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Coping with Institutional Fragmentation? Competition and Convergence between Boundary Organizations in the Global Response to Polio

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Abstract

This paper discusses competition and cooperation between boundary organizations (BOs) in the field of global health. It embeds its analysis of BOs in health in contemporary theories on institutional fragmentation and governance complexity, arguing that BOs in international politics have been a major driving force behind an often mind-boggling complexity of actors, institutions, and rule systems relevant to many contemporary international issues or “regimes.” The paper argues that growing complexity of global governance structures generates new demands for BOs with regard to how they manage their interactions with other BOs. Accordingly, the framework suggested in this paper builds on a set of hypotheses that do not isolate factors at structural and agent level but rather capture the interplay of BOs and their organizational environment. The paper's empirical analysis investigates two BOs, the Global Polio Eradication Initiative and GAVI, the Vaccine Alliance, working in the field of polio eradication.

KEY WORDS: global governance, health and medicine, boundary organizations, institutional complexity

Introduction

This paper explores the role of boundary organizations (BOs) from the vantage point of theories on fragmentation and complexity in contemporary global governance. It focuses on an area of international cooperation that is routinely portrayed as a particularly fragmented and chaotic array of agencies, programs, and rules: global health. Using competition and cooperation between BOs working on the eradication of poliomyelitis (polio) as a case study, I seek to show that the study of BOs can be greatly enriched by linking it to the question of how the complexity of global governance landscapes affects international BOs. In particular, the paper addresses the question of how BOs cope with the competitive dynamics of fragmentation—that is, how do they manage their interactions with *other* BOs when there is a pronounced contestation over legitimate knowledge and between different international organizations (IOs) and the expert networks linked with these? The contribution thus illustrates how competition between BOs also plays out within them.

BOs are observed in this paper in their broader organizational environment. They are organizations that “constitute a recognized area of institutional life” (DiMaggio & Powell, 1983, p. 148) and include organizations with similar mandates or roles that regularly interact with each other and perceive each other as “like units” (Dingwerth & Pattberg, 2009, p. 720). Departing from existing studies on the emergence of organizational fields, however, this paper puts forward the argument that international organizations’ recognition of other IOs as belonging to the same

organizational field enhances interactions and convergence of IOs but, at the same time, may lead to increasing struggles for authority over defining the norms that shape field interactions. It is thus assumed that the relative degree of complexity and fragmentation in organizational fields—expressed in the numbers of similar organizations and regulatory overlap between them—affects their role, authority, and everyday work. Following Guston's seminal definition of BOs, they are understood here most basically as organizations operating on the boundary between politics and science (Guston, 2001). More precisely, and adopting Miller's (2001) definition, they are seen as “those social arrangements, networks, and institutions that increasingly mediate between the institutions of ‘science’ and the institutions of ‘politics’” (p. 482). The paper follows Miller's (2001) concept of “hybrid management,” looking at how BOs master the interactions between the two spheres of politics and science in global health governance. The paper embeds its analysis of BOs in health in contemporary theories on institutional fragmentation and governance complexity, arguing that BOs in international politics have been a major driving force behind an often mind-boggling complexity of actors, institutions, and rule systems relevant to many contemporary international issues or “regimes.” While the origins of regime complexity have been extensively studied for some time now, the ways in which international organizations have sought to cope with such complexity have received much less scholarly attention, particularly the question of when fragmentation and complexity are perceived to be problematic rather than beneficial and the strategies through which international organizations have sought to mitigate actual or potentially dysfunctional fragmentation.

While BOs have been explored in many different policy areas at the domestic level, especially agriculture, environment, sustainable development, and water governance (Carr & Wilkinson, 2005; Franks, 2010; Kirchhoff, Lemos, & Engle, 2013), the nature and role of BOs in international and transnational relations have been predominantly studied with regard to climate change and the environment (Cash, 2001; Franks, 2010; Hoppe, Wesselink, & Cairns, 2013; Lee, Jung, & Lee, 2014). The same applies to the study of regime complexity and fragmentation, which has been disproportionately focused on issues related to environmental protection, climate change, and biodiversity (F. Biermann, Pattberg, von Asselt, & Zelli, 2009; Oberthür & Stokke, 2001; Zelli, 2011). A broadening of the empirical research agenda is long overdue in both of these research fields. Beyond enriching theoretical approaches on BOs, the paper therefore seeks to establish global health as a field of international cooperation that is particularly suited to discuss the responses of BOs to interorganizational competition for expertise and scientific authority.¹

Not only has the global health landscape seen an unprecedented growth in new agencies, programs, and rule systems, it can also be described as an area replete with “wicked problems” (Jentoft & Chuenpagdee, 2009), i.e., newly emerging diseases, mutating viruses, or novel scientific evidence that require immediate action and challenge conventional wisdom and established health policies. In this area, the major international agency in health—the World Health Organization (WHO)—has, from the onset, been a BO as two of the constitutional mandates of the WHO are to “promote co-operation among scientific and professional groups which contribute to the advancement of health” and to “promote and conduct

research in the field of health.”² Like few other international organizations, the WHO has thus acted as a platform for the interaction between scientists and policy makers, as the documentation of all of its discussions and policy decisions amply shows. However, following a historically unprecedented opening toward civil society organizations since the late 1990s, including experts (and expert organizations), the WHO has not only become an ultra-BO but also had to come to terms with the fact that new BOs—such as GAVI, the Vaccine Alliance³—were challenging its scientific authority. GAVI (as with other BOs) has gradually soaked up ever more functions and responsibilities traditionally pertaining to WHO and other international organizations such as the United Nations Children's Fund (UNICEF) and turned into a strong competitor in some of their core areas of expertise and action such as health-systems strengthening (HSS).

Following its emphasis on interorganizational relations between two or more international BOs with overlapping mandates and responsibilities, the paper analyzes how boundary work is affected by competitive dynamics between BOs. Its empirical analysis investigates how traditional (WHO/Global Polio Eradication Initiative [GPEI]) and new (GAVI) international BOs have reacted to fragmentation by analyzing the two organizations' evolving internal discussions and policies on polio eradication. The empirical findings are based on a combination of process-tracing and policy analysis, studying the interactions between these two BOs over time (2000–15) as well as an analysis of the policy-making process with regard to the “polio endgame” strategy 2013–18.

The paper is structured as follows: the first section embeds the concept of BOs in contemporary scholarly interest in governance complexity. Here, I develop a theoretical framework that emphasizes interorganizational dynamics between BOs in fragmented fields of global governance in which the missions and actions of different BOs overlap or collide. A fundamental assumption of this framework is that fragmentation and competition between BOs requires ongoing negotiation between different BOs about their respective “spheres of authority” (Rosenau, 2007)—i.e., it requires negotiations about the drawing of boundaries, about their relaxation, tightening, or stabilization. The fundamental argument is that growing complexity of global governance structures generates new demands for BOs not only in terms of how they process scientific evidence and interact with scientists and scientific institutions outside the BO but also with regard to how they manage their interactions with other BOs.

Accordingly, the framework I suggest develops a number of hypotheses that do not isolate factors at structural and agent level but rather aim to capture the interplay of BOs and their organizational environment. These hypotheses all revolve around the question of how BOs manage institutional complexity and “orchestrate” (Abbott, Genschel, Snidal, & Zangl, 2015) hybridity not only internally but also across different organizational contexts. As I will seek to show in this paper, when BOs feel that their authority is in danger, they respond either by enhancing their interorganizational relationships, thus becoming more permeable, with other BOs; by “taming” their interorganizational relationships, becoming less permeable; or by seeking to negotiate where the boundaries between spheres of authority are drawn. Scientists and experts located at the interface between different BOs play a particularly relevant role in these negotiations on authority as they can work either toward interorganizational rapprochement or intensify

competition. In the empirical part of the paper, I analyze how BOs have managed hybridity in the case of polio eradication, more specifically how the GPEI (spearheaded by the WHO) and GAVI have responded to institutional fragmentation and negotiated their respective spheres of authority in this prominent area of global health.

Boundary Organizations and the Complexity of Global Governance Landscapes

This paper is embedded in the IR research agenda on how science and knowledge at large influence policy-making processes within international organizations. This research has, so far, focused predominantly on the interactions between IOs and civil society actors, including actors that represent scientific expertise in the narrower sense (e.g., think tanks, research centers, NGOs) and other types of expertise (e.g., representatives of affected groups) (Arts, 2001; R. Biermann, 2011; Koch, 2011; Lipschutz, 2005; Scholte, 2012; Tallberg, Sommerer, Squatrito, & Jönsson, 2013). More recently, a number of studies have set out to explore the expert authority of IOs themselves, particularly their bureaucracies (Barnett & Duvall, 2005; Bauer, 2006; Winickoff & Bushey, 2010). While these studies have greatly added to our understanding of interactions between agents inside and outside IOs and, more broadly, to a sociology of professions perspective on IOs, there is still scant research on how IOs manage and negotiate the boundaries between politics and science in their interactions with outside actors. More importantly for the core argument of this paper, the interactions between different IOs with overlapping mandates and the ways in which their “boundary work” is affected by scientific experts and communities operating outside these IOs has not yet been explored. I make use of such a perspective on the politicization of science in order to shed light on how governance complexity in a field of international cooperation that has been portrayed for a long time as being “merely” about medical, technological, and epidemiological evidence (and therefore “apolitical”)—global health—has politicized the relationships between international organizations and the realm of science.

Following the definition of BOs proposed in the introduction to this special issue, I define global health boundary organizations (GHBO) as those organizations (a) that are established by a formal mandate of member states; (b) whose policies and actions are of global outreach; (c) that regularly interact with sites of knowledge production and expert (networks) outside the organization; and (d) whose purpose lies in debating, adopting, and implementing global health policies and programs. As intergovernmental organizations (WHO/GPEI) or transnational public–private partnerships (GAVI), the GHBO that constitute the focal point of the empirical section of the paper are agents of political principals in the first place. They are created and authorized by the governments of their member states as well as, in the case of GAVI, by representatives of the “vaccine industry,” of private foundations (such as the Gates Foundation) and research institutions.⁴ As the composition of the executive (WHO) or governing (GAVI) boards of the two organizations show, they also have scientific principals. The same applies to the oversight

board of the GPEI that is hosted by WHO and whose board members include representatives of five principals: WHO, UNICEF, Rotary International, Bill and Melinda Gates Foundation (Gates Foundation), and the U.S. Centers for Disease Control and Prevention.⁵

This paper suggests that there is much to gain in theoretical refinement and analytical depth by locating singular BOs in their respective organizational fields—fields that might be complex and fragmented. This approach allows seeing where boundaries are in fact impenetrable and where competition between international organizations makes knowledge a trading good that can be negotiated with and appropriated by different organizations. As such, the paper leaves behind a prevalent focus on individual BOs and, instead, looks at interorganizational relationships between BOs with overlapping mandates (Hoppe et al., 2013).⁶ Embedding the interorganizational relationships between GHBOs in a broader organizational field that is constituted by the rules, norms, and goals pertaining to a specific problem (like polio) or even a whole policy-domain (such as health), allows us to see how changes in this environment influence interorganizational dynamics and how these dynamics affect global policies and outcomes.

Boundary Organizations in Global Health

By definition, GHBOs are open systems (Seabrooke & Sending, 2015). They interact with their organizational environment and are shaped by it (Katz & Kahn, 1978). An essential facet of this environment are relationships with other organizations which means that “in order to understand organizational behavior, one must understand how the organization relates to other social actors in its environment” (Pfeffer & Salancik, 1978, p. 257). The boundaries between a GHBO and its environment are therefore inevitably fuzzy and, faced with this fuzziness, BOs are constantly involved in the “creation and maintenance of appropriate boundaries and jurisdictions between interacting organizations” (Miller, 2001, p. 492). GHBOs are embedded in an organizational environment or field with a range of social dynamics—rivalry, coexistence, and synergy—similar to transnational corporations that are entrenched in a global market driven by joint ventures and competition. These dynamics may play out *inside* a GHBO when different expert committees and advisory panels potentially advocate for different bodies of knowledge or courses of action. Or they may play out *across* GHBOs such as when the same experts or expert networks are part of different GHBOs but pursuing incoherent strategies in order to create uncertainty and demand for sustained expertise and services (Seabrooke, 2014).

The core assumption this paper advances is that relationships between BOs operating in the same organizational field are fraught with struggles over authority, market power, and autonomy. The more fragmented and complex the landscape of international organizations pertaining to a specific issue-area gets, the higher the pressure for individual BOs to negotiate their spheres of authority with other organizations. This dynamic also affects the ways in which BOs interact with sites of knowledge production and actors who hold exclusive knowledge and information that is vital to their organizational goals. As I discuss below, in global health governance there are many issue areas or problems in which the number of international

organizations and programs has multiplied since 1990 particularly, with a bewildering increase in these organizations' interactions with think tanks, universities, research and development departments, and other sites of knowledge production.⁷

How Fragmentation of Global Governance Architectures Affects Global Health Boundary Organizations

For the purpose of studying how international BOs respond to rising complexity and fragmentation in global governance, I suggest adopting a perspective which integrates two levels of analysis (agents/structure) and develops hypotheses which capture the coconstitutional relationship between the two. Following the above-mentioned conceptualization of BOs as open systems, these hypotheses do not differentiate between factors that are internal and external to international BOs but rather aim to reflect explanatory factors that are located at the borderline between international BOs and their organizational environment. In a nutshell, this implies that we should study the extent to which (cooperative or competitive) interactions between international BOs are influenced and constrained by the fragmentation dynamics of the organizational field attached to an issue area and, at the same time, to observe how individuals within and outside the organization as well as the organization as a whole respond to such governance complexity.

First and foremost, following theories on how pluralization and proliferation of actors and rules affect international organizations, it has to be assumed that the creation of new international BOs, programs, or public–private partnerships to deal with a specific global issue opens up possibilities for new interactions across the boundary of politics–science as well as for new or different knowledge and expertise to be potentially relevant to policy making. The bulk of research on the increasing complexity of global governance in almost any field of international cooperation (Alter & Meunier, 2009; Bernstein & Cashore, 2012; Drezner, 2007; Gehring & Faude, 2013; Orsini, Morin, & Young, 2013; Zelli, 2011), shares the basic assumption that fragmentation equals pluralization and, therefore, an increase in different “epistemic traditions, knowledge systems” (Seabrooke, 2014) and knowledge resources. How does this increase in knowledge systems affect international organizations and their relationships with other IOs? As empirical studies on the pluralization of actors and rules across diverse landscapes of global governance have shown, actor proliferation increases the range of available resources and opens up new possibilities for cooperation (Börzel & Risse, 2005; Hall & Biersteker, 2002). Other studies, however, have shown that the fragmentation of the actor landscape in a specific policy domain results in a growing politicization of policy issues, as the potential for contestation and conflicting ideas on the problem and the solution to the problem rises (Orsini et al., 2013; Zelli, 2011).

No matter if the relationships between GHBOs evolve into cooperative or competitive relationships, we have to assume that fragmentation affects their boundary management. Under conditions of increasing fragmentation, we would thus expect *GHBOs to enhance their hybridity management and to engage in the delineation, adjustment, and renegotiation of boundaries* (H1) not only between individual GHBOs in the realm of science but also among GHBOs themselves (Miller, 2001).

H1 has three subhypotheses. According to theories on interorganizational cooperation (Atouba & Shumate, 2010; Jönsson, 1986; Osborn & Hagedoorn, 1997; Schermerhorn, 1975; Whetten, 1981), organizations are more prone to enter cooperative relationships with other organizations when they are vulnerable, i.e., when they depend on resources outside the organization, such as knowledge, money, and legitimacy. Thus, one would expect two pathways through which GHBOs respond to the interorganizational dynamics resulting from fragmentation. *When they are self-sufficient and independent of other GHBOs' resources, we would expect them to tighten boundaries* (H1a). However, we would also expect *increasing interest in negotiating spheres of authority on the part of self-sufficient GHBOs as soon as resources in the organizational environment as a whole are becoming scarce or when policy goals significantly change* (H1b). We would thus expect increasing interest in finding division of labor agreements between GHBOs or in any other strategy or mechanism to delineate areas of responsibility and authority. When GHBOs are vulnerable, i.e., in need of resources that other GHBOs or other actors in their organizational environment offer, though, we would expect them to relax boundaries. The hypothesis is, therefore, that *vulnerable GHBOs respond to fragmentation by intensifying their interorganizational relationships with other actors in the organizational field* (H1c). They might, for example, “construct new institutional arrangements for mobilizing science” (Miller, 2001, p. 479), such as creating interorganizational advisory committees in which experts can share their valuable knowledge across GHBOs.

With regard to agency and the practices of actors within and outside BOs, the theory on epistemic arbitrage developed by Seabrooke (2014) has made important inroads in explaining how actors drive fragmentation/competition or integration/cooperation—the basic assumption here is that the existence of multiple BOs within a policy field can confer considerable power to experts and their networks. Seabrooke's seminal approach addresses the ways in which contested knowledge can be used to create uncertainty for strategic advantage rather than being a problem for experts to solve through consensus. The core assumption here is that experts working across GHBOs seek to create demand for their expertise and services and may therefore work toward maintaining uncertainty and contested knowledge. Individuals/scientists who operate *across* BOs are taken to negotiate knowledge so that it benefits themselves and their organization, and professionals working across international BOs are “mobilizing to generate demand for the skills and knowledge” (Seabrooke, 2014, p. 50). Following this theory, one would therefore assume that *fragmentation increases possibilities for experts/knowledge-holders to engage in epistemic arbitrage* (H2a), as they can play GHBOs off against each other. Thus, the coexistence of multiple GHBOs with overlapping mandates would lead to a stronger politicization of knowledge and GHBOs. If we connect the actor-centered H2a with the general hypothesis H1 on the fragmentation of a policy field, we have to assume that *epistemic arbitrage is both an outcome of fragmentation and at the same time reinforcing competition between GHBOs* (H2b) as those holding valuable knowledge resources are able to enhance the competitive dynamic.

The fundamental question regarding the responses of GHBOs to interorganizational competition, then, is the question of when BOs truly become “bridging organizations” that provide opportunities for “social learning” not only *within* the

GHBO but also for sharing knowledge, agreeing on “facts” and definitions between BOs pursuing the same policy goals (Nilsson & Swartling, 2009). These bridging exercises may lead to the emergence of new governance architectures in which some GHBOs stand out because of their capacity for “cross-domain orchestration” (Miller, 2001).

Polio Eradication, Institutional Complexity, and Boundary Organizations in Global Health

The following empirical section of the paper uses a case study from the field of global health—international cooperation to eradicate polio—in order to determine the extent to which the hypotheses developed earlier adequately capture how global institutional fragmentation affects GHBOs and how GHBOs respond to fragmentation. I focus here in particular on the GPEI as a GHBO which, for a long time, existed as the unchallenged international lead organization for the eradication of polio but has been confronted with growing complexity in the polio landscape and increasing competition with other GHBOs—most notably GAVI, the Vaccine Alliance.

At the beginning of the twentieth century, poliomyelitis was the leading cause of disability in children, infecting hundreds of thousands of children each year and making it one of the most dreaded diseases across industrialized countries.⁸ Poliomyelitis (polio) is an acute communicable disease that is caused by any one of three types of the poliovirus (type 1, 2, or 3) and can lead to paralysis or even death, affecting mostly children under the age of five (WHO, 2014, p. 73). Many people are infected without symptoms but still spread the virus through their excrements—which means that the polio virus thrives in settings with poor sanitation. Today, in almost all countries around the world, child immunization against polio is one of the most matter-of-fact medical treatments experienced during infancy and early childhood.⁹ In most countries, polio is today given as part of the pentavalent routine vaccination that is administered for the first time shortly after birth.¹⁰ A life-long immunization against polio requires multiple doses of the vaccine. In advanced health systems, immunization against polio has become practically a cost-free intervention that prevents a life-threatening illness—and it is part of immunization strategies in all countries of the world as immunization constitutes the backbone of public health systems, particularly in developing countries.

After effective vaccines were introduced in the 1950s and 1960s, the history of the eradication of polio was one that celebrated an incredible success story. From the late 1980s onward, complete eradication seemed to be within reach for the entire planet. After the GPEI was established in 1988—with the aim to complete eradication by the year 2000—polio infections were in a steep decline for over 20 years. In 1988, there were 350,000 polio cases in 125 polio-endemic countries.¹¹ By the year 2000, three of the six WHO regions were declared polio-free. By 2003, the number of remaining infections was down to below 1%.¹² However, ever since, the international community has been involved in a desperate effort to reach its goal of complete eradication of the polio virus—and has failed.

The history of polio eradication is an extraordinary case in terms of showing how easily global public health can be endangered even if the incidence of this disease is today at 0.1% and polio has vanished from 99% of the territory of the world. Polio eradication classifies as a complex problem inasmuch as it has evolved from a seemingly attainable health policy goal into a conundrum that leaves many health experts and policy makers severely at a loss in terms of appropriate strategies for its complete eradication (Muraskin, 2012). Polio only remains problematic in just two countries today—Afghanistan and Pakistan¹³—but these countries are considered fundamental to eradication and seriously threaten the polio success story (Gostin, 2014). In addition to the challenging task of preventing and detecting new cases in these two countries, the polio virus continues to resurface also in other parts of the world. In fact, in 2016, 75 new cases of polio were detected, 7 in sub-Saharan Africa and 11 in Myanmar and Laos.¹⁴

A bitter irony of the polio vaccine that has been used in most parts of the developing world for a long time—the oral polio vaccine (OPV)—is that medical evidence has now confirmed that OPV itself constitutes an obstacle toward polio eradication. Because it is a so-called “live attenuated vaccine” (WHO, 2014, p. 77) derived from parent wild-type polio virus strains in nonhuman cells, OPV can—in very rare cases—result in polio infection and therefore constitutes a small but undeniable barrier toward complete polio eradication. The incidence of vaccine-associated paralytic poliomyelitis is estimated to be 2–4 cases/million birth cohort per year in countries using OPV. However, mounting scientific evidence has shown that the viruses transmitted through OPV vaccines may, over time, replicate in individuals and communities, thereby regaining the neurovirulence and transmissibility characteristics of the wild-type polioviruses. These vaccine-derived polioviruses can even be imported and spread in undervaccinated communities in developed countries, as has been the case with an Amish community in the United States. What follows from this is a growing concern about continued use of OPV causing cases or outbreaks of paralytic poliomyelitis (WHO, 2014, fn. 13 and 14).

Most countries around the world have abandoned OPV and changed to the inactivated version of the vaccine—inactivated poliovirus vaccine (IPV).¹⁵ Here, cell-culture derived wild polioviruses of all three strains are inactivated using formaldehyde. IPV carries no risk of vaccine-associated polio paralysis. However, it has been shown that IPV is less effective than OPV in inducing intestinal immunity—which means that when a child is immunized with IPV but then infected with wild poliovirus, the virus can still multiply inside the intestines and be shed in the feces, with the risk of continued circulation and person-to-person infection. This means that IPV bears risks particularly in areas with poor sanitation. What is more, the two different vaccines differ in their cost-effectiveness: IPV is over five times more expensive than OPV and, over and above that, requires a trained health worker and sterile injection equipment and procedures to be administered. OPV, on the other hand, is given orally and has been administered by thousands of volunteers around the world. The Polio Eradication & Endgame Strategic Plan 2013–2018 has envisaged the integration of a combination of OPV and IPV in routine immunization by the year 2017. The combination of the two vaccines is needed since OPV needs to be stopped once polio is eradicated—in order to prevent vaccine-associated polio infection that can occur through OPV—but cannot yet be entirely replaced by IPV

as IPV only offers personal protection but cannot halt person-to-person spread of the disease.¹⁶ As a consequence, the vaccination plan for the endgame strategy relies on a combination of both vaccines and, particularly, the need for introduction of costly IPV in resource-poor settings.

The History of International Cooperation in Polio

In 1988, the World Health Assembly agreed that it was time to work toward eradication of polio by the year 2000. It adopted a resolution following which the GPEI was established, a global public–private partnership that is led by national governments, and spearheaded by four core partners: the WHO, Rotary International, the U.S. Centers for Disease Control and Prevention (CDC), and UNICEF. Since 1988, the GPEI has disbursed US\$10 billion for polio eradication and immunized over 2.5 billion children.¹⁷ Even though the GPEI is a partnership “hosted” by the WHO—i.e., being physically integrated into the WHO—it is still a separate political body inasmuch as it consists of an executive body, various opinion-building and decision-making forums for different technical domains, as well as a number of independent bodies which monitor the actions of the GPEI. The main decision-making body of the GPEI is the Global Health Assembly—the largest health-specific legislative body in the world—which determines the broad scope and directions of the GPEI and reviews GPEI's actions. The Polio Oversight Board (POB) of the GPEI is the main executive body of the GPEI and is comprised of the heads of agencies of the four GPEI partner institutions. The Global Polio Partners Group operates alongside the POB ensuring that the voices of stakeholders are included in programmatic and operational decisions and reporting to the POB. Finally, and most importantly for this paper, the GPEI's governance structure includes a range of advisory groups and boards: the Independent Monitoring Board (IMB; which is composed of experts from a variety of fields); regional and national technical advisory groups (composed of public health experts); the Strategic Advisory Group of Experts on Immunization (SAGE; composed of immunization experts) with its own working group on IPV policy; the Global Certification Commission that certifies that the circulation of wild polioviruses has been interrupted globally; and the Global Polio Laboratory Network, which reviews performance of network laboratories. The GPEI, thus, qualifies as a GHBO that includes a high number of external experts and scientific bodies in its governance structures and routinely cooperates with many more actors from the realm of science.

For a long time, GPEI was the central BO in polio eradication—spearheaded by the WHO—and it continues to be the center-point of what might be called an international polio regime that comprises all international rules and institutions relevant to the eradication of polio. The GPEI and its partnering organizations have helped to decrease the number of new polio infections by more than 99%—saving an estimated 10 million persons from paralysis by the disease. Since 1999, no case of poliomyelitis caused by naturally circulating wild poliovirus type 2 and since November 2012 no case due to wild poliovirus type 3 have been detected (WHO, 2014, p. 74). However, in the past decade, the success story of the GPEI has changed its tune—from enthusiasm about the rapid decrease in incidence rates to perplexity in the face of the sheer impossibility to get down to 0% incidence. A

number of factors explain why the GPEI has been going through both a legitimacy and an effectiveness crisis for considerable time due to the growing belief that polio eradication may seem to be a futile enterprise. These factors are associated both with the “polio problem” itself and the ways in which old policy solutions have become questioned (available diagnostics and vaccines) and new solutions are debated. However, the changing face of polio is also an outcome of the contemporary context(s) in which polio eradication is embedded, particularly the contexts in which polio is still prevalent as a threat and a disease as well as changes in the contemporary architecture of international cooperation in this area. In the following, I first describe how the complex nature of polio has constituted an entry point for new agencies in global health governance and, thus, been a catalyst for increasing competition between GHBOs. I then discuss how different GHBOs have responded to the challenges confronting contemporary international cooperation in polio eradication and ultimately apply the hypotheses on BOs and regime complexity developed in the theoretical part of this paper.

Polio: A Complex Problem and a Global Policy Crisis

Today the global policy goal of polio eradication has reached unprecedented urgency and renewed commitment, measured by the volume of funding for eradication. Funds spent on polio eradication have skyrocketed inversely proportional to the numbers of new infections.

There are a number of explanations for this paradoxical development. On the one hand, disease surveillance is generally becoming costlier and complicated the lower the number of new infections, as single cases are more difficult to spot. On the other, obtaining the goal of complete eradication of polio has become a matter of massive resource mobilization in the face of new vaccination strategies recommended by the WHO and costly attempts to contain the virus in extremely unstable areas. Once more, polio exemplifies that, much like environmental issues, health is an area in which the “truths” endorsed by scientific evidence and which underlie policy decisions are constantly threatened through new outbreaks, newly emerging health issues, the often unpredictable ways in which diseases spread and new findings—medical, biomedical, epidemiological, and so forth. BOs in global health, thus, face the constant challenge to reconsider the scientific foundations of their policies, to manage crises, and remain flexible and responsive to changing circumstances and revolutionary knowledge.

As recent health emergencies have told us (Ebola; Middle East respiratory syndrome [MERS]) global public health is an area of strong insecurity and unpredictability. Polio is emblematic too of the fragility of achievements in safeguarding global public health as the overall public health goal of “eradication” has become endangered on different fronts. In 2010, for example, the largest outbreak globally in five years was registered in Tajikistan. Despite the well-coordinated response to the outbreak it is feared that more of these outbreaks will occur in or in the vicinity of the EURO region. The future of polio eradication has become uncertain because the contexts in which the virus is still endemic are among the most challenging one could imagine for implementing robust immunization systems. In 1988, when the GPEI started to work, fewer than 250 people were employed by the program—

today these numbers have risen to more than 2,500, in the face of the challenging security context in endemic countries as well as the complex monitoring and surveillance strategies required to detect isolated imported polio infections in previously polio-free countries (Cochi et al., 2014, p. 2). As a consequence of these developments, the required budget for the Polio Eradication & Endgame Strategic Plan 2013–2018 has been estimated to be a staggering 5.5 billion USD for the global strategy to eradicate polio once and for all (Gates & Bloomberg, 2013).

The developments described above have necessitated a reconsideration of the position of polio eradication within the spectrum of global health priorities. Polio eradication has, for a considerable time, enjoyed high priority on the global health agenda—with the effect that international cooperation in this area has been targeted, efficient, and successful. Ironically, however, it is precisely because of the sweeping success of the GPEI and because of the dwindling number of new polio infections, that political momentum for polio has weakened and the GPEI has become “in some sense a political victim of its own success” (GPEI Independent Monitoring Board, 2011a, p. 15). Polio eradication campaigns have vanished from public debates in developed regions of the world—which is exemplified by the circumstance that the public outrage on the failures of the WHO in the 2014 Ebola crisis scarcely mentioned that all WHO efforts at the time of the first Ebola outbreaks in Western Africa had gone into another “public health emergency of international concern,” the polio outbreak in the Middle East and in Cameroon and Equatorial Guinea.

What is thus at stake in the contemporary discussion on polio eradication is the difficult choice between pursuing the endgame strategy and seeking to eradicate even the last remaining cases of polio, or let polio continue to exist at its current low levels and switch to “control” rather than “eradication.” An intensive debate is being led on the future of polio eradication which, of course, is also a discussion on the future of the GPEI and the global polio strategy it should lead. In 2012, the World Health Assembly—the supreme decision-making body of the WHO—declared polio once more a “global public health emergency” and identified it as a priority area for international cooperation. A year later, the GPEI and the WHO adopted their Polio Eradication and Endgame Strategic Plan 2013–2018, which seeks to eliminate polio once and for all by the year 2018. The past five years, however, have seen increasing conflicts among policy makers and scientific experts about appropriate endgame strategies and the way forward in polio eradication. These conflicts have resulted as much from the “nature” of the issue of polio and the unexpected hurdles in overcoming this disease, as they have resulted from institutional fragmentation and growing complexity with regard to BOs pertaining to the field of polio. Thus, contemporary struggles about the best strategy for the polio endgame are as much a consequence of factors exogenous to BOs in health as they are an outcome of interorganizational relationships between these organizations as well as the actions and relationships of scientific experts operating across multiple BOs.

In the remainder of this paper, I use the GPEI and its role in global polio eradication as a case study to explore the extent to which the hypotheses developed in the first section of this article adequately allow capturing how global institutional fragmentation affects GHBOs and how GHBOs respond to fragmentation. The

empirical insights presented here are preliminary and warrant further and more systematic analysis. For the present analysis, I have used policy documents of the GPEI and GAVI as well as background reports on the history of polio eradication and contemporary discussions on the polio endgame strategy as sources from which I gather evidence on how fragmentation has affected these two organizations and how they have responded to it. The most important insights on the politics of hybridity management in the context of overlapping mandate between the two GHBOs are drawn from the reports of the IMB of the GPEI.

Institutional Complexity, Boundary Organizations, and the Politics of Polio Eradication

The GPEI qualifies as a GHBO as it fulfills the various criteria for a GHBO discussed earlier. To date, the GPEI constitutes the only global partnership working exclusively on polio eradication and it continues to be the centerpiece of international cooperation in this field. However, in the early 2000s, the GPEI saw itself confronted both with the onset of its implementation crisis as well as with the appearance of two global players whose influence in global vaccine governance could not be denied (Fleck, 2014): the Gates Foundation and GAVI, the Vaccine Alliance whose second largest donor after the United Kingdom is the Gates Foundation.¹⁸ Both institutions (GPEI and GAVI) are separate organizational entities, but there are significant overlaps in terms of their members, their governing boards, and—most significantly—in terms of the expert and advisory groups with which they collaborate.

Global Polio Eradication Initiative's Independent Monitoring Board and Efforts Toward Reform— As an outcome of the continuing crisis of the GPEI and its diminishing support, an independent monitoring board (IMB) was established in 2010 which reviewed GPEI's progress toward eradication and issued recommendations on how to reform GPEI's structures and processes in order to move closer to that goal. While the main obstacles toward reaching the eradication goal were still located at the national level, particularly in endemic countries, the IMB's reports for the first time highlighted the failures generated by the governance structure and international organization of the GPEI itself as well as the global institutional context in which its efforts were embedded. The IMB reports, thus, expose the challenges confronted by the GPEI in terms of finding its place in a changing global governance landscape for polio eradication. From the onset, reports of the IMB highlighted a number of problems with GPEI's governance structures, its management, as well as the management of its interactions with other international agencies as well as expert groups. In particular, the IMB has noted that decision-making processes within the GPEI are often difficult and time-consuming due to the different interests and interpretations of the four core partners. In fact, the IMB reports reflect the acknowledgment that the slowing progress in polio eradication is not solely a “problem” pertaining to the last few endemic countries but that more attention has to be paid to bottlenecks caused by the (lack of) interactions between global agencies.

The analysis of documentation from a number of GHBOs relevant to polio eradication—GPEI, GAVI, Gates Foundation, UNICEF, WHO—exhibits the growing politicization of a seemingly technical and formerly straightforward health issue, not only because of the changing face of the polio virus but also because of conflicting interests and strategies promoted by different international agencies. Conflicts have revolved around the appropriate immunization method as well as the question of how polio immunization (vertical intervention) fits into health systems strengthening as a new global priority (horizontal integration into routine immunization). On the surface, there is virtually no available documentation of the “politics” surrounding polio eradication—and struggles over authority and knowledge are hidden behind a pervasive terminology of synergy, cooperation, and harmonization. When looking at most primary documentation on the global polio strategy after 2000, all evidence of disagreement and power asymmetries seem to have been deleted from summary reports. It is therefore difficult to identify where battles over scientific evidence, strategies, and policy priorities have taken place. However, on closer inspection, it still seems possible to trace relationships of competition and rapprochement between the various global agencies contributing to the “global governance” of polio—and the ways in which these relationships have sought to stabilize or redefine the boundaries between GHBOs and the world of science. The triennial reports of the IMB of the GPEI constitute a particularly rich reservoir of accounts on the more conflictual dimensions of policy making within the GPEI.

What the IMB reports that have been issued since 2010 evidence is a crisis in legitimacy and effectiveness that the GPEI continues to be confronted with. While the IMB acknowledges that this crisis is partly an outcome of the resilience of polio, it also associates this crisis with serious weaknesses in the governance structure of the GPEI and particularly the way in which these structures are able to absorb conflicts between different partners and encourage a productive and goal-oriented dialogue with experts and expert institutions. The following quote from the May 2013 IMB report is emblematic for the critique the GPEI has been faced with.

[T]he core partners expend too much energy focused inwards, rather than being sharply responsive to what the polio-affected countries need from them as a group. If major restructuring is deemed too disruptive at this stage of the Programme, the global partners instead need to far better mitigate these problems, which are a major drag on progress, within the current structures. (GPEI Independent Monitoring Board, 2013)

The quote above also exemplifies the ambivalent understanding of the interaction between science and politics promoted by the independent experts of the IMB. They interpret “politics” to be about leadership, effectiveness, and coherence, rather than pluralism, deliberation, and legitimacy. In the same report, however, they emphasize that science is about innovations challenging conventional wisdom and that “innovative ideas often generate disagreement” (GPEI Independent Monitoring Report, 2013, p. 42). Thus, the realm of science is interpreted as being a battlefield of ideas from which decision makers have to choose the best to inform their policy-making decisions. In this regard, the IMB reports elucidate the frustration of independent “evaluators” of GPEI about the lack in data sharing between the GPEI partners (GPEI Independent Monitoring Report, 2012, p. 46)—stating

that data sharing is an absolutely essential part of an effective and well-informed response to polio and should be prioritized in partners' interactions. Accordingly, the IMB has encouraged a "smarter use of data." In fact, the "practice" of data sharing is reported by the IMB to be highly problematic. It openly criticizes that "at the global level, the data are not being interlinked to present a unified analysis of the key problems facing each country" (GPEI Independent Monitoring Board, 2012, p. 21). It is also in this domain that the IMB has strongly encouraged a relaxation of the GPEI's boundaries in order to make use of the data sharing tools and practices of other agencies, most notably GAVI and the Gates Foundation (GPEI Independent Monitoring Board, 2012, pp. 43–46).

The IMB has been concerned with a lack of decisive leadership and unproductive dialogue with experts in relation with two contested policies of the GPEI. These policies stand out as being particularly pertinent to the question of how governance complexity affects GHBOs' politics, both those revolving around interactions with other actors relevant to global polio eradication and control, and those revolving around appropriate vaccines and vaccination strategies to achieve eradication (GPEI Independent Monitoring Board, 2013, p. 54). It appears that these two issues are intimately linked as it becomes evident in GPEI documentation that the GPEI has opened up to other global agencies and new actors precisely because of political deadlock within the GPEI on the introduction of IPV. As a number of independent experts/scientists became ever more frustrated with prolonged discussions on the IPV policy in the GPEI, they urged the partnership to consider closer collaboration with GAVI in order to be able to introduce combined OPV/IPV vaccinations in a consistent and comprehensive way (GPEI Independent Monitoring Board, 2012, p. 49; 2013, p. 45).

Opening Up to Powerful Contenders in the Vaccine Area: Collaboration between GPEI and Global Alliance of Vaccines and Immunizations— Following the recognition that GPEI had failed to reach its ambitious goal of complete eradication of polio and the acknowledgment that new vaccines and vaccination plans were necessary to achieve eradication, GPEI opened up to powerful contenders in the vaccine field—it needed both material (financing) and immaterial (expertise) resources from GAVI and the Gates Foundation. After the Gates Foundation had "entered the (Polio) picture as a major donor" and provided around \$450 million to GPEI between 2010 and 2012, it was recognized first as a quasi-official fifth partner of the GPEI, reflected by the fact that it is often mentioned alongside the other four partners ("...", and the Gates Foundation") in GPEI documents. Since 2016, the Gates Foundation has been officially included as a fifth partner in the GPEI.

Since roughly 2011, the GPEI has intensified its interorganizational relationships with GAVI, engaging in a continuous negotiation process with GAVI that culminated in a formal cooperation between the two organizations in 2014. In its 2011 report, the IMB encouraged the GPEI governing board to cooperate more closely with GAVI in order to "close the funding gap," noting the many synergies between the two organizations (GPEI Independent Monitoring Board, 2011b, p. 22). The need for closer collaboration with GAVI resulted from the circumstance that the cost-effectiveness of the OPV (Barrett, 2004) that was still undisputed in the early 2000s was challenged by medical, virological, and epidemiological evidence—and

that the change to a worldwide roll-out of IPV or combined OPV/IPV was calculated to be an effective but very costly endeavor. However, there was also openness on the part of GAVI itself toward being more closely involved in the polio endgame, and this openness manifested itself particularly in 2012 when the polio endgame strategy was debated and a window of opportunity for stronger engagement in a new polio strategy opened up for GAVI. GAVI was anticipating that engagement in polio could “attract new donors” and positively reflect on the alliance as investments could increase coverage and save more lives. Most importantly, becoming a partner in an endgame strategy and potentially contributing to a historical success (similar to the eradication of smallpox) would potentially imply a boost in legitimacy for the Alliance and attract even more donors and donations (GAVI Alliance, 2012).¹⁹ GAVI's decision to collaborate with the GPEI implied a major policy shift for GPEI, inasmuch as the GPEI agreed on the prioritization of routine immunization (RI) strengthening as a strategy against polio. However, GAVI's mission was also affected since the focus on a single disease constituted a deviation from GAVI's focus on RI and health systems (World Bank Group, n.d.). Accordingly, GAVI and GPEI started their close collaboration in 2013, focusing on interagency coordination, the strengthening of routine immunization, and the development of a plan for the introduction of IPV.²⁰ The envisaged harmonization between the two GHBOs and the shift in policy priorities by both organizations, however, also required negotiations with GHBOs' donors as, for example, GPEI donors required that polio campaigns be prioritized over routine immunization systems.

GAVI's decision to partner with the GPEI and secure funding for the introduction of the expensive IPV was meant to create a complementary synergy between the two organizations (World Bank Group, n.d., pp. 29–30). However, as is evidenced in documentations of discussion within GAVI, the potential cooperation with the GPEI was also seen as an “opportunity for GAVI to maintain its position as the global agency focused on immunisation” (GAVI Alliance, 2012, p. 5) while, at the same time, the GAVI board emphasized that the main responsibility for polio eradication was clearly in the hands of the GPEI.²¹ Relaxing the boundaries between the two organizations for GAVI thus was motivated by the incentives of a potential gain in authority and centrality of the organization while still sharing responsibility with the GPEI. In this effort to renegotiate the boundaries between the two organizations, a number of areas of programmatic overlap between the two organizations were identified: “(a) strategic planning (b) advocacy, communication and social mobilisation (c) programme monitoring, and (d) disease surveillance” (GAVI Alliance, 2012, p. 7). In particular, positive synergies were expected where both organizations already had a strong field presence (before all in the two endemic countries Pakistan and Afghanistan).

The growing interest of both GHBOs—GPEI and GAVI—in strengthening their interorganizational ties has resulted in ongoing efforts to renegotiate their respective spheres of authority. While the GPEI-IMB recommended that the GPEI should include GAVI as its sixth core partner, the executive board of the GPEI considered “close ties” rather than partnership with GAVI a better option in order to ensure its decision making remains effective. The GPEI thus anticipated that making GAVI a partner in polio eradication would entail even more conflicts among partners and political controversies over the appropriate polio strategy. However, cooperation

between GPEI and GAVI was strengthened through the creation of new advisory bodies. Among these the Immunization Systems Monitoring Group (IMG) of the GPEI is particularly interesting as it was established in 2013 with the main responsibility to manage and coordinate partners' activities in the introduction of IPV and the withdrawal of OPV. Here, for the first time, GAVI is included in the group of representatives constituting the IMG, alongside the core partners of the GPEI. The creation of the IMG must be considered a strong indicator for the institutionalization of cooperation between the two GHBOs and a core component of the two organizations' strategy to manage their boundaries and interorganizational interactions.

Global Health Boundary Organizations, Expert Networks, and Organizational Environments— Looking at the professional background and the various roles of senior officials at GPEI, it is apparent that these individuals have operated on the boundaries between the global partnership, international organizations, and scientific institutions. They form expert networks located between global policy making and the scientific “polio” community, which must be seen as the primary terrain for negotiating the boundaries of authority between different GHBOs. In the polio case, there are a number of individuals—such as Steve Cochi, Senior Adviser at the Global Immunization Division at the Centers for Disease Control and Prevention or Hamid Jafari, Director of the GPEI²²—who build the backbone of the global polio regime. By way of their professional background and employment history as well as their interactions with various global agencies they embody the threshold between politics and science as well as between different GHBOs. The career pathways of these two central figures in the international effort to eradicate polio are emblematic for global health generally where leading policy makers often rotate between international organizations such as UNICEF, UNAIDS, or WHO and newer public–private partnerships such as GAVI and the Global Fund. Thus, for example, the GAVI managing director for country programs, Hind Khatib-Othman, has moved from the Global Fund to UNAIDS to GAVI between 2004 and 2012.²³ Hamid Jafari, Director of the GPEI, has moved back and forth between WHO and the CDC throughout his career. Others, such as Steve Cochi, have occupied different positions within the same organization—in this case, the CDC—for considerable time, but served as advisors to numerous international organizations and programs. These individuals have collaborated with each other in numerous ways, not last by publishing coauthored scientific publications on polio. They thus form a very tight expert network that spans multiple GHBOs. As this paper constitutes the very first attempt to explore boundary politics in the case of polio, it cannot provide an exhaustive mapping of the interactions between these experts. Nevertheless, scientific publishing activities between the persons mentioned above, the relative epistemic authority in the field of polio as well as the institutional affiliation of individuals most cited in relation to polio eradication, strongly suggests that the GPEI partner institutions as well as the high-level experts working for them are at the center of that network with very tight interactions.²⁴ Muraskin's (2012) historical study of the origins of the GPEI and the politics surrounding the global eradication effort also concludes that the literature on polio eradication has been largely generated by the global polio eradication campaign itself (p. 2)

The central figures in global polio eradication are also associated with the most influential advisory group on immunization—the SAGE—whose recommendations on

polio heavily influence the official recommendations of the WHO. The SAGE recommendations must also be seen as the main driver for a policy change in WHO toward including at least one dose of IPV in the recommended polio vaccination plan until OPV can be entirely abandoned for IPV (as is the standard in all developed countries of the world today). SAGE is a very large advisory group whose members come from national research institutions, think tanks, or nongovernmental organizations. However, this core group of members is surrounded by a large circle of individuals/experts who work in senior advisory or executive positions in the most important international agencies for polio eradication: GAVI, WHO, GPEI, Gates Foundation, UNICEF, and the CDC. SAGE thus includes representatives of all partner organizations of the GPEI as well as representatives of the broader organizational environment of the GPEI. Among the list of “other participants” in the SAGE meetings, representatives of GAVI by far outweigh representatives of any other agency.²⁵ Even though the numerical weight of GAVI representatives cannot tell us anything about their influence on the discussion and decisions, it still gives an indication of how much importance GAVI attributes to SAGE and its interests in observing and influencing its actions. SAGE also includes a SAGE Polio Working Group which holds regular meetings alongside the general SAGE meetings in Geneva. Thus, even where organizational boundaries between GHBOs are intact—such as between GAVI and the GPEI—a closer look at the multiple interactions between executive staff and associated experts suggests that the interactions between these two GHBOs are much denser and that scientists working across these two institutional contexts yield considerable power over outlining the spheres of authority of the two organizational units.

The interactions between different GHBOs described above have been influenced by developments in the broader organizational field surrounding the global polio eradication campaign, most notably the emergence of global norms on “donor coordination” and “interagency harmonization” (Holscheiter, 2015; Holscheiter, Bahr, & Pantzerhielm, 2016) as well as the discernible shift in global health policy from vertical, disease-specific interventions to horizontal health systems strengthening (HSS). These developments have influenced both the GPEI as well as GAVI and measured by their recent strategies and their funding allocations, the two organizations have committed themselves to both harmonization and HSS.²⁶ The increasing attention to HSS both on a programmatic and funding level has affected discussions on polio eradication inasmuch as the contemporary debate emphasizes the integration of polio vaccination in routine immunization strategies. This integration has necessitated a revision of conventional polio strategies and considerably heightened the need for synchronization among international and domestic agencies working on individual diseases and vaccinations.

Discussion: Fragmentation in Global Polio Governance and Global Health Boundary Organizations

What the case study discussed above makes abundantly clear is that *fragmentation*, i.e., a proliferation in the number of actors and rule-systems pertinent to a specific issue area or problem, makes demands on GHBOs to increase their boundary management. However, as the polio case suggests, explaining the fragmentation dynamic

is not a straightforward affair. First of all, the polio case confirms the hypothesis that GHBOs engage in the relimitation of their boundaries. This is clearly exemplified by the decision of GAVI to engage in the “polio endgame.” Initially, this overlap provoked a reaction of tightening boundaries, particularly by the GPEI, which suggests that its dependence on donor support created the need to underline the GPEI's unique leadership position. What the case study thus implies is that, at least in the initial stages of fragmentation, the competitive dynamic prevails.

However, an analysis of the continued interactions between different organizational units operating in the same issue area reveals that at least in the multiple advisory committees and groups the boundaries between GHBOs are not as neatly drawn as they might appear at first sight. The composition of these bodies and the lists of participants for their meetings suggest that the interorganizational dynamics between GHBOs amount to “mock competition” as the majority of polio experts participate across different institutional contexts. These findings imply that the longer different GHBOs in the same policy domain exist, the more interorganizational competition wanes as historically older GHBOs (such as the GPEI/WHO) renegotiate their spheres of authority and GHBOs that have newly entered the field adapt to norms and rules of the organizational field. H1 is thus partly validated by the polio case study—the conclusions drawn here, however, point to the necessity to analyze how the fragmentation *process* affects GHBOs rather than seeing fragmentation merely as a condition of global governance. The case study clearly shows that fragmentation dynamics require GHBOs to enhance their hybridity management and require intricate processes of managing boundaries not only between politics and science but also between different political organizational units.

With regard to the subhypotheses H1a, H1b, and H1c, the polio case study confirms the expected responses of GHBOs to fragmentation. The challenges that the GPEI confronted with stagnating success in the early 2000s coupled with its increasing vulnerability due to the massive resources projected for the endgame strategy provoked a change of mind with regard to cooperation with GAVI in 2012. Following the recommendations of the IMB, the GPEI POB acknowledged that GAVI could be a vital partner both in terms of the financial resources it could offer as well as with regard to gross obstacles toward harmonization and sharing of data between the two agencies. However, the analysis of the process of rapprochement between the two agencies also shows that while GAVI was a self-sufficient agency in the immunization area for considerable time (including polio as part of its routine immunization strategy), the fact that it was willing to change its strategy on polio demonstrates that it had to adapt to its organizational environment and find more synergistic ways to operate alongside the GPEI, particularly in domestic contexts in the few remaining endemic countries. Overall, the broad policy shift in global health governance toward HSS and the continued implementation of global norms on donor harmonization have created new demands for GHBOs to work toward the creation of “governance architectures” (Holzscheiter et al., 2016) surrounding a specific global problem. With regard to H2a and H2b on epistemic arbitrage and the role of experts interacting with GHBOs, the case study suggests—again—that in the initial stages of fragmentation, the coexistence of different GHBOs leads to a stronger politicization of the global issue at stake and therefore to increased opportunities for experts to engage not only in the

“production” of knowledge and facts but also in the interpretation of scientific evidence in the policy-making process. However, at this stage, the interplay between epistemic arbitrage and institutional fragmentation needs further analysis, particularly in terms of studying the influence of different expert networks across GHBOs as well as the behavior of individual experts in different GHBOs.

Conclusion

This paper has addressed how institutional fragmentation in global governance affects GHBOs, the demands it creates for GHBOs’ hybridity management, and the strategies with which they cope with these demands. What needs to be addressed in future research, however, are the aggregate effects of these coping strategies on collective problem-solution, i.e., the outcome of competitive/cooperative dynamics between GHBOs on success or failure of global responses to polio. The paper suggests that there is much to be gained from creating new institutional structures coordinating and harmonizing the actions of GHBOs with overlapping mandates—but that these new structures can easily get out of hand and create more not less demand for hybridity management. Generally, the polio case underlines the need to contextualize the study of GHBOs in terms of their embeddedness in broader organizational fields with their interorganizational dynamics, norms, and rules—particularly in an age where the talk of the day is about the ever-increasing complexity of international regimes.

Notes

1. As an indication of the low profile of health in the study of boundary organizations, an internet search on Google Scholar for “boundary organization(s)” or “boundary organization(s)” and “global health” produces only about 70 hits.
2. Constitution of the World Health Organization, adopted by the International Health Conference held in New York from June 19 to July 22, 1946, signed on July 22, 1946, by the representatives of 61 States (*Off. Rec. Wld Hlth Org.*, 2, 100), and entered into force on April 7, 1948. Amendments adopted by the Twenty-Sixth, Twenty-Ninth, Thirty-Ninth, and Fifty-First World Health Assemblies (resolutions WHA26.37, WHA29.38, WHA39.6, and WHA51.23) came into force on February 3, 1977, January 20, 1984, July 11, 1994, and September 15, 2005, respectively, and are incorporated in the present text. See: http://www.who.int/governance/eb/who_constitution_en.pdf, last accessed March 31, 2017.
3. Formerly the Global Alliance on Vaccines and Immunizations. Other important BOs in international health are, for example, the Global Partnership for Maternal and Newborn Health, the Drugs for Neglected Diseases Initiative, or the Roll Back Malaria Partnership.
4. As reflected in the composition of the GAVI Governing Board or the WHO Executive Board, which consists of 34 “technically qualified persons” designated by a member state serving on the World Health Assembly. Typically, these “qualified persons” are high-level employees of Ministries of Health.
5. In the executive board of the WHO, these are ministers of health who, at the same time, also hold appointments at universities and research institutes. At GAVI, the governing board includes a representative of “research and technical health institutes.” At present, this group of stakeholders is represented by Samba O. Sow, Director General of the Center for Vaccine Development (CVD) in Mali and Professor of Medicine at the University of Maryland School of Medicine; see <http://www.gavi.org/about/governance/gavi-board/members/>, last accessed March 31, 2017.
6. The focus on isolated interactions between (international) organizations is also prevalent in empirical studies on interorganizational relationships, where most analyses have looked at either bi- or trilateral relationships between organizations without taking into account the broader organizational field in which their interactions are embedded.

7. However, despite this overall trend toward fragmentation and complexity, it is still possible to say that some areas (such as HIV) are more complex and fragmented than others (such as hookworm disease).
8. See GPEI, "History of polio," available at: <http://www.polioeradication.org/Polioandprevention/Historyofpolio.aspx>, last accessed March 31, 2017.
9. See GPEI, "History of Polio," available at: <http://www.polioeradication.org/Polioandprevention/Historyofpolio.aspx#sthash.8RCdz1Qm.dpuf>, last accessed March 31, 2017.
10. The Recommended Immunization Schedule of the Advisory Committee on Immunization Practices/CDC suggests that the first immunization should be given at the age of two months. See: <http://www.cdc.gov/vaccines/schedules/hcp/child-adolescent.html>, last accessed March 31, 2017.
11. WHO, Factsheet on Poliomyelitis, available at <http://www.who.int/mediacentre/factsheets/fs114/en/>, last accessed March 31, 2017.
12. See note 11.
13. Nigeria was removed from the WHO list of polio endemic countries in September 2015.
14. GPEI, Polio Cases worldwide, Map 2016, <http://www.polioeradication.org/Dataandmonitoring/Poliothisweek/Poliocasesworldwide.aspx>, last accessed March 31, 2017.
15. See more at GPEI, "Inactivated polio vaccine," available at: [http://www.polioeradication.org/Polioandprevention/Thevaccines/Inactivatedpoliovaccine\(IPV\).aspx#sthash.ijO1hxak.dpuf](http://www.polioeradication.org/Polioandprevention/Thevaccines/Inactivatedpoliovaccine(IPV).aspx#sthash.ijO1hxak.dpuf), last accessed March 31, 2017.
16. See GPEI, Polio Eradication & Endgame Strategic Plan 2013–2018, available at: http://polioeradication.org/wp-content/uploads/2016/07/PEESP_EN_A4.pdf, last access March 31, 2017.
17. See GPEI, "About us," available at: <http://www.polioeradication.org/AboutUs.aspx>, last accessed March 31, 2017.
18. See GAVI, "Contributions and Proceeds to GAVI" (as of March 31, 2017), available at: <http://www.gavi.org/funding/donor-contributions-pledges/annual-contributions-and-proceeds/>, last accessed March 31, 2017.
19. See also presentation by Seth Berkley, CEO of GAVI, to the Strategic Advisory Group of Experts on Immunization, April 1–3, 2014, Geneva, available at: http://www.who.int/immunization/sage/meetings/2014/april/1_SAGE_April_GAVI_Report_Berkley.pdf, last accessed March 31, 2017.
20. See note 19.
21. See note 19.
22. Both with medical (Cochi, Jafari) or public health (Cochi) training.
23. As evidenced by LinkedIn Profiles of senior officials and executive staff of these organizations.
24. Analyzing the Web of Science Database for "polio eradication" (1945–2016) produces 1,225 results. Using the "analyze results" tool of the database several things can be shown: first, the three most cited authors on polio eradication (Roland Sutter, Bruce Aylward, and Mark Pallansch) have worked for most of their professional lives either for one of the GPEI partners (CDC) or at the WHO for the GPEI itself. Second, the Gates Foundation is the leading funding agency for research on polio eradication (5.1%), followed by the WHO and the CDC. Third, the WHO has the largest share of authors with regard to institutional affiliation followed closely by the CDC.
25. See list of participants in 2012 meeting of SAGE, available at http://www.who.int/immunization/sage/meetings/2012/november/Participant_list_SAGE_9_Nov_2012_for_web.pdf?ua51, last accessed March 31, 2017.
26. See GAVI and the "seven behaviors" at <http://www.internationalhealthpartnership.net/en/news-videos/ihp-news/article/the-gavi-alliance-how-it-uses-the-seven-behaviours-327754/>, last accessed March 31, 2017.

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