

Better forecasting urged to avoid drug waste

Here's a predicament you don't hear about too often: in November, Dutch health officials found that they had too much flu vaccine on their hands. Early on in the swine flu pandemic, they had ordered two doses of the H1N1 vaccine for each of the country's 16.5 million citizens. But due to low uptake of the shots, the country was left with an excess of close to 20 million doses.

Fortunately, the Dutch government was able to sell off its surplus to other countries in need. But last month Germany and Spain announced plans to simply return their surplus to manufacturers. These types of unused medications often get discarded, and millions of dollars are wasted because of inadequate demand forecasting. For example, in 2006, the France-based pharmaceutical firm Sanofi-Aventis had to destroy nearly 500 kilograms worth of starting material that would have made up more than 10 million tablets of the antimalarial drug artesunate because orders from the developing world were substantially below original estimates. Likewise, Ugandan health officials in the same year ended up with over \$1 million worth of AIDS drugs and other medications that expired on the shelf because of inaccurate predictions.

"The problem," says Ruth Levine, vice president for programs and operations at the Center for Global Development (CGD), a Washington, DC-based think tank, "is that there haven't been organized approaches to collect and analyze the data that are required to generate credible forecasts."

Accurate forecasting of demand is crucial for avoiding the twin dangers of excessive overproduction, which leads to a waste of money and resources, and underproduction, which can cost lives. Yet many of the organizations that collect relevant supply and demand information do so in isolation and rarely share their findings with each other to create a comprehensive overall picture. Now, however, many agencies are creating the go-betweens to coordinate the dissemination of key data. This should allow stakeholders to share resources and build baseline predictions in a coordinated fashion to prevent bad forecasting mistakes from happening again.

One of the most well-developed information partnerships is being spearheaded by the Accelerated Vaccine Initiative's Strategic Vaccine Supply (SVS) project, a GAVI Alliance-supported effort to centralize demand forecasting for pneumococcal and rotavirus vaccines. The project is analyzing vaccine introduction and coverage data, mostly provided by the World Health Organization

and UNICEF, to allow a rapid uptake of these vaccines as more countries in the developing world adopt them. "Ultimately, we want to ensure that there is enough supply in the countries at the right time," says SVS director Stefano Malvolti.

Trend watch

The Roll Back Malaria Partnership, a global framework for coordinated action against malaria, similarly serves as a clearing house for strategic information of market trends for antimalaria medicines. It implemented a forecasting taskforce in 2007 to ensure that all of the participating nations and financing agencies collected common sets of data that they then shared in the public domain. As a result, last year's predictions for the numbers of required antimalarials were closer to real demand levels than they had been for the past five years. "I think a bigger success is that the process is now in place to make things even better," says Prashant Yadav, a supply chain expert at the MIT Center for Transportation and Logistics in Zaragoza, Spain, who chairs the taskforce.

In February, Yadav and his team also received a \$500,000 grant from the Bill & Melinda Gates Foundation to compare drug forecasting by nonprofit groups with similar efforts in the pharmaceutical industry. Yadav also instigated a two-year work-study program for representatives from the health ministries of developing countries to come to the center in Spain and improve their skills at managing supply chains. "You can't have good global forecasts unless individual countries can forecast their demands well," Yadav says.

Another difficulty is that forecasts of drug and vaccine demand are often based on unreliable epidemiologic data or expert surveys, rather than on-the-ground hand-outs of medicines. To remedy the situation, researchers from the Clinton Health Access Initiative in Boston modeled demand for antimalaria drugs on the basis of five years' worth of disbursement and procurement data from the Global Fund, the largest financial backer of antimalarials. Last year, this approach enabled them to create one of the most robust forecasting models to date (*Malaria J.* 7, 200; 2008). But it's "an evolving methodology" in need of tweaking, cautions Inder Singh, director of drug access at the Clinton Health Access Initiative and a co-author of the study.

Jessica Pickett, a former CGD global health policy analyst who is pursuing doctoral studies in health care management and economics at the University of Pennsylvania's Wharton



A lens into demand: Data sharing promises better drug models

School in Philadelphia, worries about what can happen when predictions go awry. "All this money is being poured into developing new drugs, but if the forecasts are wrong, the drugs won't be reaching the people who need them."

"The bottom line is that poor people don't have access to the medicines that are required to keep them alive," adds Anne Goldfeld, an infectious disease physician-scientist at the Harvard Medical School in Boston. "These are human lives and it's not acceptable to have people dying because of poor management of drug supplies."

As a back-up for bad estimates, some organizations are now starting to put in place better contingency plans. For example, in July, UNITAID launched a \$9.3 million, two-year effort to provide a monetary safety net for growers and extractors of artemisinin, one of the most widely used defenses against malaria. Because it can take more than a year for farmers to turn the compound into a useful product, this financing scheme is seen as a way to secure a steady supply of the life-saving drug in the developing world.

Renia Coghlan, associate director of global access with the Medicines for Malaria Venture in Geneva remains optimistic about demand forecasting: "The situation is definitely on an upward trend," she says. "There is better information that is starting to come through the pipeline, so we will start to see an improved situation over the next couple of years in terms of people's ability to predict major market changes."

But Neelam Sekhri Feachem, CEO of the Healthcare Redesign Group, a consulting firm in Alameda, California, worries that the demand forecasting landscape is still too fractured: "I think we need to see a more comprehensive and systematic approach."

Elie Dolgin, New York