Beyond eradication: The United States' role in sustaining public health gains achieved through polio programs

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455 Massachusetts Avenue, NW, Suite 1000
Washington, DC 20001

info@path.org
www.path.org

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BEYOND ERADICATION: THE UNITED STATES' ROLE IN SUSTAINING PUBLIC HEALTH GAINS ACHIEVED THROUGH POLIO PROGRAMS

Elana Banin, Erin Fry Sosne, Heather Ignatius, Kelly Healy

INTRODUCTION

The world has reached a pivotal moment: polio is on the brink of eradication. The Global Polio Eradication Initiative (GPEI) projects the last case of polio will occur in 2016, and the world may be declared polio free as early as 2019. The number of countries with endemic wild poliovirus has been reduced to three - Afghanistan, Pakistan and Nigeria. Until August 2016, Nigeria had been polio free for 2 years.[1,a] The United States Government (USG) is the biggest government donor to polio-eradication efforts, and achievements over the last three decades are in part attributable to effective financial investments and technical support provided by the US Centers for Disease Control and Prevention (CDC) and the US Agency for International Development (USAID).

Efforts to eradicate polio have not operated in isolation from larger immunization or public health programs, enabling tremendous strides in routine immunization. The health workforce, supply chains, surveillance systems, laboratories, social mobilization, and other functions essential to delivering polio vaccines to children worldwide have been leveraged to deliver other vaccines and health services. Furthermore, polio networks have provided a foundation upon which vital infrastructure to prevent, detect, and respond to other emerging health threats—including Ebola and Zika viruses—has been built in some countries.

As polio nears eradication, it is critical that financial and technical resources that support polio-specific efforts and associated health systems do not disappear along with the disease. Discontinuing US funds for polio too rapidly or without consideration for how current resources support broader functions would leave gaps in the global-health architecture. This shift could weaken routine immunization coverage and may further expand the likelihood of new vaccine-preventable disease outbreaks, including polio. Even after polio is eradicated, it will be necessary to maintain high-quality surveillance and vaccination programs into the future to ensure that the disease does not return.

American political leadership is also at a turning point. As the United States prepares to inaugurate a new presidential administration in 2017, along with a new Congress, it is vital that these leaders prioritize allocating resources to ensure that:

1. **Polio is eradicated and there is no risk of resurgence.**
2. **The public-health gains made as a result of polio eradication are not lost.**

Summary of Recommendations

- **CDC** and **USAID** must each define a polio transition plan which articulates the resources necessary to sustain each agency's public-health impact through and beyond polio eradication; these plans should inform the President's budget for fiscal years 2018 and 2019 (FY18 and FY19).
- **Congress** should support CDC and USAID polio transition plans by appropriating funds and adjusting agency mandates, as needed.

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a. Cases of vaccine-derived poliovirus (disease caused by oral polio vaccine) were detected in Nigeria and India in 2016.

ROADMAP TO A POLIO-FREE WORLD

Polio eradication will occur once all regions of the world have been certified polio-free. Certification requires three years without the occurrence of a wild poliovirus case. Afghanistan, Pakistan and Nigeria, the last three endemic countries, may interrupt transmission in 2016, provided no additional cases occur. This carries with it the possibility of a certified polio-free world in 2019.[4]

Once the world is deemed polio-free, a set of essential functions must continue for a period of time to ensure that the disease is eradicated. Activities include:

- Sustained vaccination with injectable inactivated polio vaccine (IPV) to ensure there is no resurgence by maintaining high levels of immunity against polio.[b] Gavi, the Vaccine Alliance began supporting the introduction of IPV in 2013 into routine immunization programs.[c]
- Surveillance and laboratory support to investigate and respond to any potential signs of disease.
- Containment of the limited, remaining, infectious poliovirus stocks preserved for vaccine production, diagnostics, and research.

The health infrastructure required to maintain these functions must be preserved to guarantee the disease stays at bay, confirm the virus is not circulating, and ensure infectious materials are destroyed or kept in biosafety facilities. Nigeria provides a prime example of the importance of polio infrastructure preservation, as two new cases of the virus were discovered shortly after the two-year anniversary of the last confirmed case in Africa. The Government of Nigeria is collaborating with GPEI, WHO and other partners to respond urgently including conducting large-scale immunization campaigns and strengthening surveillance systems.

To be certain of its eradication, polio will remain a mandatory reportable disease into the future.

UNITED STATES' POLIO INVESTMENTS SIGNIFICANTLY CONTRIBUTE TO OTHER PRIORITIES: GLOBAL HEALTH SECURITY AND CHILD HEALTH

Beyond ensuring that polio eradication endures, opportunity exists to safeguard the broader public-health gains achieved through eradication efforts. Supported by investments from the USG and other major donors, GPEI-funded programs have contributed to health priorities such as reinforcing health systems that promote increased immunization coverage or infrastructure used to prevent, detect, and respond to emergent threats. See examples of polio-funded activities on page 7.

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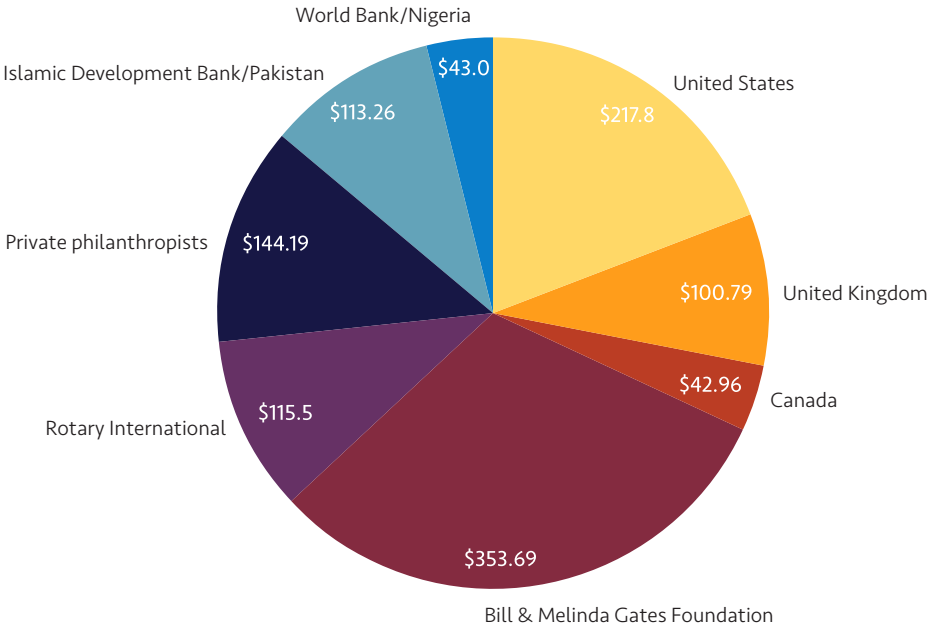
What is the Global Polio Eradication Initiative (GPEI)?

Launched in 1988, GPEI is led by national governments (see Figure 1) and spearheaded by the World Health Organization (WHO), Rotary International, the CDC, and the United Nations Children's Fund (UNICEF), with the support of core partners such as the Bill & Melinda Gates Foundation. With the mandate to eradicate polio, GPEI provides governments with the technical guidance, expertise, training, and administrative functions to carry out disease surveillance and outbreak investigation and response, procure vaccines, and plan and implement vaccination campaigns around the world (see Figure 2).

b. Currently, countries that are polio-endemic or have high risk of transmission are still using oral polio vaccine due to its low cost and ease of administration. As such, a transition from oral polio vaccine to IPV is underway.

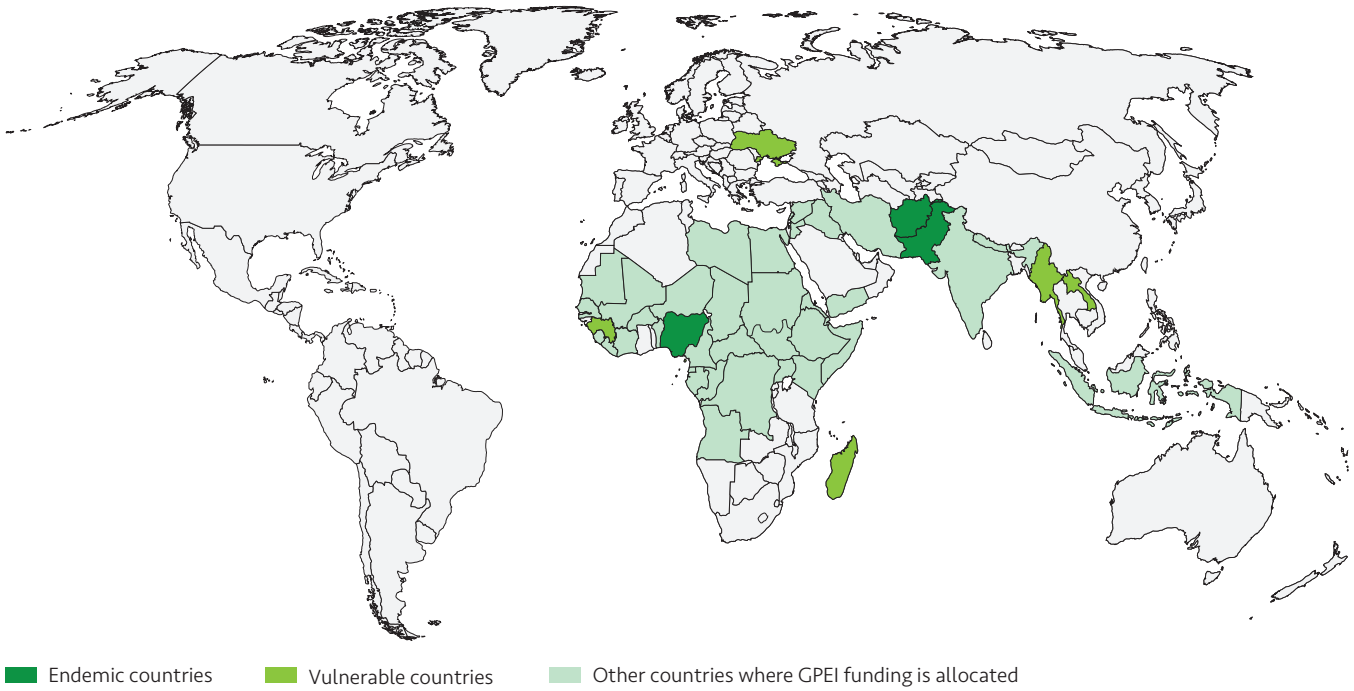
c. Maintaining a sufficient supply of IPV remains a challenge and support for routine immunization systems will be needed in order to sustain high vaccination rates. As vaccine supply remains a problem, innovations such as injection devices that allow fractional dosing (or one-fifth of the dose usually required), are possible.

FIGURE 1. **Leading global donors to polio eradication (2015). Numbers in US$ millions**[2]



Note: This figure does not include the financial contributions of countries to their own polio-eradication efforts.

FIGURE 2. **Countries receiving GPEI funds (2016).**[3]



Examples of polio-funded activities driving complementary health outcomes

Health Workforce. GPEI trains and funds millions of health workers and technical experts who have impact on health outcomes beyond polio in the countries where they work. Select polio workers spend time delivering other vaccines, such as yellow fever, measles, and rubella; detecting and responding to outbreaks of vaccine-preventable and other diseases; providing basic maternal and child health services, including vitamin A supplementation; promoting sanitation and hygiene; contributing to guinea worm eradication; and responding to emergencies.

- Polio-eradication staff are the single largest source of external technical assistance for immunization and surveillance in low-income countries.[5] For example, GPEI funds 90 percent of more than 1,000 personnel focused on broad immunization activities in the WHO Regional Office for Africa's program for immunization and vaccine development.[6]
- Supervisors and higher-level polio personnel in five countries[d] recalled spending 54 percent of their time on non-polio immunization and other health priorities in 2014.[7] For example:
  - GPEI workers administered at least 1.3 billion doses of vitamin A, creating an economic benefit of more than $17 billion from 1998 to 2010.[8]
  - In South Sudan, some polio workers spent 73 percent of their time detecting and addressing cholera, measles, and meningitis outbreaks.[9]
  - In India, the polio workforce has been involved in delivering measles and Japanese encephalitis vaccines, counselling to pregnant women, oral rehydration salts and vitamin A supplements.[9]

Emergency Response. Polio-funded health workers are often available to provide critical services when a disease outbreak occurs or a disaster strikes.

- After the 2015 earthquake in Nepal, polio-funded staff were deployed to conduct rapid assessments and disease surveillance, and to implement mass vaccination campaigns to protect against health threats that often break out in disaster settings.[10]
- Nigeria was able to rapidly replicate its polio infrastructure and emergency operating center, built with CDC input and support, to respond to and contain an imported case of Ebola in October 2014. Health workers undertook 19,000 contact-tracing visits and reached 27,000 households through social mobilization,[11] containing Nigeria's outbreak at just 19 cases.[12]
- Polio laboratory staff were involved in the response to severe acute respiratory syndrome including genetically sequencing the virus, and providing epidemiological and health-services support to Pakistan during the 2010 floods.[13]

Surveillance and Immunization Systems Improvement. Improving polio surveillance systems through oversight and management has built the foundation for disease surveillance, monitoring, and evaluation in low- and middle-income countries.

- WHO is beginning to use polio-eradication surveillance systems to enhance surveillance for timely detection and monitoring of microcephaly and Guillain-Barré syndrome, a starting point to test for Zika virus.[14]
- India's National Polio Surveillance Project,[15,e] which is supported through the Global Polio Laboratory Network, serologically investigated 135 measles/rubella outbreaks, testing nearly 700 samples in its polio labs in 2012.[8]
- In Sudan, GPEI's measles and rubella immunization activities and surveillance systems are fully funded through polio-specified funding.[16]
- Eighty-seven percent of polio health-center staff in Ethiopia, Kenya, and Uganda reported improvements in how they conduct vaccination sessions.[17] Examples globally include the following:
  - In Bihar, India, integration of polio vaccination with other vaccines has helped boost routine immunization coverage from 31 percent to more than 80 percent.[18]
  - In the Democratic Republic of the Congo (DRC), integrating measles vaccination within polio vaccination campaigns increased measles immunization coverage from 71.3 percent in 2014 to 95 percent in 2015.[19]

d. The Democratic Republic of the Congo, Ethiopia, India, Nepal, and Somalia.

e. The National Polio Surveillance Project is responsible for finding, detecting, investigating, and collecting stool samples. The stool samples are transported to one of the accredited labs in India that are part of the Global Polio Laboratory Network. Fifty-five percent of the National Polio Surveillance Project's budget comes through the GPEI.

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COUNTRIES ARE DEVELOPING PLANS TO INTEGRATE POLIO ASSETS, BUT IMPLEMENTATION IS YEARS OFF

To better understand how health systems might be impacted by winding down polio-eradication efforts, GPEI is working with countries to develop costed "transition plans,"[20] which should outline:

- **Activities required to maintain polio-free certification**, as described above.
- **Programs currently funded through polio-specified funds that contribute to other health outcomes**. Plans should include a management structure to embed programming previously operated by polio-funded personnel into broader health efforts.
- **Other sustainable funding sources or international mechanisms** which are available to support the activities, systems, and processes.[20]

Transition of these polio-funded resources, systems, infrastructure, and staff—sometimes referred to as polio "assets"—will require specialized expertise, dedicated resources, and focused planning. While acknowledging the important impact polio-funded programs have on health systems, it will also be important to detail where activities may not be fit for purposes beyond eradication. For example, the cadre of health workers who administer oral polio drops may not be easily shifted to provide injectable vaccines. Transition plans must also draw out these distinctions.

GPEI's Transition Management Group and the Polio Eradication and Endgame Strategic Plan 2013–2018[21] encourages long-term transitions to full country ownership of basic public-health functions and other health priorities. The USG is encouraging countries to establish a transition committee to map out the assets, define country-specific plans, and develop costed outlines that indicate how much funding will be made available, while working with donors to identify resources for remaining gaps.

Most countries have only begun the planning process, and transition strategies are years off. India, for example, is currently working to transition to a government-owned, -funded, and -managed polio program.[22] However, staff have reported that they do not have the sufficient time or technical capacities to adequately address the issues that arise from a government-led polio program.[15] For other countries, domestic financing remains a significant challenge as state and national governments are expected to absorb a portion of the cost for essential people, functions, and activities in conjunction with simultaneous transitions off other donor financing, such as from the US President's Emergency Plan for AIDS Relief, the Global Fund, and Gavi. This is exemplified by the DRC which has defaulted on its co-financing commitments several years in a row, indicating the challenges of providing cost-sharing for the most vital of services.[23]

The USG must prioritize planning for these transitions with countries, identifying national and local stakeholders who will need to be trained and engaged to

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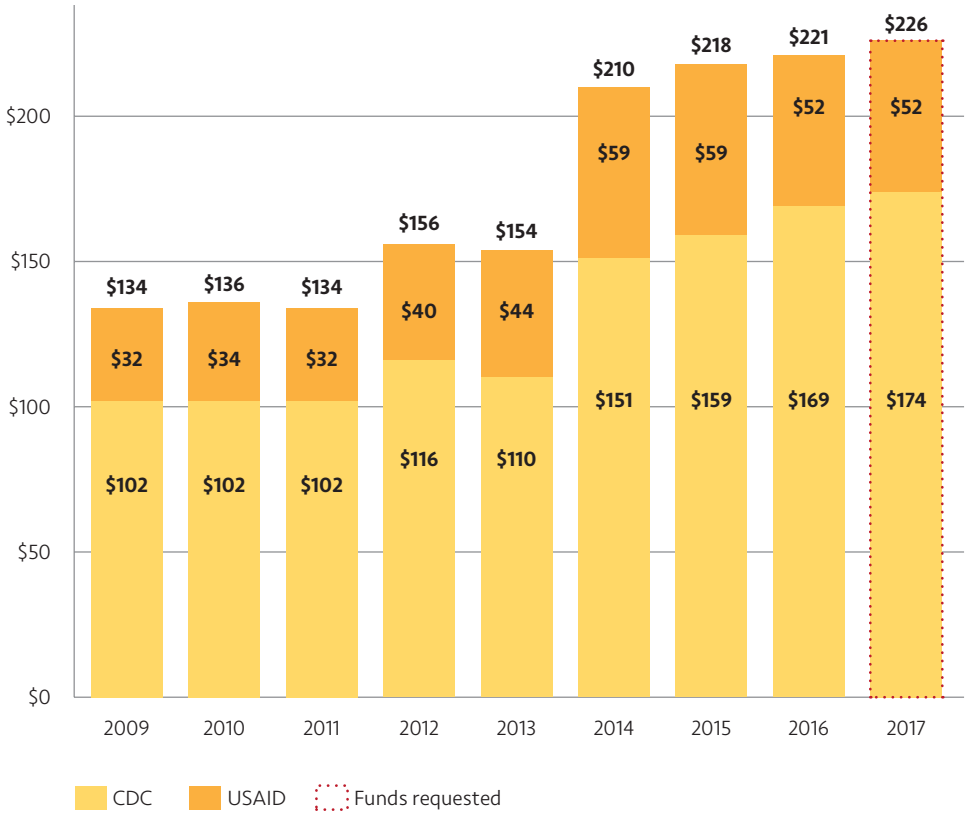
ensure the successful shift to long-term sustainability and country ownership. This must be undertaken with the understanding that time is of the essence. CDC, USAID and other global donors will need to make decisions about their investments before country-specific transition plans are finalized, particularly in the US as budgets are crafted years in advance.

WHAT ROLE DOES THE USG PLAY IN FINANCING POLIO ERADICATION?

The United States' investment in polio comes from budget lines so named within CDC's Global Immunization Division (since 1991) as well as USAID's Maternal and Child Health (since 1996) and Economic Support Funds for Afghanistan and Pakistan programs also implemented by USAID (since 2010). (see Figure 3).

CDC and USAID play complementary roles in eradicating polio. Together with WHO, CDC provides global leadership, lending technical expertise in addition to sustaining the development and implementation of country eradication strategies. USAID supports implementing partners, contributing to the polio effort through expanding immunization coverage for every child, including those in remote, marginalized, and nomadic communities. CDC and USAID coordinate efforts through regular meetings and informal communications as well as through host-country-led planning processes.

FIGURE 3. **United States funding of polio-eradication efforts FY09–FY17. Amount in millions.**



- The total USG FY17 funding request for polio is $225.7 million.[24]
- In FY16, $52 million within USAID, with an additional $7.5 million from the Economic Support Fund for work in Afghanistan and Pakistan, and $169 million within CDC were appropriated to support eradication.
- CDC's polio funding makes up 77 percent of its global immunization funds programs ($224.0 million).[24]

Acronyms: CDC, Centers for Disease Control and Prevention; USAID, United States Agency for International Development.
Includes polio funding provided through the CDC's global immunization program and the Global Health Programs and Economic Support Fund accounts at USAID

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CDC's role in polio eradication

CDC serves as the lead technical agency together with WHO in providing scientific, research, and programmatic leadership for GPEI. CDC deploys epidemiologists, public health experts, and scientists to WHO, UNICEF, and their regional and country offices. CDC also provides significant technical and financial support to the Global Polio Laboratory Network and uses genetic sequencing surveillance to investigate outbreaks of polio, identify the strain of poliovirus involved, and pinpoint its exact geographical origin.

CDC's polio budget contributes to GPEI and other multilateral efforts such as funding for WHO and UNICEF, as well as bilateral efforts, such as supporting direct eradication programming in partner countries such as Afghanistan, Angola, Chad, DRC, Ethiopia, India, Kenya, Nigeria, Pakistan, and South Sudan.[25] Funding for UNICEF provides for the purchase of oral polio vaccine and for a wide range of technical expertise and laboratory support. Through its partnership with WHO, CDC assists in tracking poliovirus transmission, investigating and responding to polio outbreaks, and assisting governments to strengthen national immunization-program infrastructure as well as monitor, evaluate, and improve vaccination programs. This includes providing scientific expertise in control and prevention, conducting operational research, and monitoring vaccination campaigns.

A component of CDC's work against polio is conducted through CDC's Emergency Operations Center, a command center for monitoring and coordinating emergency response activities. The Emergency Operations Center has contributed to the growth of CDC's Stop Transmission of Polio (STOP) program, which trains public health volunteers, in conjunction with WHO and UNICEF, to improve surveillance and quality of vaccination campaigns. Since 1998, CDC has deployed 1,840 STOP-trained volunteers on 3,212 assignments in 76 countries.[26]

Other significant contributions to the polio effort include using geographic information system tools and social-mapping techniques to improve immunization coverage in countries such as Burkina Faso, Ethiopia, Kenya, and Nigeria.[27] A second example includes the implementation of the stimulate, appreciate, listen/learn, transfer (SALT) approach, which encourages the development of locally tailored, specialized communication strategies to increase polio vaccination acceptance in countries such as the DRC.[28]

CDC'S TRANSITION PLANNING

CDC has established the Polio Legacy Transition Task Force that is forming a plan to maintain public health benefits achieved through polio efforts. The objectives are to map polio assets and capabilities, identify post-polio priorities, and develop detailed strategic materials

for the maintenance of public health programs funded through polio. The plan is expected to be finalized by December 2016 and will inform future US programs with a projection of the costs and assets required to maintain essential post-eradication activities and priority immunization activities at the global, regional, and country levels. These resources will document the progress made in reducing the burden of vaccine-preventable diseases worldwide and protection of Americans from the threats posed by these diseases while either traveling abroad or from importation into the United States.

CDC is also playing, and will continue to play, an important role in helping countries develop their own transition plans by encouraging their importance in bilateral diplomatic discussions.

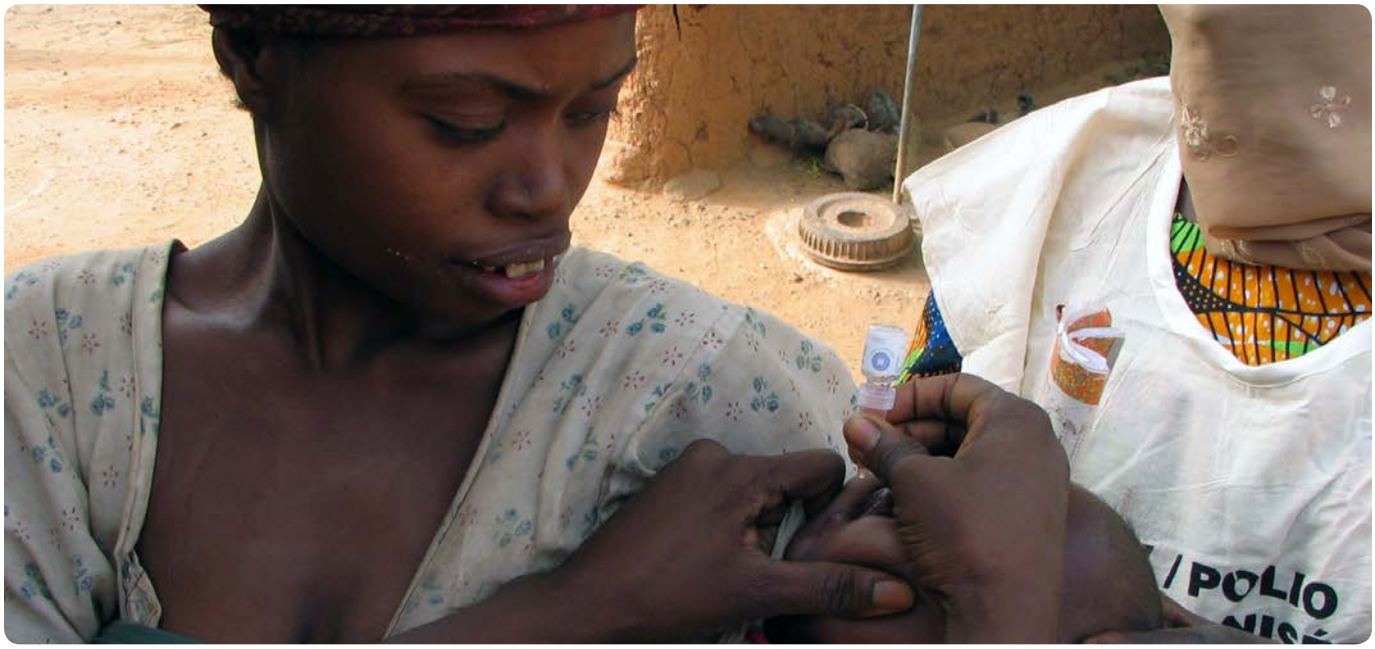
CDC'S BUDGET IMPLICATIONS

Through its Global Immunization Strategic Framework 2016–2020,[29] CDC articulates a vision for immunization that includes robust communication networks, community engagement for vaccination, strong laboratory networks, real-time disease detection and response, and delivery of health services to chronically neglected communities. However, since the majority of these activities are currently funded through a congressionally appropriated budget-line for polio, careful and planned transition of funds must occur to continue to support these activities more broadly within the immunization program and its priorities, once polio is eradicated.

The results of transition planning will yield valuable information to inform budget allocations. CDC has an opportunity to use this information to signal its budget plans and priorities to Congress and reframe future budget requests to ensure support for these activities. By June 2017 CDC will need to provide concrete recommendations to shape its FY19 budget request. It is doubtful that country-specific costed strategies will be available to inform this process, although this information is likely to be available when FY19 funds will be spent. Therefore, it is critical CDC anticipate the time gap between national transition strategy development and when US budgets must be designed, allocating funds to be used in a more flexible manner and accommodate the impact of future information.

Recommendation for CDC

CDC must finalize its transition plan, explicitly stating what costs and activities will need to be sustained to maintain essential polio activities after polio eradication, and what resources are needed to continue to support priority immunization programs at the global, regional, and country levels. The transition plan should inform the FY18 and FY19 budget justification.



Umit Kartoglu

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USAID's role in polio eradication

USAID's polio-related efforts meet the congressional mandate to focus on eradication-specific activities while simultaneously strengthening routine immunization systems and maximizing other public health benefits. This is done in conjunction with implementing partners through USAID's Maternal and Child Survival Program (MCSP), CORE Group Polio Project (CGPP), the Communication Initiative, WHO, and UNICEF with a reach of more than 30 countries and five of six WHO regions.

Polio funding supports environmental, community, and facility-based disease surveillance; assistance for the global laboratory network and accreditation; communication and social mobilization around vaccination, building public trust in immunization; polio containment and certification; as well as engagement of international and local nongovernmental-organization networks that focus on cross-border, migrant, mobile, and hard to reach populations.[1,30] USAID brings a community and capacity-building focus to its GPEI efforts.

Within MCSP, USAID seeks to eradicate polio while strengthening routine immunization by increasing capacity to achieve and sustain high and equitable immunization-coverage levels, manage the delivery of immunization services and promote their acceptance and utilization. In 2015, MCSP supported the introduction of IPV in Nigeria and Malawi by reviewing training manuals and working with the ministries of health to prepare for its introduction, and communicating best practices to national counterparts.[31] USAID's support for Gavi complements this work, providing financial, technical, and diplomatic efforts to support country immunization programs to reach all children, a key driver in ending preventable child deaths by 2035.

USAID's work also supports the CGPP, a multipartner initiative providing financial support and on-the-ground technical guidance to strengthen country polio-eradication efforts. CGPP works with in-country, private, voluntary organizations and grassroots/faith-based nongovernmental organizations in coordination with governments, to provide community engagement, social mobilization, health camps and/or independent

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monitoring and evaluation of national polio programs. In 2015, USAID provided funding to train networks of mobilizers, aiming to reach every household with vaccines and vaccine-related information. For example, CGPP in Ethiopia enabled 4,296 community volunteers to conduct 495,793 house-to-house visits primarily in pastoralist, nomadic, and cross-border areas.[32] In India, CGPP tracked children under five years old in high-risk areas to discover the reasons children were not vaccinated and followed up with highly focused and coordinated social-mobilization activities. These activities included visiting homes, engaging influencers, and working with communities and schools. CGPP also gave further training to community mobilizers, launched mass media campaigns, developed communication materials, partnered with local health systems, and conducted other activities focused on building community trust.[33]

USAID'S TRANSITION PLANNING

Following eradication, certain assets built for the purpose of eradicating polio can be applied for routine immunization, child tracking—especially in remote communities—integrated surveillance, vaccine-preventable disease and outbreak response, and more.

USAID must develop a plan, in consultation and coordination with host governments, for sustaining the gains achieved through its polio programs by cataloging its polio-specific efforts that must remain beyond eradication, identifying how to transition and build upon its assets, and documenting learning to support other vaccine-preventable diseases that build on the success of polio.

USAID'S BUDGET IMPLICATIONS

Extending immunization coverage is a central strategy to achieving the USG's goal of ending preventable maternal and child deaths, for which USAID is the lead agency. Efforts to eradicate polio that have also strengthened routine immunization programs have contributed to achieving this goal. USAID's investment thus far has built a strong platform with great potential for reaching the most disenfranchised children with vaccines, extending community-based surveillance into areas where health services are limited and much preventable disease occurs, and reducing cross-border transmission. Beyond eradication, congressional direction must be given to ensure the budget line previously marked for polio may transition to sustain relevant programming for community-based surveillance, routine immunization, and other health outcomes.

Recommendation for USAID

USAID must develop a transition plan, outlining the costs and activities needed to sustain essential polio activities after polio eradication and the resources needed to continue priority immunization activities that contribute to ending preventable maternal and child deaths. The transition plan should inform FY18 and FY19 budget justifications and be developed with host countries.

Political leadership will be needed

A newly elected presidential administration will be tasked with finalizing budget requests for FY18 and FY19, including the need to address shifting priorities around polio programs. Plans by leadership are needed to develop financial commitments and justification language to reflect the dramatic progress made in routine immunization and other health programs through polio-eradication efforts.

Additionally, congressional leaders who have historically championed polio might have limited appetite to fund polio beyond eradication. Funds with the perception of being liberated by polio eradication will be in high demand for reallocation and a strong case will need to be made to continue funding for what have been, up until now, less-visible immunization priorities. The consequences and potential risks of a loss of funds would be significant, representing a serious setback for global immunization systems. Advocates and technical experts must speak with a unified voice to ensure alignment within immunization priorities. Concentrated efforts to educate decision-makers about what is at stake as well as solutions to avoid health-system gaps are needed to ensure that the USG's valuable support continues to strengthen health systems and immunization services.[34]

Recommendation for Political Leadership

The President's FY18 budget should signal pending changes to the polio budget lines. This shift should take place in FY19, informed by requests from CDC and USAID.

Agencies with relevance to polio efforts should also address polio transition as a priority within transition memos.

Congress should appropriate sufficient funds to eradicate polio, ensuring eradication is safely completed, and the public-health gains sustained by polio are not lost.

CONCLUSION

It is vital for the USG, as the biggest government donor to polio eradication, to lead the way in a planned transition for sustaining the broader public-health benefits of the polio effort. A dedicated focus on polio transition planning will encourage other donors, as well as national and global public-health authorities, to undertake similar efforts to ensure continuation of polio-program resources and benefits. Sustained investment and policy leadership by the United States will enable the eradication and certification of polio, harness its momentum for broader health gains, and foster tremendous impact on strengthening public-health systems globally to save lives.

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455 Massachusetts Ave
NW, Suite 1000
Washington, DC 20001

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