

## **A Conversation with Kimberly Thompson and Radboud Duintjer Tebbens on October 31, 2013**

### **Participants**

- Kimberly Thompson – President, Kid Risk, Inc. and Professor of Preventative Medicine and Global Health, University of Central Florida College of Medicine
- Radboud Duintjer Tebbens – Vice President, Kid Risk, Inc.
- Jake Marcus – Research Analyst, GiveWell
- Elie Hassenfeld – Co-Founder and Co-Executive Director, GiveWell

### **Summary**

Drs. Kimberly Thompson and Radboud Duintjer Tebbens run Kid Risk, Inc. a nonprofit organization devoted to the production and dissemination of research on the risks to children and using evidence to cost-effectively manage children's risks ([www.kidrisk.org](http://www.kidrisk.org)). They have published widely on the topic of polio eradication and control, modeling the costs and benefits of eradication efforts and developing strategies for managing risk post-eradication. The conversation focused on GiveWell's questions related to the donor and non-donor country costs of polio eradication, the historical context for the decline in polio cases, and the definition of a polio case used in modeling.

**Note:** This set of notes was compiled by GiveWell and gives an overview of the major points made by Drs. Kimberly Thompson and Radboud Duintjer Tebbens.

### **The Global Polio Eradication Initiative (GPEI) Budget**

Kid Risk pointed out that the GPEI successfully eradicated type 2 wild polioviruses by 2000, and that so far no cases of type 3 wild polioviruses have been reported in 2013, which may mean that the GPEI will soon be able to declare victory for the second of the 3 wild poliovirus serotypes. Despite its successes, in its history the GPEI has had to scale back efforts because of budget shortfalls, which led to outbreaks (for example, in 2002-2003). A large portion of the GPEI's projected \$5.5 billion budget for its 2013-2018 strategic plan will support countries adopting inactivated poliovirus vaccine (IPV) prior to or at the time of stopping the use of oral poliovirus vaccine (OPV) type 2. In general, it is challenging to estimate how much it will cost to achieve eradication and transition to a world free of all three serotypes of live polioviruses, because this depends on the actions of multiple stakeholders. Some donors restrict their aid to specific countries or activities, which can produce shortfalls if a need arises elsewhere and the GPEI cannot reallocate funds.

### **Non-Donor Country Costs for Polio Eradication**

The GPEI's \$5.5 billion budget for its 2013-2018 strategic plan does not include the costs incurred by countries. All countries spend portions of their own budgets on their national immunization programs and polio eradication efforts, and some countries get support from the GPEI. Kid Risk assumed a 1:1 ratio between donor expenditures and country expenditures for countries supported by the GPEI.

### **Uncertainty in the Timing of Interruption of Wild Poliovirus Transmission**

Hopefully, we will achieve eradication of all wild polioviruses within the next 5 years as projected by the GPEI, but it could take longer and we cannot claim to know how long it could take with certainty. Disease eradication requires global coordination and management. The total cost of eradication increases with each additional year we fail to achieve interruption of wild poliovirus transmission.

### **Historical Context for Polio Eradication and Control**

The GPEI started in 1988, but efforts to control and eliminate polio beyond routine immunization and using supplemental immunization activities (SIAs) began earlier. For example, early elimination efforts such as the campaign in Brazil led to big reductions in polio cases ("The control of poliomyelitis in Brazil", Risi 1984). Successes like these led the Americas (i.e., all countries in the Western Hemisphere) to launch a regional polio elimination campaign in 1985. Although polio surveillance did not exist before 1988, at least one study has estimated polio cases at 600,000 per year before increased immunization efforts ("Paralytic poliomyelitis: seasoned strategies, disappearing disease," Hull et al 1994). Kid Risk suggested talking with PAHO, the CDC and Rotary International to learn more about the history of polio eradication.

In 1995 before the large increase in spending on eradication, the GPEI represented a smaller program. Some countries performed supplemental immunization activities, and the world spent roughly \$250 million a year on eradication efforts while reporting roughly 50,000 cases per year. A Kid Risk study ("Economic analysis of the Global Polio Eradication Initiative," Duintjer Tebbens et al 2011) characterized the historical trend of paralytic cases since 1988 for those countries impacted by the GPEI. Kid Risk also looked prospectively at eradication vs. control ("Eradication versus control: an economic analysis," Thompson and Duintjer Tebbens 2007), and noted that discounting over a 20-year time horizon complicates simplistic division of expenditures and cases into annual estimates. In the late 90s and early 2000s, the GPEI efforts intensified significantly and increasingly supported countries that had low routine coverage and needed to increase their immunization efforts outside of their routine systems.

### **What constitutes a case of polio?**

When modeling what would happen if the world pursued a strategy of control instead of eradication, Kid Risk estimated the total number of permanent paralytic

cases, excluding cases of people who recover within 60 days of the onset of paralysis. If countries rely on routine immunization alone, for instance, they estimated that roughly 150,000 cases of permanent paralysis would occur annually (“Economic analysis of the Global Polio Eradication Initiative,” Duintjer Tebbens et al 2011).

Historic estimates of polio cases also do not include most cases of temporary paralysis, although the current surveillance system looks for cases of acute flaccid paralysis to detect circulating live polioviruses, which includes some patients who recover within 60 days of onset of paralysis. Before the GPEI ramped up, the estimates of polio cases came from reported numbers adjusted to account for observed cases of lameness compared to reported cases in studies conducted in parts of the developing world. These surveys were much more likely to sample people with a permanent disability, because they picked up cases in older individuals and low immunization coverage at the time meant that people were infected with polio and became paralyzed at relatively young ages.

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