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Vaccine Discovery, Production, And Delivery

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Vaccines are a bit like a wonder drug. A shot or two is all it takes to prevent premature death or a lifetime of disability. What more do we need to know? Quite a lot, it turns out. The gap between the potential vaccines offer and what we actually achieve is determined by myriad social, economic, political, and health system factors.

As Seth Berkley, CEO of Gavi, the Vaccine Alliance, notes in an interview in these pages: “Vaccines do not deliver themselves.” They also don’t finance their own development or distribution, educate the public about their benefits, or eliminate income disparities in access to health services.

The complex environment in which vaccines are discovered, produced, and delivered is the theme of this month’s *Health Affairs*.

THE VALUE OF VACCINES

The vaccine discussion begins with an understanding of the value they provide. Sachiko Ozawa and colleagues tackle the complex task of calculating the costs and economic benefits associated with broad vaccination coverage in the world’s ninety-four low- and middle-income countries. They find an average sixteenfold return on investment when considering only health-related costs and benefits, with much higher returns when they include broader economic effects.

This sort of evidence is one reason governments and private donors are supporting efforts to spread the benefits of vaccines around the globe. Annie Haakenstad and colleagues report on the rapid growth in support for vaccines over the past decade: \$3.6 bil-

lion in 2014, compared to \$822 million in 2000. While the growth in support for vaccines slowed from 12.3 percent annually between 2000 and 2010 to 8.3 percent annually between 2010 and 2014, even that slower rate of growth greatly exceeded overall health-oriented development assistance during the latter period, which averaged just 1.4 percent per year.

SUSTAINABLE FINANCING

While donors can support the spread of vaccines, sustaining the gains that have been made will ultimately require low- and middle-income countries to contribute financially to this core investment in the health of their populations. Judith Kallenberg and colleagues describe how Gavi’s support for countries’ vaccine efforts begins with requiring only a modest financial contribution but then transitions to larger expectations, ultimately resulting in full financing by the country itself.

Even as Gavi financing ends, countries can take advantage of five years of their negotiated vaccine prices. The authors conclude: “The ultimate success of international development assistance for health should be measured in its gradual disappearance, after having left a lasting positive impact on populations and strengthened the foundations of further economic development.”

Logan Brenzel and colleagues undertake the complicated task of determining the amount of funding support for vaccine procurement and delivery provided by governments in six countries. In 2011, government sources accounted for a low of 27 percent of overall funding in Benin and a high of 95 percent in Moldova. Among the six countries, those with higher per capita income

also had higher shares of financing attributable to the government.

DELIVERING VACCINES

It takes more than money to make sure that vaccines make their way to those who need them. Health systems must have sufficient personnel, planning and monitoring capacity, and supply chains to deliver vaccines. Health systems operate in a social and political context that can be supportive or hostile to health improvement goals. Stephen Cochi and colleagues analyze how the Global Polio Eradication Initiative provides lessons and leaves behind an infrastructure that can be used to support delivery of other life-saving vaccines.

VACCINES IN THE UNITED STATES

Vaccine policy has a different flavor, but still raises important challenges, in the United States. Brendan Walsh and colleagues report on the effects of the Vaccines for Children program, which became operational in 1994. They show considerable reductions in racial and ethnic disparities in vaccination rates, but early declines in income-related disparities have recently begun to reverse.

The 2015 measles outbreak linked to Disneyland shined a spotlight on compulsory immunization laws and the exceptions states allow. James Colgrove and Abigail Lowin explore how Mississippi and West Virginia became the only two states with narrow exemptions from the requirement to vaccinate children before entering school—allowing them solely for medical reasons. Jessica Bylander explores the patchwork of state immunization laws in this month’s Entry Point.

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