

# Policy Brief



## Potential Global Demand and Associated Policy Implications for Preventive HIV Vaccines

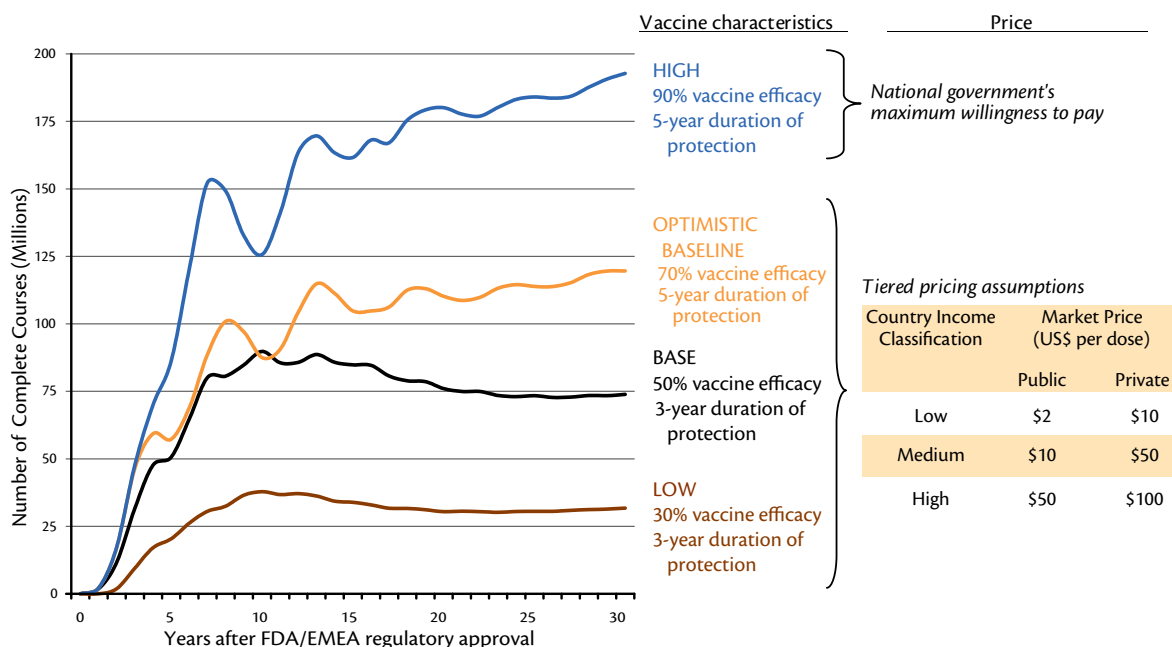
When a vaccine is developed, up to 40 million additional people could have access to this HIV prevention technology each year if efforts are made now to address regulatory, infrastructural and political constraints.

### The need for an HIV vaccine

At the end of 2005, approximately 40 million people worldwide were living with HIV/AIDS, most of them adults, 95% of them in developing countries. Although prevention programs have been implemented in many countries and have lowered the rate of new infections, more than 13,000 people became infected with HIV every day in 2005, and about three million died of AIDS during that year.<sup>1</sup>

The HIV/AIDS crisis requires a comprehensive response that balances expansion of existing prevention, treatment, and care programs with investments in new prevention technologies, such as an HIV vaccine. An HIV vaccine with 50% efficacy given to just 30% of the population could cut the number of new HIV infections in the developing world by more than half over 15 years.<sup>ii, iii</sup> For a vaccine to make a significant difference, however, it needs to be widely accessible and must be adopted quickly.

**Figure 1:** Total annual global demand forecasts for a first-generation HIV vaccine



**Additional Assumptions:**

- Dosing schedule (for a full vaccination course) is assumed to be a 2-dose prime-boost combination.
- The vaccine efficacy is assumed not to be clade-specific; i.e. the vaccine is effective against all strains/subtypes.

### The importance of HIV vaccine forecasting for public sector decision-makers and donors

Creating a framework that estimates the potential demand for products still in an early stage of development, such as a first-generation HIV vaccine, can inform policy decisions to accelerate adoption and accessibility.

- Forecasts can help donors design R&D incentives based on realistic market scenarios, which are vital for the credibility and effectiveness of such policy instruments.
- Forecasts can also provide information to donors like GAVI and national health program officials to prepare delivery infrastructure for new vaccines well in advance of their introduction.

### Modeling global demand for an HIV vaccine

Previous academic and industrial approaches to forecasting were reviewed in order to identify the key drivers of demand. A forecasting framework for first-generation HIV vaccines was then designed to build upon previous work in this realm.<sup>iv</sup>

Eighty expert stakeholders worldwide, including government policymakers, NGO personnel, pharmaceutical executives, academics, and vaccine researchers, were interviewed to assess their perceptions with respect to:

- the range of acceptable characteristics of a first-generation HIV vaccine;
- vaccine adoption decisions and the vaccination strategies that might be employed; and
- the ability of these strategies to reach and cover target populations given likely capacity and funding constraints.

The most important findings pertaining to countries' public sector adoption and implementation behavior are that:

- HIV vaccines may need to be at least 50% effective before governments will initiate

vaccination in the general population in countries with widespread or "generalized" epidemics, while efficacy may need to reach at least 70% to persuade officials to vaccinate the general adult population in countries where the epidemic is still focused in small pockets ("concentrated" epidemics).

- For use in high-risk populations, such as sex workers and their regular partners and injecting drug users, 30% may be an acceptable efficacy threshold to authorize vaccine use within countries experiencing generalized AIDS epidemics, while 30% to 50% efficacy may be sufficient to convince officials to organize such "targeted" vaccination campaigns in countries with concentrated epidemics.

These interview findings were combined with large secondary datasets from published sources to create a mathematical forecasting model capable of assessing demand and revenues at global and national levels, for public and private markets, and within a variety of the most likely target populations for an HIV vaccine.

### Global demand and policy change scenarios

Modeling suggests that average annual global demand for a first-generation preventive HIV vaccine could range between 28 and 142 million courses over a 30-year period, and demand could peak at between 38 and 152 million courses some seven to ten years after vaccine launch (Figure 1). [NB: One course is assumed to equal two doses in a prime-boost dosing regimen. Key vaccine characteristics were varied: efficacy between 30% and 90%, duration from three to five years, and tiered pricing between US\$2 and \$100 per dose.]

Public markets might account for as much as 80-90% of global demand if a medium/high-quality vaccine candidate (with levels of efficacy of 50% or above and duration of protection of three years or more) is developed and implemented. For a high quality vaccine (70% efficacy or more), private markets are estimated to account for a mere 6% of worldwide volume, and even for

a lower quality vaccine (at least 30% efficacy), private markets are expected to make up 43% of the global total demanded.

Modeling indicates that the governments of the 20 countries worst affected by HIV (in terms of absolute prevalence) might increase access to an HIV vaccine by 40 million additional courses a year over a 30-year period (59% increase), as compared with baseline projections (Figure 2). These improvements in future access could be achieved by:

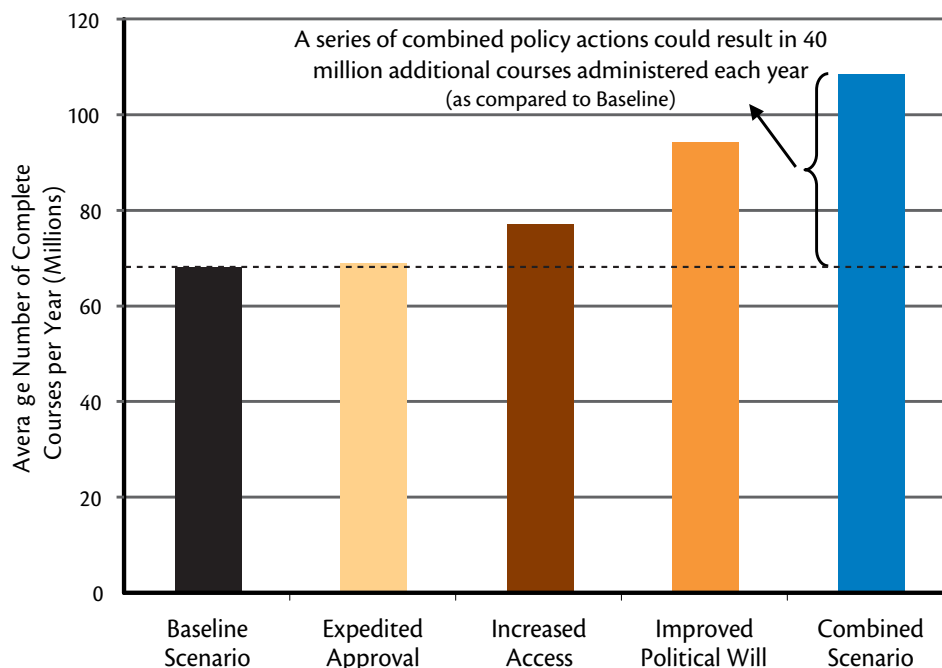
- strengthening national regulatory systems;
- expanding health care infrastructure and programs to reach adolescents and vulnerable populations; and
- marshaling the political will and support to actively promote an HIV vaccine among their own citizens.

### Conclusions

Demand for an HIV vaccine is not fixed – developing and developed country governments, international organizations, and AIDS advocates can do much to boost demand for, and access to a future HIV vaccine through a series of policy actions.

While there are considerable scientific challenges and an HIV vaccine is still likely to take several more years to develop, it is important to start changing the policy environment now to maximize future demand and access, by engaging vaccine developers, manufacturers, private financiers, public donors, and health care system officials on their respective R&D, funding, and preparatory endeavors. This model can assist these decision makers with immediate and long-term strategic action and investment decisions.

**Figure 2:** The average annual effect of policy change on demand and access



This model is limited by imperfect information and the inherent uncertainty of the future. Nonetheless, this research creates a framework for a longer-term dynamic forecasting process. Forecasts can be updated and strengthened as better data become available through lessons learned from the introduction of other vaccines (e.g., HPV vaccines) and other new prevention options (e.g., male circumcision) as well as other new initiatives to address informational constraints. To this end, IAVI supports the Center for Global Development's new recommendations for demand forecasting which include plans for an "Infomediary."<sup>v</sup> This initiative has the potential to address many of the current informational constraints and improve future demand forecasts for medicines in the developing world.

This summary is drawn from IAVI Policy Research Working Paper #15, *Forecasting the Global Demand for Preventive HIV Vaccines*. This and other IAVI policy research publications are accessible online at [www.iavi.org](http://www.iavi.org).

<sup>i</sup>UNAIDS and WHO. 2006. "AIDS Epidemic Update: Special Report on HIV Prevention." Geneva: UNAIDS, 90.

<sup>ii</sup>IAVI. 2005a. "Estimating the Global Impact of an AIDS Vaccine." Policy Research Working Paper #4. New York: IAVI. Available at: <https://www.iavi.org/viewfile.cfm?fid=35123>

<sup>iii</sup>IAVI. 2006. "The Impact of an AIDS Vaccine in Developing Countries: A New Model and Preliminary Results." Policy Research Working Paper #8. New York: IAVI. Available at: <http://www.iavi.org/viewfile.cfm?fid=41748>.

<sup>iv</sup>IAVI. 2005b. "Demand for a preventive HIV vaccine: a review of the literature." Policy Research Working Paper #3. New York: IAVI. Available at: <http://www.iavi.org/viewfile.cfm?fid=10825>

<sup>v</sup>Center for Global Development Global Health Forecasting Working Group. 2007. "A Risky Business: Saving Money and Improving Global Health through Better Demand Forecasts". Washington: CGD. Available at: <http://www.cgdev.org/content/publications/detail/13784/>

