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A Ripe Moment for Reducing Vaccine-Preventable Disease

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Summary

Immunizations are one of the most effective and cost-effective health promotion tools, improving child well-being and lowering the risk of epidemic-prone diseases. Yet despite focused efforts to increase global vaccine delivery, more than one in ten children received no vaccines in 2016, while an additional one in seven missed receiving all recommended doses and thus remains vulnerable to potentially deadly diseases.

Over the next several years, three global health activities growing out of programs championed by the U.S. government will come together in a way that could catalyze immunization system improvements in the most disease-prone countries. These include immunization and disease surveillance goals outlined in the Global Health Security Agenda (GHSa) and two activities related to global polio eradication: the need for worldwide delivery of the inactivated polio vaccine; and the repurposing of the polio infrastructure for immunization and other health activities, a process known as polio transition. All three activities create concerted attention to immunization systems that could result in sustained increases in global vaccination rates and amplify U.S. investments in vaccine promotion mechanisms, such as Gavi, the Vaccine Alliance.

Yet an uncertain budget future for each of the activities threatens not only the potential expansion of this global public good but could cause regression in successful vaccine delivery and related coverage rates. Although both polio eradication and the GHSa enjoy strong bipartisan support, including under the current administration, the potential for decreases in U.S. foreign assistance endangers the future of these activities. In fact, the U.S. Centers for Disease Control and Prevention is already developing staff reduction plans for the GHSa in the face of possible budget cuts.

To capitalize on this unique opportunity to expand a valuable global health tool and avoid deterioration in immunization delivery with consequent increased risk of vaccine-preventable disease importations, the U.S. government should:

- Provide stable, consistent funding for the Global Health Security Agenda;

- Continue financial and technical support for polio eradication through certification and post-certification activities;
- Be an active player in polio transition planning with an eye toward encouraging countries to sustain key polio assets like immunization and surveillance systems and have a willingness to cover financing and technical gaps; and
- Ensure continued support for vaccine delivery through Gavi and other international partners.

Both the GHSA and activities related to polio eradication provide an unparalleled opportunity to save the lives of children in the developing world and protect Americans by reducing the risk of imported disease. Supporting these activities would ensure that the United States remains a leader in global health and pushes forward proven disease prevention interventions that will protect Americans at home and abroad.

Mobilizing for Higher Vaccine Coverage

Ensuring vaccines reach children worldwide has long been a U.S. priority. While immunization rates have increased to a historic high of 86 percent with individual recommended vaccines, there remain pockets of inaccessibility that left 20 million infants either totally unimmunized or less than fully immunized in 2016.¹ Further, progress toward key global health goals that rely on vaccines, such as polio eradication, have been slowed because of immunization system weaknesses in the three remaining endemic countries (Afghanistan, Pakistan, and Nigeria). As a result, diseases that are preventable with a simple tool continue to plague far too many children and create the specter of potential epidemics that could reach around the globe.

But a combination of activities is coming together to create a powerful catalyst that could advance immunization delivery worldwide: the country-level and international political momentum around the Global Health Security Agenda (GHSA), the shift to an inactivated poliovirus vaccine (IPV), and a drive to repurpose polio eradication “assets.” To capitalize on this unique moment, the U.S. government should allot specific, continued funding for the GHSA, fortify commitment to polio eradication through certification and beyond, and marshal careful attention to polio transition to ensure valuable immunization assets developed by the program are preserved and expanded. Through these actions, the United States will exercise its longstanding leadership in global health to foster life-saving immunizations, reduce the global burden of disease, and protect Americans at home and abroad.

The Global Health Security Agenda

Launched in 2014 and supported by the U.S. government through \$1 billion in funding,² the GHSA aids national governments in developing the capacities to prevent, detect, and respond to potential

¹ UN International Children’s Emergency Fund (UNICEF), “1 in 10 infants did not receive any immunizations in 2016,” July 17, 2017, https://www.unicef.org/media/media_96642.html.

² Global Health Security Agenda (GHSA), *Advancing the Global Health Security Agenda: Progress and Early Impact from U.S. Investment*, 2, <https://www.ghsagenda.org/docs/default-source/default-document-library/ghsa-legacy->

global health emergencies.³ Working under the premise that controlling diseases close to their source protects populations everywhere, the initiative has now been joined by more than 64 partners, both as donors and participants. One of the 11 “action packages” developed under the initiative focuses on immunization. It includes a five-year goal of creating a functioning vaccine delivery system with “national reach, effective distribution, access for marginalized populations, adequate cold chain, and ongoing quality control.” To measure progress, the GHSA sets as a goal 90 percent coverage of the country’s 15-month-old population with at least one dose of measles vaccine.⁴

GHSA also includes a “real-time surveillance” action package that aims to establish public health monitoring systems that can identify events of concerns, such as disease outbreaks or biological attacks, and quickly report them to national and regional authorities.⁵ Surveillance is a key tool for immunization because it identifies where disease is occurring and among which populations, thus guiding vaccination needs and weaknesses.

The GHSA dovetails with and supports compliance toward the International Health Regulations (IHR), a set of country-level requirements promulgated by the World Health Organization (WHO) to help contain potentially epidemic diseases. The two initiatives offer countries voluntary external evaluations conducted by a group of international experts to determine the status of health system components deemed necessary to prevent and control disease. National governments then use the evaluation to develop a “roadmap” to address identified systems gaps. Roadmaps outline national government activities toward GHSA and IHR capacities and highlight areas of need for interested donors.

Ethiopia provides an example. Among 10 countries collectively identified as having 75 percent of the world’s under-unimmunized children,⁶ Ethiopia’s vaccine coverage rate varies from 63 percent to 86 percent depending on the type of vaccine.⁷ In a GHSA evaluation conducted in March 2016, vaccine coverage based on the measles target scored a 3 out of a possible 5 points.⁸ A roadmap developed by the country outlines steps it will take over the next five years to reach its own and GHSA immunization goals. Under Ethiopia’s plan, the U.S. Centers for Disease Control and Prevention (CDC) is slated to provide technical assistance for planning, integrating data systems, and operations. The U.S. Agency for International Development (USAID) will provide support for immunization systems

report.pdf?sfvrsn=12. While the GHSA does not have its own specific U.S. funding, it received support through appropriations made for the 2014–2015 Ebola outbreak.

³ GHSA, “What is GHSA?,” <https://www.ghsagenda.org>.

⁴ GHSA, “Immunization Action Package,” <https://www.ghsagenda.org/packages/p4-immunization>.

⁵ GHSA, “Real-Time Surveillance Action Package,” <https://www.ghsagenda.org/packages/d2-3-real-time-surveillance>.

⁶ The other countries are Nigeria, India, Pakistan, Indonesia, DR Congo, Angola, Ukraine, Afghanistan, and Uganda. Seth Berkley, “Update from Gavi, the Vaccine Alliance,” SAGE Meeting, October 17, 2017, slide 18, http://www.who.int/immunization/sage/meetings/2017/october/SAGE_October_2017_SFB_Final.pdf?ua=1.

⁷ World Health Organization (WHO), “WHO vaccine-preventable diseases: monitoring system. 2017 global summary, Ethiopia,” September 6, 2017, http://apps.who.int/immunization_monitoring/globalsummary/countries?countrycriteria%5Bcountry%5D%5B%5D=ETH.

⁸ WHO, *Joint External Evaluation of IHR Core Capacities of the Federal Democratic Republic of Ethiopia, Mission Report* (Geneva: WHO, March 2016), 4, <http://apps.who.int/iris/bitstream/10665/254276/1/WHO-HSE-GCR-2016.24-eng.pdf?ua=1>.

and supply chains. The Gates Foundation; Gavi, the Vaccine Alliance; Rotary International; UNICEF; and WHO also will contribute.⁹

GHSA provides tangible immunization goals countries can work toward, while also giving donors specific targets to gauge progress. Beyond ensuring that children are fully vaccinated, an effective immunization system serves as an important marker of public health system strength, since immunization and disease response requires effective surveillance, laboratory, distribution, cold chain, and diagnostic capabilities. Used effectively by care givers, it also engenders regular contact with health providers for both parents and children, creating opportunities to receive other health services as well.

The United States currently is working with 49 countries to bolster disease surveillance, modernize laboratories, and train staff in disease response. However, CDC is now developing plans to reduce these activities in anticipation of potential budget cuts at the end of the year. The move would curtail build-up efforts in midstream and threaten the continuation of newly trained staff.¹⁰

IPV Delivery

Eradication of all types of poliovirus requires a worldwide shift from the oral polio vaccine (OPV) to the injectable IPV. OPV, made from attenuated live poliovirus, can in rare cases cause the disease itself. The vaccine virus also can mutate to a form that can circulate among populations with low vaccine coverage. In fact, while there were only 22 cases of wild, or naturally occurring, polio worldwide in 2017, there were 96 cases from mutated virus in the OPV, outbreaks that were concentrated in Syria and the Democratic Republic of Congo.¹¹ A killed virus vaccine, IPV does not carry this risk.

While most industrialized nations switched to IPV by the late 1990s, OPV is still used in 150 countries and has been a critical tool in the eradication effort. As an oral vaccine, it is easy to administer even by minimally trained personnel, is inexpensive, and can be widely distributed through vaccination campaigns, including those that go door-to-door. IPV, on the other hand, must be injected and therefore requires more highly trained health staff, a more complex set of delivery tools (e.g., needles and needle disposal systems), and is most often delivered in facilities.

Phasing out OPV is one of the goals of the *Polio Eradication and Endgame Strategic Plan, 2013–2018*,¹² and that process already has begun. In April 2016, the Global Polio Eradication Initiative

⁹ GHSA, *Global Health Security Agenda Roadmap for Ethiopia*, March 9, 2016, 11–12, <https://www.ghsagenda.org/docs/default-source/ghsa-roadmaps/ghsa-ethiopia-roadmap.pdf>.

¹⁰ Betsy McKay, "CDC to Scale Back Work in Dozens of Foreign Countries Amid Funding Worries," *Wall Street Journal*, January 19, 2018, <https://www.wsj.com/articles/cdc-to-scale-back-work-in-dozens-of-foreign-countries-amid-funding-worries-1516398717>.

¹¹ Global Polio Eradication Initiative (GPEI), "This Week: Polio this week as of 6 March 2018," <http://polioeradication.org/polio-today/polio-now/this-week/>.

¹² GPEI, *Polio Eradication & Endgame Strategic Plan 2013–2018* (Geneva: WHO, April 2013), 52, http://polioeradication.org/wp-content/uploads/2016/07/PEESP_EN_A4.pdf.

(GPEI)¹³ orchestrated an ambitious and successful worldwide shift from trivalent OPV to bivalent OPV, thus removing from immunization systems the vaccine serotype (Type 2) responsible for the bulk of vaccine-derived polio cases. To protect against all three wild poliovirus types into the future, WHO's Strategic Advisory Committee of Experts on Immunization has recommended that countries introduce at least two doses of IPV into their national systems after global OPV withdrawal.¹⁴ The recommendations will mitigate the potential for vaccine-derived poliovirus, which may emerge up to four years after OPV is gone as poliovirus will remain in the environment. The risk from polioviruses other than those included in the vaccine, such as a failure to contain the virus in a vaccine manufacturing facility, could last more than 10 years after OPV is stopped.

The OPV withdrawal strategy's effectiveness is dependent upon the strength and reach of immunization systems globally, and there are some serious deficiencies. For example, six countries, all experiencing armed conflict, have immunization rates of less than 50 percent.¹⁵ Further, rates vary tremendously in some countries based on income, geography, and living situation. India, for example, has coverage rates of 87 percent. However, boys, urban residents, and the wealthy are more likely to be fully vaccinated than girls, rural dwellers, and the less wealthy.¹⁶ The Global Vaccine Action Plan (GVAP) approved by the World Health Assembly in 2012 calls for 90 percent vaccine rates in all countries. To address inequities within vaccination coverage, it also calls for rates of 80 percent in every district.¹⁷

One of the goals of the polio Post-Certification Strategy,¹⁸ now being developed by the GPEI, is to work through the GVAP and with other initiatives to strengthen routine immunization and broader health systems. In addition, it calls for improving outreach and developing innovative strategies to reach high-risk populations with vaccines. If vigorously pursued, this effort would add impetus to improving immunization systems worldwide. Concentrating the focus, attention, and resources currently available for polio eradication on ensuring that injectable vaccines can reach a broader population would provide a boost for all childhood immunizations.

Polio Transition

Polio eradication's requirement that all children receive vaccination against the disease has forced health workers into every corner of the world, including places that have never seen health services

¹³ GPEI is led by national governments and supported at the international level by WHO, UNICEF, CDC, Rotary International, and the Bill & Melinda Gates Foundation.

¹⁴ WHO Strategic Advisory Group of Experts (SAGE) on Immunization, "Summary of the April 2017 meeting of the Strategic Advisory Group of Experts on Immunization," 2, http://www.who.int/immunization/sage/meetings/2017/april/SAGE_April_2017_Meeting_Web_summary.pdf.

¹⁵ The countries are Central African Republic, Equatorial Guinea, Somalia, South Sudan, Syrian Arab Republic, and Ukraine. WHO, "Global immunization coverage sustained in the past five years," July 15, 2016, http://www.who.int/immunization/newsroom/press/immunization_coverage_july_2016/en/.

¹⁶ Joseph L. Mathew, "Inequity in Childhood Immunization in India: A Systemic Review," *Indian Pediatrics* 49, no. 3 (March 2012): 203–223, <https://www.ncbi.nlm.nih.gov/pubmed/22484740>.

¹⁷ WHO, "Global Vaccine Action Plan," 2017, <http://apps.who.int/gho/cabinet/gvap.jsp>.

¹⁸ GPEI, "Polio Post-Certification Strategy," 2017, <http://polioeradication.org/polio-today/preparing-for-a-polio-free-world/transition-planning/polio-post-certification-strategy/>.

before. To accomplish the goal, the GPEI combined a range of innovations, including novel mapping technologies, to identify remote villages, and community- and sometimes even neighborhood-specific operational plans to ensure hard-to-reach populations were vaccinated. Where government services could not reach communities or where there is distrust of government services, respected nongovernmental organizations (NGOs) became an extension of the health system to close the remaining gaps.

In anticipation of the final case of polio occurring in the next year or so,¹⁹ the GPEI now is encouraging what is called polio transition. This involves fostering continued support and funding for polio-related functions that will be required for at least a decade after polio has been certified as eradicated, including polio immunization, surveillance, and outbreak control. The goal is for countries to take on the functions themselves to the degree possible. Transition activities also call for transferring helpful tools, strategies, and knowledge gained through eradication to other health programs. The GPEI's ability to reach the previously unreachable is considered by immunization experts to be polio's most valuable innovation for boosting other vaccine programs. The GPEI used social mobilization techniques, including engaging community leaders in the campaign and educating mothers about the value of vaccination, to create demand around polio vaccine. It also used meticulous campaign planning, supervisory methods, and sophisticated mapping to ensure all communities were vaccinated. If countries and international partners continue to support the techniques, they could be applied to other immunization activities to increase rates for all childhood vaccines.

India has done just that through a program called Mission Indradhanush.²⁰ Using polio partners and eradication's tools, the program focuses on immunizing children in communities with the lowest vaccination rates. Over the last three years, it has vaccinated more than 25 million children.²¹ While Mission Indradhanush is an exemplary use of polio assets to address deficiencies in the delivery of other vaccines, there is concern that the program operates through campaigns rather than as an integral and sustained part of the country's health system. Further, there are questions around the program's continuation as eradication is achieved and polio funding begins to dwindle. Sustaining and building on the remarkable progress engendered by Mission Indradhanush will require integrating the program into an expanded, permanent immunization system that can offer future generations of Indian children the same vaccination advantage. Countries with the most externally provided polio funding, including India, are developing plans that, like GHSA roadmaps, will specify domestic contributions toward polio asset continuation and where financial and technical gaps are most likely to occur. As an example, using both domestic and partner funding, India expanded its National Polio Surveillance Project to include other diseases and will use data from the program to monitor its immunization systems.

¹⁹ Polio will be certified as eradicated by an expert panel after at least three years have passed since the last case.

²⁰ For more on Mission Indradhanush, see Nellie Bristol and Chris Millard, *Catalyzing Health Gains through Global Polio Eradication: An India Trip Report* (Washington, DC: CSIS, July 2016), https://csis-prod.s3.amazonaws.com/s3fs-public/publication/160721_Bristol_CatalyzingHealthGains_Web.pdf.

²¹ Mission Indradhanush, "Mission Indradhanush," <http://www.missionindradhanush.in/index.html>.

While expanding services to remote areas in India and other countries, polio transition activities also can aid in delivering immunizations to children in areas of conflict. In collaboration with government leaders, the GPEI has developed flexible and innovative approaches in insecure countries including: professional security assessments; negotiating secure access; engaging local communities; coordinating vaccinations with NGOs and other humanitarian aid delivery; military collaboration; vaccinating along borders of insecure areas; and being flexible as to when campaigns are conducted, based on current security information.²² These advances can be repurposed to other vaccine programs to help improve child health under even the most difficult of circumstances.

The U.S. Leadership Role

Polio eradication has enjoyed consistent bipartisan U.S. support for the last 30 years. The unprecedented combination of global funding, advocacy, monitoring, and top-level technical support fostered by the effort has reduced wild virus polio cases from more than 350,000 a year in 1988 to 22 in 2017. Harnessing that same energy and attention for broader immunization improvements would have a dramatic effect on childhood morbidity and mortality, as well as on controlling diseases that could potentially affect Americans. In concert with its efforts toward polio eradication, the United States over the years has provided critical technical and financial support for immunizations in countries with the weakest systems, including through the GHSA. For example, CDC's Global Immunization Division trains epidemiologists, managers, and data experts to help improve disease monitoring and systems operations. USAID provides support for surveillance officers who investigate suspected polio cases and, increasingly, other diseases. It also funds and helps coordinate a consortium of international and national NGOs who work with high-risk, cross-border, and nomadic populations. Both CDC and USAID provide expert input into immunization system strategy and oversight.

Further, both polio eradication and global health security are priorities for the Trump administration. Polio eradication remains a key goal in both CDC and USAID global immunization strategies.²³ Voicing the administration's position on global health security, former HHS secretary Tom Price called it "an absolute priority for the United States. We know that supporting global health security clearly benefits the United States and all partner countries both domestically and globally."²⁴

Immunization system strengthening also is a top goal for CDC, USAID, and the federal government more generally. The United States is a staunch supporter of Gavi, the Vaccine Alliance, a public-private partnership that helps developing countries purchase and deliver vaccines. The United States has been one of Gavi's top government donors since the program's launch in 2000, providing \$1.6

²² Chimeremma Nnadi et al., "Approaches to Vaccination Among Populations in Areas of Conflict," *Journal of Infectious Diseases* 216, suppl. 1 (2017): s368–72.

²³ Centers for Disease Control and Prevention (CDC), *CDC's Strategic Framework for Global Immunization, 2016-2020* (Atlanta, GA: CDC, May 2016), 6, <https://www.cdc.gov/globalhealth/immunization/docs/global-immunization-framework-508.pdf>; U.S. Agency for International Development (USAID), "Immunization," <https://www.usaid.gov/what-we-do/global-health/maternal-and-child-health/technical-areas/immunization>.

²⁴ Tom Price, U.S. health and human services secretary, World Health Assembly, Geneva, May 22, 2017, <https://www.youtube.com/watch?v=5giVuNKPil0>.

billion through 2016.²⁵ Marshaling the collective resources of the GHSA and the polio program to improve immunization systems will enhance Gavi-supported countries' abilities to deliver vaccines.

But continued support is threatened by an uncertain budget. GHSA funding was secured through an appropriation for the 2014 Ebola response, and the funding runs out this year. CDC already is drawing up plans to discontinue GHSA work in 39 countries as budgets diminish. To guarantee its future, Congress should provide the program with its own specific funding allocation. At the same time, Congress should continue its strong commitment to polio eradication and engage in a serious examination of polio assets' value to global health security and other health programs to ensure worthwhile infrastructure is not lost. Both CDC and USAID are developing plans that would lay out how polio assets can be used for future disease control efforts, but securing a strong funding commitment is essential to their success.

The GHSA, IPV delivery, and polio transition combine to create an exceptional opportunity to advance global immunization. As an integral player in all three activities, the U.S government should nurture the possibilities this moment presents by continuing its support to Gavi and other international organizations, the immunization programs of both CDC and USAID, and America's greatest asset—technical assistance for immunization planning and operations. Childhood immunization protects everyone, everywhere. To secure the health of its own citizens as well as that of the world's children, the United States should champion systems to ensure life-saving vaccines are available to all.

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²⁵ Kaiser Family Foundation, "The U.S. & Gavi, the Vaccine Alliance," April 25, 2017, <https://www.kff.org/global-health-policy/fact-sheet/the-u-s-and-the-gavi-alliance/>.