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How Much AIDS Vaccine Do Poor Countries Really Want?

Public health groups take a page from business to understand the developing world's weak demand for drugs and vaccines

By JR Minkel

Supplying desperately needed medicines to the developing world would be a lot easier if Big Pharma would bring its considerable resources to bear on the problems of global health. But even when public health groups can convince firms to supply their drugs at reduced cost, another problem remains: the countries in need can be unpredictable in their buying habits.

Consider that malaria affects more than 500 million people worldwide, and yet this past summer the *Financial Times* reported that French drugmaker Sanofi-Aventis faced half the demand it had expected for its anti-malaria compound artesunate. As a result, the company was contemplating destroying up to 10 million tablets of the drug. Swiss pharmaceutical giant Novartis had complained of similar troubles. After scaling up production of its malaria medication Coartem to 30 million treatments in 2005, it received orders for only 14 million treatments.

The global public health community has become increasingly sensitive to the problem of forecasting the developing world's actual demand for medicines, as opposed to the raw need. In one sign of the change, the Center for Global Development, an influential Washington, D.C.-based think tank, has convened a panel of economists, consultants and representatives from industry and public health to make recommendations for forecasting practices.

Among the groups leading the way are those devoted to global vaccine development, which already partner with firms to bring vaccine programs closer to fruition. Now these so-called public-private partnerships (PPPs) are constructing models designed to better understand the factors that influence developing nations' decisions about whether or not to adopt new vaccines.

Their projects run the gamut from relatively short-term analyses of emerging vaccines to more prospective, exploratory studies for still distant products. For the near term, groups known as accelerated development and introduction plans (ADIPs) have studied the possibility of more rapidly introducing new vaccines for rotavirus, a common diarrheal disease, and pneumococcus, a bacterium that causes pneumonia.

Looking farther ahead are partnerships such as the International AIDS Vaccine Initiative (IAVI) and the Malaria Vaccine Initiative, both of which have begun or completed new forecasting projects in the past two years.

The hope is that improved forecasting will increase demand as well as cooperation between industry and public health, which could in turn lead to greater investments. "It means everybody goes in with their eyes open," explains Wendy Woods of the Boston Consulting Group, which has worked with IAVI and other PPPs. "It's important for both sides to make the right decisions and know what to expect."

Catch-22, If not 33

Unpredictable demand creates a three-way catch-22 problem, as pointed out in a 2002 study commissioned by the GAVI Alliance, formerly the Global Alliance for Vaccines and Immunization. Poor countries have to know the price of a vaccine to see if they can afford it. Manufacturers, however, are hesitant to set a price unless they know how many doses will be bought. And aid donors cannot be sure they can subsidize a purchase without knowing the price and quantity of the sale.

Vaccine purchases have occurred anyway, but not without difficulty. In 2002, when GAVI convinced suppliers to manufacture extra courses of an existing vaccine against *Haemophilus influenzae* type b, poor countries were slow to buy it. "We were very naive at that time and thought countries would take up the vaccine much faster than they did," recalls Michel Zaffran, the group's deputy executive secretary. "The tools that we had available were very poor."

Hoping to keep from alienating manufacturers, GAVI instituted the ADIP programs in 2003. The new approach adopted by the ADIPs and other PPPs makes use of interviews with health officials in developing countries to figure out the preferences of those nations. Prior HIV vaccine forecasts, for example, failed to take into account the influence of price and political willingness on potential demand, says Gian Gandhi, manager of policy research and analysis for IAVI.

The PneumoADIP, based at Johns Hopkins University, constructed surveys designed to understand how countries would react to vaccines of varying efficacy, price and method of administration. Consulting firm Applied Strategies collected responses from global, regional and national public health officials, and these responses were incorporated with information gleaned from donors and manufacturers into a forecast model, explains Sandra Wrobel, president of Applied Strategies.

So far the models project only weak demand. Gandhi reports that his team's estimates, which are not yet complete, find a basically negligible demand of 10

million treatments for a minimally effective vaccine. Candidate HIV vaccines currently in clinical trials may have relatively low efficacy.

The PneumoADIP anticipates that a few so-called early adopter countries would realistically order one million to three million doses of vaccine in the next three years at a range of (donor-subsidized) prices that manufacturers might accept, observes Angeline Nanni, the group's director of vaccine supply and finance. Although the numbers are low, "we could take it to suppliers and say, 'Look, this is where we have good solid data,'" she says.

The Number's Not the Thing

The point of a forecast is not the number it coughs up but the understanding it creates about the market for a product, stresses Woods. "You can start doing things today to increase the rate of use of the vaccine" when it comes out, she notes.

Gandhi concurs: "It's showing us the light at the end of the tunnel, if you will." IAVI might try to inform nations of the potential advantages of a minimally effective vaccine if need be, which could ultimately enhance demand, he points out. Eventually, he adds, the group hopes to use an improved forecast to help decide which vaccine candidates to push ahead with.

Such judgments should not be rushed, says Steve Brooke, commercialization adviser for human papilloma virus (HPV) vaccines at the public health group PATH. Brooke is charged with modeling demand for the two HPV vaccines in development, one of which was approved by the U.S. Food and Drug Administration last year.

Longer-term forecasting "can be totally appropriate," Brooke explains, "as long as everybody understands--when you're early in the product cycle, your accuracy of [predicting demand for] any particular country, for any particular time, for any particular unit volume, is going to be terrible." For that reason, he adds, "it would be disappointing to me if these kinds of forecasts got used to make critical decisions for vaccine X versus vaccine Y."

One potential complication in ascertaining demand for emerging vaccines could be competition between them. Additional pneumococcus vaccines may come to market by 2015, for example. GAVI, along with the World Bank and the Gates Foundation, hopes to model the health and financial trade-offs developing countries will face if they suddenly encounter a choice of products, Zaffran notes.

Public health groups would like to someday coax suppliers into expanding their production facilities for these products, which may barely cover a firm's costs even if all goes smoothly. They face a major challenge, however. Manufacturers

require five years' notice to build new facilities, meaning they need an idea of what to expect even farther down the line.

Given that public health groups are just learning how to construct forecasts, convincing suppliers to take such risks may be a slow process, remarks Zaffran. Step one is finding out how well these initial efforts work, and there's only one way to know, he says. "They just have to wait and see if the demand materializes."

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