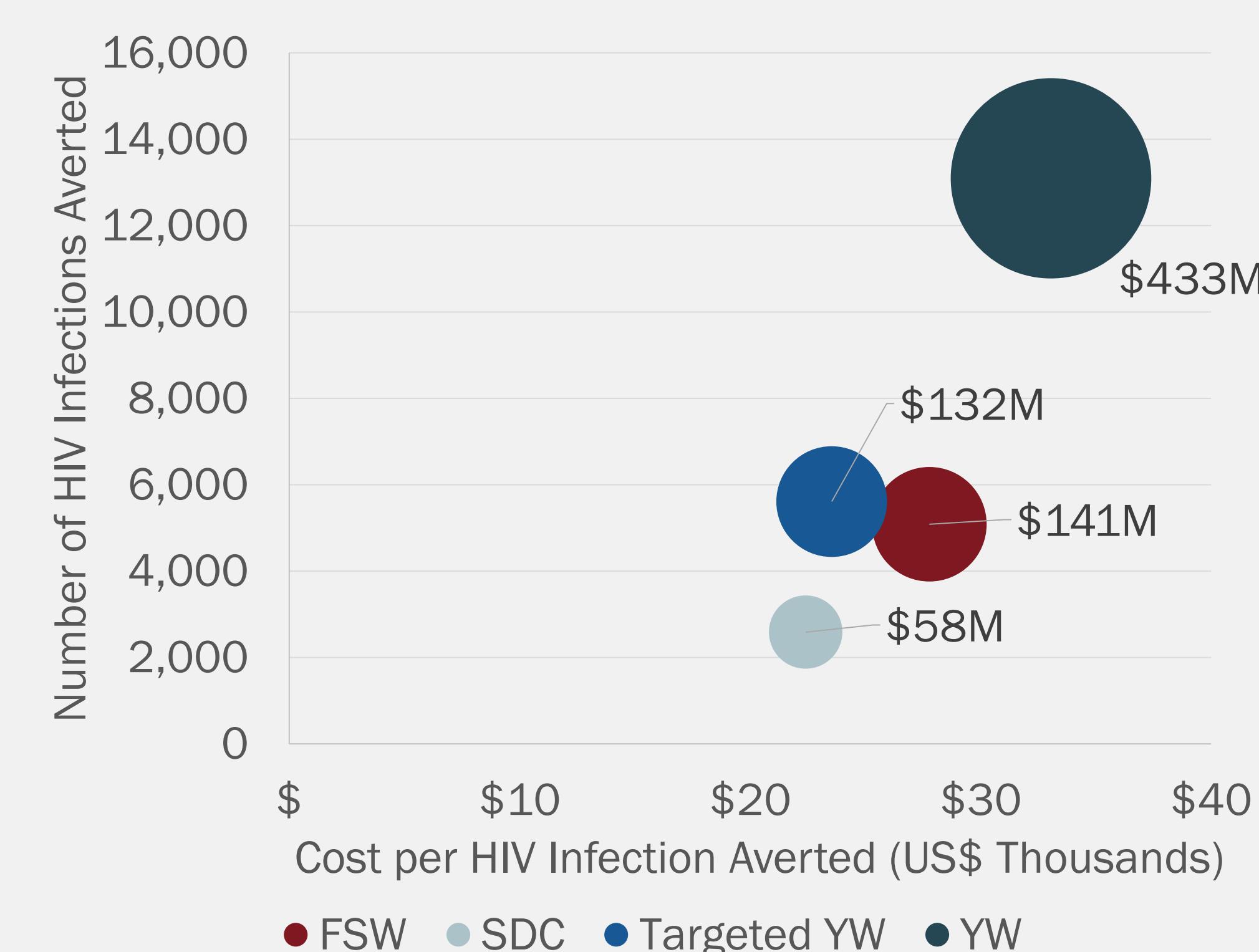


Individual Risk Groups

By risk group, the projected cost-effectiveness is lowest for SDC at US\$22,400 and highest for YM at US\$33,000 per infection averted. Providing oral PrEP to YM in provinces with HIV incidence higher than the median is nearly as cost-effective (US\$23,500) as PrEP for SDC. In terms of impact, providing oral PrEP to YW with multiple partners is projected to have the greatest impact, averting 13,000 HIV infections between 2018 and 2030.

Results (continued)

Figure 2. Cost-effectiveness, HIV infections averted, and total cost by oral PrEP risk group from 2018 to 2030. Bubble size and data labels: total cost of adding oral PrEP program, US\$ millions.



Conclusions

We developed a modeling approach that provides policymakers with impact and cost-effectiveness data to guide decision making on PrEP. Additional analyses (not shown) show that these estimates are sensitive to changes in oral PrEP adherence and unit cost, and scale-up of combination prevention interventions, particularly ART and voluntary medical male circumcision.

Policy Implications

Oral PrEP is an important component of combination prevention programs given its potential to protect highly vulnerable and underserved populations. These modeling results encourage the Ministry of Health to consider expanding oral PrEP beyond FSW and SDC to include higher risk YW—a population not previously prioritized for oral PrEP rollout in Mozambique.

Partnered With

