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Is the Global Polio Eradication Initiative worth the resources that could be invested in other health initiatives?

The global campaign to eradicate polio has been called the biggest global health program ever.[1] All told, $8.2 billion has been spent on efforts to defeat the poliomyelitis virus since the World Health Organization (WHO) launched the initiative in 1988. By most counts, it has been a success. Polio's incidence worldwide dropped 99 percent, from 350,000 cases of children developing the paralytic disease annually to less than 1,000 cases in 2010.[2] Proponents of eradication say not finishing the task would allow hundreds of thousands of more children to suffer a lifelong disability, and it would undermine confidence to tackle other critical health burdens.[3]

Critics of the WHO-led Global Polio Eradication Initiative (GPEI) say the goal should switch from eradicating to containing the poliovirus.[4] Donald Henderson, former head of WHO's smallpox eradication campaign, has stated sticking to the present strategy is not justified "when there are much bigger problems."[5] Those proposing a containment strategy argue that eradication efforts need to be viewed in the context of Africa's public health situation and the failure of the global health community to meet the United Nations Millennium Development Goal of reducing childhood mortality.[4] The current vertically oriented initiative could force countries like Nigeria and nations in the Indian subcontinent to deploy too many of their own health resources to eradication. That would divert attention from horizontal-style interventions through primary care.

Between, 2000 and 2008, the number of annual polio cases worldwide rose from 719 and 1,651.[6] In response, a new program was drawn up by the GPEI, a partnership with national governments led by the WHO, Rotary International, the U.S. Centers for Disease Control and Prevention (CDC), and UNICEF. The GPEI's deadline to defeat polio was pushed to 2013. The current strategy focuses on halting wild poliovirus transmission in Asia and Africa, strong surveillance and response, and better

immunization efforts. The campaign targets four countries where the poliovirus is endemic: Afghanistan, Pakistan, Nigeria, and India.[2]

The world's largest charitable organization,[7] the Bill & Melinda Gates Foundation, is backing the GPEI through its Global Health Program. Polio eradication remains one the foundation's priority initiatives, with commitments of $815 million to date.[8] The foundation gave the GPEI $255 million in 2009, the largest single pledge to the campaign.[1] With its bias to technological solutions, the foundation also supports developing new vaccines and antiviral drugs that target all three polioviruses.[3]

Polio eradication efforts have used the Sabin oral polio vaccine (OPV) since 1962. OPV is inexpensive to apply and requires three doses. It is effective against paralysis and targets the three polio types. However, its use can, in rare instances, induce a paralytic condition, or it can mutate and become virulent. As long as OPVs are used, there will always be a potential for infection. So, the foundation and the GPEI are gambling on the development of modified inactivated poliovirus vaccines (IPVs).[3] This year, these investments may be paying off. A vaccine used in India, Afghanistan, and Nigeria is credited with the 90 percent drop in cases in those countries.[9] The WHO reports as of October, the number of cases worldwide in 2010 was 717, down from 1,997 in 2006, but nearly identical to the 719 counted in 2000.[6]

The international campaign remains costly. The Gates Foundation is seeking additional fiscal and political commitments from other partners.[3] The current GPEI strategy notes more resources will need to come from donors and countries waging anti-polio campaigns.[2] According to the GPEI, efforts to fight polio from 2010 to 2012 will cost $2.6 billion; the current funding gap is presently $810 million.[10]

Supporters of the GPEI have made several economic and humanitarian arguments to justify continued investments in the 22-year-old program. The GPEI itself argues that hundreds of thousands of children could be paralyzed for life by the preventable disease in the next decade if the campaign does not proceed. What's more, billions would need to be spent on outbreaks, rehabilitation and treatments, and lost productivity. Total eradication would ensure an investment in perpetuity.[2] Supporters point to the 2010 outbreak in Tajikistan, which had 458 cases after having none in 2009. The incidents forewarn of similar occurrences if eradication is not completed soon.[10]

Using economic modeling, Thompson et al. (2007) argue that the global eradication of polio likely will yield strong public health and financial benefits if the campaign is finished. Their analysis shows that a low-cost control policy relying on routine immunization for 20 years could cost $3.5 billion and lead to roughly 200,000 paralytic polio cases every year in low-income countries.[11] They maintain that eradication remains a sounder policy option than control, even with large upfront costs. [11]

Ethical arguments in defense of eradication also have been raised. Claudia Emerson and Peter Singer argue that not totally eradicating polio would "fail to rescue 4 million children" in the next 20 years. They claim the global community has a moral obligation to finish the job, but with support from wealthier nations who can support the needed switch from using the OPV to the more expensive IPV.[12]

Supporters of the GPEI, including WHO polio consultant Peter Wright and former senior WHO official David Salisbury, claim that if global eradication against polio were to fail now, confidence in programs to tackle the world's other health priorities could falter.[1,3,10] Proponents say donor confidence needs to be maintained to ensure that long-term funding is shored up for global health campaigns like malaria eradication and the development of an HIV vaccine.[10]

Such campaigns worry others. The GPEI represents a single-disease or vertical program approach that has been criticized for decades for disrupting more comprehensive national public health measures that were promoted in the 1978 Alma-Ata Declaration.[13,14] The last decade in particular has seen a rise in global health funding through vertical mechanisms such as the GAVI Alliance and the Global Fund. Between 2002 and 2006, a third of international health assistance passed through the large global health initiatives (GHIs) for HIV/AIDS, tuberculosis, malaria, and childhood immunization, including polio.[15]

Critics of vertical strategies claim that while technically driven efforts may succeed in the short term, they can be counterproductive long-term.[16,17] Vertical health programs like the GPEI can distort national health systems and draw health care workers away from primary care.[17] They often do not involve local populations in their planning or implementation, which can prevent local buy-in. Disease-based programs also can undermine the long-term development of health systems and ministries of health in low-

and middle-income countries.[18] Their short-lived nature also consumes scarce resources, reducing local health systems' effectiveness.[13] Finally, the approach prevents the implementation of social and political solutions, which promote health improvements.

The shortcomings of vertical program delivery can be seen in Nigeria, a country with some of the world's poorest health, education, and income indicators.[19] According to UNICEF's 2009 data, nearly 800,000 Nigerian children under five die annually, the second highest rate of any nation.[20] Because the poliovirus passes via the fecal-oral route, Nigeria's unhygienic conditions make it an ideal host for the disease. Last decade the number of annual cases jumped from 28 in 2000 to 1,122 in 2006.[21] Vaccinations in some states stopped for a year after rumors spread about the safety of the vaccine. The disease spread from Nigeria to 27 countries, costing more than $500 million to address.[22] In 2008, the WHO issued a warning Nigeria posed a risk to the entire global effort.[21]

Nigeria's neglect of primary health care undermined its ability to manage polio eradication efforts.[23] Elisha Renne notes many Nigerians questioned a door-to-door health campaign that failed to help people who were sick from other illnesses. Protests eventually led to integrated immunization interventions.[23] As of October 2010, the number of polio cases in Nigeria this year was eight.[21] But Renne argues Nigeria's structural conditions make total eradication difficult.

Nigeria's experience is not unique. High rates of polio immunization have not worked over the last 40 years to prevent periodic epidemics in tropical countries with poor sanitation.[22] Stephen Cochi and Olen Kew doubt that the world will reach the 2010 global goal for all countries to have 90% national vaccination coverage.[22] India's continued status as endemic hotspot for polio has been attributed to poor sanitation, poverty, and even the disruption of primary care programs because of polio-related activities.[24] Singh et. al (2007) say there is no "magic bullet" approach for polio due to sanitation issues. They note the poliovirus has been shown to resurface after two decades of dormancy.[25] Persistent poliovirus transmission also occurs in parts of Afghanistan and Pakistan. Both countries are wracked by civil strife and war. Conflict regions in both nations have raised serious concerns among WHO officials how eradication can succeed, especially in Pakistan.[1]

Arita et al. say international assistance toward polio eradication could have negative effects on other public health efforts worldwide.[4] They propose that the strategy shift from eradication to "effective control."[4] This approach would follow current emergency measures and limit the spread of polio in Africa, the Indian subcontinent, and other regions where outbreaks may occur. They also note that international aid for the smallpox eradication was $100 million for a 10-year effort, but recipient nations spent $200 million of their own resources. That scenario would repeat in future polio eradication efforts, and Afghanistan and sub-Saharan African could not cope with those costs.[4]

Finally, Arita and his colleagues argue polio eradication must be viewed in the context of meeting Millennium Development Goals, particularly in Africa. Established by the United Nations (UN) in 2000, the goals call for reducing poverty and improving health globally. One objective is to reduce child mortality by two-thirds by 2015, from the 12.5 million deaths in 1990. As of 2010, just 10 of 67 countries with high child mortality rates likely will meet this goal, according to the UN's 2010 update.[26] That report notes malnutrition accounted for more than one-third of the nearly 9 million deaths worldwide of kids five and under.[26] Low-cost prevention and treatment measures, says the UN, could have saved most of these lives. In a country like Nigeria, where total government spending for health care is below 5 percent of all government outlays[27] and where hundreds of thousands of children's lives could be saved by simple, low-cost measures, the GPEI may come at too high of a cost. Singh et al. conclude that the proposed eradication strategy would cause even more deaths than polio because of its collateral effect on routine vaccination infrastructure.[25]

Few disagree that the polio eradication campaign has benefited humanity. The harder question remains, is the present course worth the price. The Millennium Development Goals, calling for large drops in maternal and child deaths by 2015, will not be cheap. To meet them, international aid will have to increase three to seven times.[28] Polio eradication in the next three years may cost nearly $3 billion, with no guarantee of 100% success. It will focus on four nations where the disease is endemic—countries that also account for more than one-third of all under-five child mortality deaths.[20] Global campaigns such as polio eradication and reducing childhood mortality have to be

prioritized, though declarations like the 2009 Venice Statement call on nations to harmonize disease-specific program interventions with the goal of promoting access to primary health care.[29]

Today, the consensus appears that the global health community will give the GPEI more time.[1] But there is also near consensus that well-functioning local health systems are essential to improving global health and that donors need to move from vertical to horizontal financing.[14] Ultimately, the GPEI is a technology-driven, disease-specific approach. It does not invest in primary health care or correct social or political inequities that help to promote overall population health. Shifting course from total eradication to containment is the right path, provided freed up resources are invested in health initiatives that strengthen primary care systems first called out by the Alma-Ata Declaration.

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