



Mozambique, 2008 – In the triage section of the central district hospital in Manhiça, blood samples are taken from sick children showing symptoms of malaria and then screened at the lab across the street as part of a research program on the malaria vaccine candidate RTS,S.

Delivering on the Promise of Vaccines: Strengthening the Continuum from R&D to Delivery to Eradication

Seth Berkley

In the last decade, we have seen tremendous progress in vaccines, with extraordinary potential for the developing world. In the lab, scientists have developed vaccines for several of the world's biggest killers, and several promising candidates could come to fruition in coming years. In clinics and communities in the developing world, more children than ever are receiving the lifesaving vaccines that many of us in the developed world have long taken for granted. We have also seen gradual progress toward eradicating some diseases forever.

The path from the lab to the frontlines and eventual defeat of diseases, however, has historically been long and bumpy. We can only realize the full promise that vaccines hold for current and future generations if we connect these efforts, from research and development (R&D) to delivery and eventual eradication, into a seamless continuum.

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In the R&D arena, scientists have recently developed vaccines that could curb two major killers of children: pneumococcal pneumonia and rotavirus diarrheal disease. Additionally, two vaccines were approved in 2006 to prevent transmission of the strains of human papillomavirus (HPV) that cause the majority of cervical cancer, a disease that affects half a million women and kills 250,000 annually, mostly in developing countries.¹ As CEO of the International AIDS Vaccine Initiative (IAVI), I have been greatly encouraged by new scientific breakthroughs in pursuit of vaccines for AIDS, malaria, and tuberculosis. Product development partnerships (PDPs), such as IAVI, have accelerated vaccine development for the developing world, where commercial incentives are generally inadequate to generate significant industry investment. Since the 2008 financial crisis, however, PDPs have faced funding reductions that threaten progress at a time of unprecedented scientific advances.

In the vaccine delivery sphere, rising immunization rates in the developing world have played a major role in reducing child mortality by 30% since 1990.² But obstacles to access and delivery remain. Even four years after licensure, there is little penetration of

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¹ “National Cervical Cancer Coalition”, *National Cervical Cancer Coalition*, <http://www.nccc-online.org/>.

² “Levels and Trends in Child Mortality, Report 2010,” United Nations Children’s Fund, 2010, http://www.childinfo.org/files/Child_Mortality_Report_2010.pdf.



PATH and Carib Nelson

Lombok, Indonesia – Health worker administers a hepatitis B vaccine birth dose to an infant.

the lifesaving HPV vaccine in the developing world where it is needed most, largely due to high prices.

In terms of eradication, we have seen steady progress, but also setbacks. Polio has been isolated to a few cases in four countries and measles elimination is soon to be within reach. These achievements are cause for great optimism—eradication would mean ending these diseases and their human and economic costs forever. Still, the same delivery weaknesses in remote areas and fragile states, as well as inconsistent financing and some limits in existing technologies, have kept us from realizing our goals.

An important player in raising immunization rates and accelerating new vaccine introduction has been the GAVI Alliance, of which I will become CEO later this year. Support from GAVI prevented an estimated five million future deaths from 2000 to 2010, according to World Health Organization estimates, and could prevent another four million deaths if fully funded up to 2015, by rolling out pneumococcal, rotavirus, and HPV vaccines, among others.

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So, given these very different challenges, how do we better connect R&D, delivery, and eradication efforts? In short, prioritization of new vaccines must be informed by assessing which will be of the greatest benefit at the lowest cost in the areas of highest burden. R&D must be explicitly linked to delivery systems so that new products can be introduced where they are needed most, immediately upon licensing—which has, unfortunately, not been the historic standard. Delivery and eradication efforts must also be mutually reinforcing, especially in “last mile” areas and fragile states.

In order to strengthen this vaccine continuum, we need to do the following:

Streamline communication and rapid information flow across the vaccine continuum

The effectiveness of the continuum will depend largely on the rapid flow of information between R&D, delivery, and eradication efforts. For example, information detailing obstacles to access and uptake that vaccine deliverers face must inform target product profiles that can guide developers of new vaccines. Likewise, information on successful approaches in eradication campaigns must inform ongoing delivery efforts and vice versa, such that both help strengthen the reach of health systems. To accomplish this objective, mechanisms must be put in place to speed the flow of information between R&D, delivery, and eradication groups.

Encourage involvement of emerging economies

China, India, Brazil, and other emerging economies are critical to realizing the promise of vaccines. Not only are their capacities to manufacture vaccines and reduce prices key, but their potential to be innovators and donors themselves is also increasingly important. Emerging economy governments, public health systems, firms, and researchers should further integrate into global efforts to develop novel vaccines, hasten introduction and uptake of vaccines, and support eradication efforts.



Jacqueline M. Koch/Merlin

Pakistan, 2010 – A young boy is vaccinated in the Swat Valley, Kyber Pakhtunkhwa province, a region where vaccine campaigns were halted under the rule of Taliban militants. The results have been disastrous for Pakistan's efforts to combat polio, and the infection rate is now the highest among the world's four last remaining polio-endemic countries, exceeding Afghanistan.

Implement and expand financing mechanisms that span the entire continuum

Financing mechanisms need to both reach further upstream to accelerate development of new, high priority vaccines, and reach further downstream to ensure adequate and sustained support of the ultimate goal of eradication. Both new and existing financing mechanisms need to explicitly link components of the vaccine continuum to ensure that new vaccines are immediately accessible upon licensure, and that delivery and eradication efforts are coordinated and mutually reinforcing.

Taking these measures would accelerate development and delivery of vaccines that hold the greatest lifesaving potential and smooth the path toward eventual eradication of many of the major causes of death and disease worldwide. A seamless vaccine continuum could minimize the disparity in vaccine access both between and within countries, and increase efficiencies across health systems. Our long-term goal must be audacious—to make more diseases preventable through the development of new vaccines and, progressively, to eliminate vaccine-preventable diseases for all time.

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