The Power of Immunization: The WHO and Global Immunization Programs from 1974 to the Present

By

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Abstract

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How do intergovernmental organizations exercise power and how has this exercise of power changed over the last decades? This dissertation addresses these questions through a case study of the WHO's involvement in global immunization programs. It seeks to bridge the gulf between global and local examinations of IGO power by simultaneously exploring the exercise of power at both levels.

This dissertation includes four main empirical studies. The first asks whether global civil society or the society of states has greater influence on the spread of global norms and practices. It employs fixed-effects models to test the influence of IGOs (society of states) and INGOs (global civil society) on immunization coverage with polio, measles, DPT and BCG vaccines for the years 1980-2001. It shows that IGOs have a positive effect on immunization coverage, suggesting that the society of states has a greater influence on the spread of public health norms than global civil society. Further, INGOs have a negative effect on immunization with controversial vaccines, especially in high-income countries. I argue that global civil society's influence on the spread of global norms is particularly strong for controversial issues with ties to transnational social movements, like women's rights and human rights. For less controversial issues strongly associated with the state, like public health, the society of states plays a more important role.

The second analyzes changes in global immunization policy, tracing power dynamics in deciding on policy changes. It assesses whether states or the WHO plays a more important role in determining policy changes through an analysis of WHA debates and by tracing the source of major policy changes. It argues that WHO experts play a particularly important role in determining how immunization policy has changed since the beginning of the Expanded Programme on Immunization in 1974. It further shows how the power to influence policy has shifted dramatically since the mid-1980s with the rise of new supranational coalitions, like the Task Force for Child Survival and the GAVI Alliance. These new coalitions have come to play a particularly important role in determining major policy changes, constraining the WHO's power to act independently on health issues. However, I argue that they represent a change how the WHO exercises power rather than a diminution in its power, per se.

The third study looks at the idea of "health as a human right" as it applies to childhood immunization. In it, I analyze changes in the discourse of responsibility concerning childhood immunization. I show a clear shift from a limited vision, which placed ultimate responsibility for providing immunization on the state, to a vision of shared global/local responsibility which saw immunization as a "right" that both state and global actors had a duty to ensure. Through an analysis of donations to the Voluntary Fund for Health Promotion, I show how changing visions of global responsibility for immunization helped create a new system of shared global/local responsibility for funding immunization programs that relied heavily on long-term, voluntary funding for immunization programs in the developing world. My analysis shows that the EPI had great success increasing donations. However, doing so required constant efforts to maintain donor interest and prevent "donor fatigue," efforts which led to the adoption of increasingly ambitious, and even unrealistic, program goals. Thus, despite increasing actual resources, the WHO's immunization programs came to face a situation of perpetual crisis, with programs facing near constant shortages and funding gaps. I argue that, ironically, the perception of crisis helped sustain needed program funding.

The final study in my dissertation looks at two national immunization programs to examine factors favoring and impeding program success. I use residual analysis to identify states with particularly strong and particularly weak immunization programs, ultimately choosing Malawi (with a particularly strong program) and Cameroon (with a particularly weak program) for comparison. I argue that their divergent experiences arose in part from WHO advisers' lack of consideration of institutional legacies. Especially in the early 1980s, WHO advisers strongly pushed a "primary health care" approach to vaccination that stressed the importance of integrating immunization into basic health services, particularly as part of all-encompassing maternal and child health services, preferably delivered from fixed health centers. This orientation gained ground easily in Malawi, where a heavy missionary presence and a history of government cooperation with missionary health centers had furthered the development of a system of holistic health centers spread across much of the territory. In Cameroon, on the other hand, it contrasted starkly with the existing system, which separated preventive and curative health services, with the later being provided by specialized, mobile "Grandes Endémies" teams. Attempts to reform this system in response to advice from the WHO incited resistance from health personnel on the ground, generally hindering efforts to promote immunization.

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LIST OF ACRONYMS AND ABBREVIATIONS

AFP surveillance	Acute Flaccid Paralysis surveillance
BCG vaccine	Bacillus Calmette-Guérin vaccine
CDC	Centers for Disease Control and Prevention
CVI	Children's Vaccine Initiative
DPT vaccine	Diphtheria, Pertussis and Tetanus vaccine
EPI	Expanded Programme on Immunization
GAG	Global Advisory Group
GAVI	Global Alliance for Vaccines and Immunization, now known as the GAVI Alliance
GPV	Global Program on Vaccination
Hib vaccine	*Haemophilius influenzae* serotype B vaccine
HPV vaccine	Human papillomavirus vaccine
ICC	Interagency coordinating committee
IGO	Intergovernmental Organization
IMF	International Monetary Fund
INGO	International Non-governmental Organization
IO	International Organization
MMR vaccine	Measles, mumps and rubella vaccine
NID	National Immunization Day
NNT	Neo-natal tetanus
OCCGE	*Organisation de coordination et de coopération pour la lutte contre les grandes endémies*
OCEAC	*Organisation de coordination pour la lutte contre les grandes endémies en Afrique Central*
OIHP	*Office International d'Hygiène Publique*
PAHO	Pan American Health Organization
PEI	Polio Eradication Initiative
PHC	Primary Health Care
SAGE	Strategic Advisory Group of Experts
UN	United Nations
UNICEF	United Nations Children's Fund
USAID	United State's Agency for International Development
VFHP	Voluntary Fund for Health Promotion
WER	*Weekly Epidemiological Record*
WHA	World Health Assembly
WHO	World Health Organization

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CHAPTER 1

INTRODUCTION

In 1974 the World Health Assembly[1] (WHA) passed a resolution starting the Expanded Programme on Immunization (EPI). The resolution recommended that all World Health Organization (WHO) member states "develop or maintain" immunization programs against diphtheria, pertussis, tetanus, measles, poliomyelitis, tuberculosis and smallpox.[2] The resolution came at a time when the world was excited about the possible health advantages of immunization. The WHO's long-running smallpox eradication effort was reaching its final stages: the last case of smallpox would occur in 1977 and the organization would declare the disease eradicated three years later (Fenner et al. 1988). At the time, smallpox vaccination was widespread, but vaccines against the other target diseases were little used outside of the developed world. In its *Proposed Programme and Budget Estimates* the WHO highlighted this discrepancy, noting:

> The infectious diseases of childhood (diphtheria, whooping-cough [pertussis], tetanus, poliomyelitis, measles) are good examples of diseases for which immunization is available but where the means necessary to apply it effectively have not been sufficiently developed... In this connexion, smallpox is an exceptional case of eventual success.[3]

No reliable estimate of vaccination coverage to protect against the six diseases originally targeted by the EPI existed at the time. However, as seen in Figure 1.1, below, coverage increases since 1980, when the first reliable statistics are available, are impressive.

[Figure 1.1 around here]

The WHO and the United Nations Children's Fund (UNICEF) estimate that global vaccination coverage was 13% for measles vaccine, 16% for BCG vaccine (against tuberculosis), 17% for DPT vaccine (against diphtheria, pertussis and tetanus), and 18% for polio vaccine in 1980. In 2011, they estimate that coverage was 83% for DPT vaccine, 84% for measles and polio vaccines, and 88% for BCG vaccine (WHO/UNICEF 2012)

Today, the WHO estimates that two to three million deaths are prevented each year thanks to vaccination. By any measure, the EPI has been a success. Furthermore, over the years the WHO and its allies have begun many additional immunization programs, including new disease-targeted campaigns like the Polio Eradication Initiative (PEI) started in 1988, new vaccine research efforts like the Children's Vaccine Initiative

[1] The WHA is the annual meeting of delegates from the WHO member states that has supreme governance power over the WHO.
[2] 1974. WHO Expanded Programme on Immunization. WHA27.57.
[3] 1974. Proposed Programme and Budget Estimates for the Financial Year 1 January-31 December 1975. Official Records of the World Health Organization No. 212.

(CVI) begun in 1992, efforts to introduce new vaccines to the EPI, and, more recently, attempts to better coordinate all these goals and programs through the creation of the Global Alliance for Vaccines and Immunization (GAVI) in 2000.

Immunization programs' success has depended on sustained efforts to develop vaccination programs suitable for developing countries and vast changes in thinking about global responsibility for child health in general and childhood vaccination in particular. The WHO has needed to garner substantial international support and to work closely with a growing international alliance of actors interested in child health, including other international governmental organizations (IGOs), like UNICEF and the World Bank, national development agencies like USAID (US Agency for International Development), international charities like Save the Children and Rotary International, and major philanthropic foundations, like the Bill and Melinda Gates Foundation.

These efforts also straddle a difficult period for the WHO. Member states froze the WHO's regular budget in 1982, which created financial difficulties compounded by unpaid contributions from the US, which decided to withhold its contributions to the regular budget starting in 1985, and former Soviet states. The budgetary problems of the 1980s were followed by a leadership crisis in the 1990s, under the leadership of Director-General Hiroshi Nakajima from 1988 to 1998 (for an overview of these difficulties, see Brown et al. 2006; Godlee 1995). Despite these difficulties, vaccination coverage continued to increase and fatalities from vaccine preventable disease to decrease. How? How has the WHO had the power to change national-level practices? And how has this exercise of power changed over the last several decades?

This is the central question driving the studies presented here. The various studies in this dissertation show, first, that intergovernmental organizations, like the WHO, do have a measurable impact on vaccination coverage. In other words, they do affect national practices. Two case studies of immunization programs in Cameroon and Malawi make the extent of this influence very clear: both countries paid extraordinary deference to the advice of WHO experts, sometimes drastically changing government organization and practices in order to follow their dictates. However, national case studies shed little light on the WHO's influence on the global scene. Two studies in my dissertation explore this question: the first looks at the development of global immunization policies and the second at global discourses of responsibility for immunization and their funding implications. While neither can definitively show the WHO's power over states, both highlight the growing influence of international and global-level actors. The first shows the key role of public health experts and international conferences and panels in establishing global immunization policies, while the second traces the development of the idea of immunization as a global human right, which the global community is responsible for promoting, and the impact this idea had on international funding for immunization.

I begin this introduction with a brief overview of the programs analyzed in this dissertation, some background information on the vaccines used in them, and a brief discussion of relations between the main organizations involved in these efforts. I then review existing theories of IGOs' influence and power. I argue that the current constructivist trend in political sociology and political science offers the best insight into sources of IGO power. The Weberian analysis of Michael Barnett and Martha Finnemore provides particularly important insights into the sources of the WHO's power. However, this perspective misses one important source of power for IGOs: their position outside of

the fracas of interstate politics. Drawing on Simmel's discussion of triads, I explore how this position enhances IGOs' power, and the WHO's power in particular. Bringing these strands together, I discuss what implications the nature of the WHO's power has for the development of global health governance. I then discuss the methods I use to explore the working of power in the case of the WHO's immunization campaigns in my dissertation. I emphasize the need to use mixed and historical methods here. Finally, I provide a brief overview of the studies forming this dissertation.

The Programs, the Organizations, and the Vaccines

WHO Immunization Programs: From smallpox eradication to routine vaccination and beyond

The WHO's first major immunization effort was the smallpox eradication campaign, begun in 1959. Over the decades, new initiatives have started and major changes have been made to existing programs. The timeline in Table 1.1, below, indicates when various immunization programs began and when major policy shifts occurred.

[Table 1.1 around here.]

The WHO's smallpox eradication program began when the World Health Assembly, the primary governing body of the WHO, adopted that goal by passing a resolution put forth by the Soviet delegate. The effort initially languished, the victim of Cold War politics[4] and the overwhelming attention paid to the competing malaria eradication effort. It was not until it was clear that the WHO's vast malaria eradication campaign could not succeed that the global community rallied around smallpox eradication. In 1967, the WHO intensified its smallpox eradication efforts with major new backing from the US. Ten years later, the last recorded case of smallpox occurred in Somalia, and three years after that, in 1980, the WHO declared naturally occurring smallpox eradicated.

Many factors converged to enable the success of smallpox eradication: geopolitics, technological innovations,[5] intensive disease surveillance, tactical innovations,[6] excellent leadership,[7] and just plain luck are all credited with making smallpox eradication possible (Fenner et al. 1988). The effort's success was also a major coup for the WHO, whose credibility had been seriously damaged by the failure of malaria eradication efforts, and for vaccination as a whole.

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[4] The USSR's smallpox eradication proposal was a clear response to the US-led malaria eradication effort, which had begun during a period when the Soviet states did not participate in any UN organizations.

[5] Two key technological innovations widely credited with making smallpox eradication possible include heat-stable, freeze-dried smallpox vaccine, which made vaccination in hot climates feasible, and the bifurcated needled, which improved vaccination success rates.

[6] The "surveillance and containment" tactic is also considered a key to smallpox eradication's success. Taking advantage of the vaccine's extraordinary efficacy – it could impart immunity even after someone was exposed to smallpox – this tactic combined extensive disease surveillance, aimed at locating outbreaks as quickly as possible, with quick intervention, vaccinating all potential contacts as quickly as possible, to prevent the spread of the disease and ultimately eradicate it.

[7] D.A. Henderson, head of the WHO's smallpox eradication effort, is widely regarded for his extraordinary leadership on the issue.

The EPI built on the enthusiasm for vaccination engendered by the smallpox eradication program's success. In smallpox eradication's final years, the EPI "expanded" upon the already existing smallpox eradication program, promoting the use of 4 common but underused vaccines worldwide: DPT vaccine (targeting diphtheria, pertussis and tetanus), BCG vaccine (targeting tuberculosis) and polio and measles vaccines. The link between the two programs is clear: the call for such a program appeared in the section of the WHO Proposed Program and Budget dedicated to smallpox eradication, and for the first few years of the program, it occupied the same budget line as smallpox eradication (listed as "smallpox eradication and the expanded programme on immunization").

However, even if the EPI was seen as a logical extension of smallpox eradication, it was also a new kind of program, one that broke with the top-down "vertical" logic of eradication campaigns. Smallpox eradication had called for extraordinary efforts as part of a time-limited global effort to eradicate a single disease. Once eradicated, disease control efforts were no longer needed, and very few people are vaccinated against smallpox today. In contrast, the EPI called for the establishment of routine childhood immunization programs everywhere in the world – programs that would have to be maintained indefinitely.

The EPI's focus on building and strengthening *routine* vaccination services tied it to a new WHO program: primary health care (PHC). Advocated by Halfdan Mahler, Director-General of the WHO from 1973 to 1988, PHC was framed as a new kind of global health program befitting a new era in international health. PHC initiatives were supposed to emphasize a "horizontal" and more holistic approach to health, breaking with the vertical logic of previous major health campaigns like smallpox eradication. They focused on developing basic health services and meeting local demands with locally appropriate technologies. As part of this effort, Mahler advocated the WHO's "Health for All by the Year 2000" campaign – an effort which tied many WHO programs together in pursuit of a broad, holistic view of health.

This tension between vertical and horizontal and between specialized and integrated programs has marked the entire history of the WHO's immunization efforts. After its initial link with smallpox eradication, the EPI was tied to the WHO's PHC effort and its "Health for All by the Year 2000" campaign. As part of that campaign, the EPI adopted the goal of achieving Universal Childhood Immunization by 1990. From the time the program adopted that goal, in 1977, until the mid-1980s, the program focused on raising vaccination coverage broadly and on promoting immunization as part of "integrated," "horizontal" maternal and child health services.

The emphasis on integration began to wane again after the EPI shifted its focus from vaccination coverage in general to reducing the burden of specific vaccine preventable diseases in the late 1980s. In 1986, the EPI first made control of specific vaccine preventable diseases a priority, calling for a new focus on reducing measles, polio and neonatal tetanus. This focus came to dominate the program starting in 1988 and 1989, when the WHO began a polio eradication campaign separate from the EPI, and added polio eradication, neonatal tetanus elimination and ambitious measles reduction targets to the EPI itself.

These new disease reduction targets, along with intensive efforts to meet the 1990 target date for Universal Childhood Immunization, pushed the EPI to be increasingly open to "vertical" tactics. A particularly important "vertical" tactic was the national (or

sub-national) immunization day (NID), an intense, one-day campaign to vaccinate every child in a country with one or more antigens in an effort to quickly raise coverage levels. NIDs involved intense media campaigns, massive efforts from health authorities and the marshalling of extensive community and volunteer support. This tactic proved particularly important to polio eradication efforts, ultimately becoming a cornerstone of that campaign.

In addition to new, more "vertical" disease-focused efforts, the 1990s saw considerable criticism of the EPI for its failure to address two key issues: introducing new vaccines to the program and vaccine research. The EPI's primary purpose was to promote the use of already existing vaccines in the developing world, where they remained underused despite decades of proven efficacy. It did so by directly naming four vaccines that needed to be used everywhere: polio vaccine, measles vaccine, DPT vaccine and BCG vaccine. As a sad irony, this very act made it difficult to add new vaccines to the program by investing these four vaccines with special importance.

As discussed in detail in Chapter 4, the global community came to recognize ensuring children's access to these four vaccines as part of their "duty," and donors were often eager to show their support for children's health through vaccine donations. However, they were less eager to take on responsibility for more, and more expensive, vaccines, creating a general reluctance to add new vaccines to the EPI program. These dynamics meant that adding vaccines to the EPI required considerable pressure, often from outside the WHO, in the 1990s. In 1992, the hepatitis B vaccine was added to the program, thanks to the efforts of the International Hepatitis B Task Force, and a new focus on yellow fever vaccination began. In 1996 another vaccine was added: *Haemophilus influenzae* type B (*Hib*) vaccine. However, no real procedure existed for adding vaccines to the program before the GAVI era.

The CVI, which began in 1990, also came from outside the WHO, with UNICEF playing a particularly important role in supporting the new program. Indeed, as William Muraskin shows in *The Politics of International Health* (1998), organizers of the new program initially tried to keep it entirely independent of the WHO. The CVI called for a focus on vaccine *research*, which had never been a primary focus of the EPI, aiming to help create an ideal children's vaccine: a heat-stable (preferably oral) vaccine that would protect against all six diseases targeted by the EPI in one dose. It also called for greater collaboration with vaccine manufacturers in order to further the development and then distribution of any new vaccines.

Ultimately, the CVI failed both to stay independent of the WHO and to attract large new vaccine research funding, and it ended in 2000 with the creation of a new immunization alliance, GAVI, which united all of the WHO's immunization efforts (except for polio eradication) into a single program. GAVI's creation also streamlined the process for adding new vaccines to programs, although there is still no automatic procedure for doing so. As late as 2005, the WHA failed to agree on a timeline for introducing newly developed vaccines to the program, due in large part to the reluctance of donor nations. Finally, GAVI helped facilitated cooperation between the WHO and UNICEF with regards to vaccination programs.

The Vaccines and the Diseases

Even though the smallpox eradication effort was the predecessor of the WHO's subsequent immunization campaigns, it was very different from the later efforts. Similarly, although the smallpox vaccine was the predecessor of subsequent vaccines, it too is very different from these newer vaccines. Edward Jenner famously developed the smallpox vaccine in 1796 after observing that people who had cowpox were subsequently immune to smallpox. He vaccinated patients with cowpox virus, inducing a mild case of cowpox, in order to protect his patients against the much more deadly smallpox virus.

The smallpox vaccine remained the only existing vaccine for almost a century, until advances in medical science led to development of new vaccines, including Pasteur's famous rabies vaccine, first used in 1885. Unlike the smallpox vaccine, subsequent vaccines were derived from the disease-causing viruses and bacteria themselves. For instance, to make his rabies vaccine, Pasteur weakened (or attenuated) the rabies virus in his laboratory to create a substance that could offer protection from rabies without imparting the illness.

However, Pasteur's vaccine was not a prophylactic vaccine, like the smallpox vaccine. Instead, patients received the vaccine post-exposure to prevent them from developing rabies. In this sense, it was more of a treatment than a preventative health measure. New prophylactic vaccines were not invented until the 20th century, with the first appearing in the 1920s, when diphtheria and tetanus toxoid vaccines and the BCG vaccine (for tuberculosis) were invented. A pertussis vaccine followed in 1939, and in 1948 it was combined with the diphtheria and tetanus vaccines to form the DPT vaccine. The other two vaccines used in the EPI, the polio and measles vaccines, were invented in the 1950s and 1960s.[8] A few vaccines that existed when the EPI began in 1974, including the yellow fever vaccine, invented in 1937, the influenza vaccine, first licensed in the 1940s, and vaccines against mumps and rubella, invented in the late 1960s and combined with measles vaccine in 1971, weren't included in the original program.

The six diseases originally included in the EPI program shared many common features. A safe and effective vaccine imparting long-lasting immunity existed for all six diseases.[9] All were widespread – with many being "childhood" diseases that, prior to major vaccination efforts, were endemic, infecting the vast majority of children and thus rendering them immune to future infection. In addition, all were dangerous, contributing significantly to morbidity and mortality in childhood.

The vaccines that were not included in the EPI were excluded for different reasons. The influenza vaccine did not impart long lasting immunity, which made it inappropriate for the new program. Mumps and rubella vaccines posed a different challenge: low levels of vaccination coverage with either could have worse public health consequences than no vaccination at all. Furthermore, neither mumps nor rubella is especially dangerous for children, but they can be far more dangerous for teens and adults. Rubella is particularly dangerous for pregnant women's fetuses. Public health experts feared that if the two vaccines were included in weak immunization programs,

[8] The first polio vaccine, Salk's killed-virus vaccine, was invented in 1954, while the second, Sabin's attenuated-virus oral vaccine, was invented in 1959. The measles vaccine was invented in 1963.

[9] This was least true for the BCG vaccine, which doesn't offer particularly strong protection against all forms of tuberculosis. However, the vaccine is safe and was already widely used when the EPI began. That, combined with research suggesting that it does offer some protection against some forms of tuberculosis, ensured it a place on the program.

more children would reach adulthood without immunity to the diseases, potentially leading to a greater incidence of the diseases in these vulnerable populations. Yellow fever vaccine was excluded for yet another reason: it did not need to be used everywhere. Yellow fever is spread by mosquitoes, and mosquito control efforts almost eradicated the disease in the early 20th century. It is only a health concern in some countries where "jungle reservoirs" make it impossible to eliminate, and only people who live or travel to those countries need be vaccinated.

Since 1974, many new vaccines have been invented. The first appeared in the 1980s, with *Hib* vaccine and the hepatitis B vaccine. The 21st century has seen even more new vaccines, including the Human papillomavirus (HPV) vaccine, new pneumococcal and meningococcal conjugate vaccines,[10] and a rotavirus vaccine. In addition, new combined vaccines have been developed, including pentavalent vaccines, which add Hepatitis B and *Hib* vaccines to the DPT vaccine. Both new and older vaccine posed a new challenge to the EPI: how and when should the program promote additional vaccines? This question was especially important to address as non-EPI vaccines faced the same problem as the original four EPI vaccines: they remained underused in developing countries despite their clear public health benefits. Special outside efforts were needed to add the first new vaccine, the hepatitis B vaccine, to the EPI program,[11] and internal processes for adding new vaccines to the program only truly developed after the formation of GAVI in 2000.

Even today mere existence is not enough to guarantee that GAVI/the EPI will promote a vaccine. Currently, the WHO has official positions about vaccines offering protection from 23 different diseases/disease-causing agents,[12] and the organization only encourages universal vaccination against nine of them: diphtheria, pertussis, tetanus, rotavirus, pneumococcal diseases,[13] *Hib*, hepatitis B, measles and polio.[14] Considerations remain roughly the same as they were in 1974: the diseases must be widespread (or have been, prior to vaccination efforts) and dangerous, and the vaccine must be safe, effective and offer long-lasting immunity. Thus, pneumococcal vaccines are a high priority, but varicella vaccines[15] are not. In addition, cost is a major concern for some new vaccines. The WHO only recommends use of HPV vaccine if secure financing to assure the

[10] Pneumococcal and Meningococcal vaccines have existed since the 1970s, but they didn't prove effective in infants. However, new conjugate vaccines, made use of pieces of the disease-causing bacteria, solved these problems. Conjugate pneumococcal and meningococcal vaccines were developed in 2000 and 2005 respectively, with improved versions appearing since then.

[11] See Muraskin, William. 1995. *War against Hepatitis B: The International Task Force on Hepatitis B Immunization*. Philadelphia: University of Pennsylvania Press.

[12] They include: BCG, cholera vaccine, diphtheria vaccines, *Haemophilius influenzae* type B (Hib) vaccines, hepatitis A vaccines, hepatitis B vaccines, human papillomavirus (HPV) vaccines, influenza vaccines, Japanese encephalitis vaccines, measles vaccines, meningcoccal vaccines, mumps vaccines, pertussis vaccines, pneumococcal vaccines, polio vaccines, rabies vaccines, rotavirus vaccines, rubella vaccines, tetanus vaccines, tick-borne encephalitis vaccines, typhoid vaccines, varicella (chicken pox) vaccines and yellow fever vaccines.

[13] Including pneumonia and bacterial meningitis, among others.

[14] Four diseases have been added as targets for universal vaccination campaigns since 1974, and one disease, tuberculosis, is no longer universally targeted. Instead, BCG vaccine is now primarily recommended for countries with high TB burdens. Countries with low TB burdens tend to rely exclusively on other TB control measures.

[15] Varicella vaccine protects against chickenpox.

vaccine supply is available, and currently GAVI only supports some pilot programs experimenting with the introduction of this particularly expensive vaccine.

In addition to promoting the universal use of appropriate new vaccines in routine immunization programs, some new efforts are underway to encourage the widespread use of other vaccines where appropriate. The first such effort began in the 1990s, when the EPI called for more widespread use of yellow fever vaccine where appropriate. Since its creation, GAVI has heightened support of that measure. More recently, it has begun supporting meningitis A vaccination programs in African countries particularly affected by epidemics of that disease.

In contrast to the increased emphasis on yellow fever and efforts to introduce many new vaccines, global actors have remained reluctant actively to promote rubella and mumps vaccination, despite the relatively widespread use of the MMR vaccine. While two regions (the Americas and Europe) adopted major rubella control initiatives in the late 20th and early 21st centuries, continued worries about provoking a greater incidence of rubella in pregnant women (and thus causing the very problem rubella vaccination is primarily meant to address) has kept rubella vaccination from being a global priority until very recently. The WHO and GAVI only embraced a global rubella initiative in 2011.

Organizations and Immunization

The WHO played a major role in all of the efforts discussed above, but in no case was it the only organization involved. From the EPI to GAVI, global immunization efforts have brought together a large array of interested organizations, including IGOs, like the WHO and UNICEF, international non-governmental organizations (INGOs), like Save the Children and Rotary International, charitable foundations, like the Bill & Melinda Gates Foundation, governments of donor countries and their foreign aid organizations, like USAID and SIDA (the Swedish International Development Cooperation Agency), governments of the developing countries that received this aid, and vaccine manufacturers themselves.

All of these organizations have different, and even competing, interests in childhood immunization programs. Some are obvious, such as tensions between aid-giving and aid-receiving countries or potentials for conflict with vaccine manufacturers, who seek a profit, and the program as a whole, which seeks to contain costs as much as possible in its quest to make immunization more accessible. Chapter 4 examines one of these major differences: tensions between aid-giving and aid-receiving countries and the development of an agreed upon norm of global responsibility for childhood immunization. Here I briefly discuss relations between the major intergovernmental organizations involved in childhood immunization, with a particular focus on the WHO's relationship with UNICEF and the World Bank.

Intergovernmental organizations are famous for their infighting and turf wars, and those involved in childhood immunization are no exception. The WHO has often feared that another UN organization would take over its mandate and render it obsolete. Yet it remains the key player not only in childhood immunization but in global health more generally. Two organizations with which the WHO has had a particularly tense relationship are the World Bank and UNICEF, both of which have an active interest in

global health, and both of which have considerably more financial resources than the WHO.

As Nitsan Chorev discusses in her book, *The World Health Organization between North and South* (2012), the World Bank threatened the WHO's leadership in health in the 1990s. During the same period, UNICEF directly challenged the WHO's leadership on childhood immunization by spearheading the CVI (Muraskin 1998). Chorev argues that the World Bank's challenge to the WHO's leadership on health arose as part of a larger challenge facing the WHO: the neoliberal turn in global politics. Yet, the WHO was able to adapt to these challenges thanks to the strategic leadership of Director-General Gro Brundtland. While the WHO's leadership position is not the same now as it was before the neoliberal turn, it remains the key player in global health thanks to its strategic adaptation to changes in the global climate.

By spearheading the CVI, UNICEF posed another sort of challenge to the WHO: it directly challenged its leadership on childhood immunization. UNICEF and the WHO have worked together on various health projects since their creation. UNICEF became a major partner in the EPI campaign in the early 1980s, when it began playing a key role in helping developing countries procure high-quality vaccines at reasonable prices through its vaccine procurement services. However, UNICEF and the WHO have not always agreed on the best strategies or objectives for the EPI and for childhood immunization in general. As Muraskin shows in *The Politics of International Health* (1998), the early 1990s saw particularly intense conflict between the two organizations. UNICEF wanted the EPI to focus more on vaccine research, and particularly on efforts to develop vaccines better suited to conditions faced by immunization programs in developing countries. Faced with the WHO and EPI's reluctance to embrace this goal, UNICEF pushed for the creation of a new "Children's Vaccine Initiative" that would be independent of the WHO. Ultimately, the CVI was not able to maintain independence from the WHO, and the program had a difficult time attracting the external funding it needed to realize its goals. The program ended in 2000, when it was replaced by GAVI, which was designed to promote coordination and cooperation between the WHO and UNICEF on immunization issues.

These frequent inter-organizational tensions and conflicts are hardly unique to global health organizations. For example, the tense relationship between the International Monetary Fund (IMF) and World Bank is well known. Commentators often point to the cultural differences between those two organizations to explain their frequently tense relationship: the IMF is traditionally headed by a European citizen, whereas the head of the World Bank is traditionally American. Similar tensions may mark relations between the WHO and UNICEF. The WHO has its headquarters in Geneva, Switzerland, whereas UNICEF's are in New York. In addition, all six of UNICEF's Executive Directors have been American, whereas no American has ever headed the WHO.[16] However, the directors of the EPI and other WHO immunization programs, including the EPI's first director, Ralph Henderson, have often been American, suggesting that cultural differences are not the only reason for these recurrent tensions.

[16] However, WHO Director-Generals have not been exclusively European either. The eight Director-Generals have all come from different countries and from various regions. Chrisholm was Canadian, Candau Brazilian, Mahler Danish, Nakajima Japanese, Brundtland Norwegian, Lee Korean, Nordström Swedish and Chan Chinese.

Instead, a basic characteristic of all bureaucratic organizations may explain both the recurrent tensions between international organizations and why, despite these tensions, certain organizations have such a long history of cooperation. As Weber taught us, modern bureaucracies have fixed jurisdictions (Weber 1978), and they jealously guard these jurisdictions from others' interference. However, where organizations' mandates overlap, "interference" is often inevitable. The WHO, charged with promoting health, and UNICEF, charged with protecting children's rights and promoting their welfare, both have a clear role to play in childhood immunization. However, their basic missions and expertise are different, and these differences manifest themselves in the two organizations' different roles in promoting childhood immunization.

The WHO, as a global public health organization with considerable medical and public health expertise, has played a key advisory role in determining desirable and feasible goals and in advising countries on how to best carry out national immunization programs. UNICEF, as a humanitarian organization focused on children's rights and welfare, has been very active ensuring that countries have the necessary means to realize these goals and enact these recommendations. It plays an active role in the field in developing countries and in vaccine markets and purchasing through its vaccine purchasing services. It also plays a much larger funding role than the WHO, which has far more limited funds than expertise.

Inasmuch as UNICEF does not possess the necessary technical expertise to advise national programs and to adjudicate between various possible program goals and tactics, it needs the WHO to meet its goal of promoting children's health. Similarly, inasmuch as the WHO cannot meet countries funding and vaccine supply needs and does not have the field experience to help national programs on a daily basis in the field, it also needs UNICEF. Furthermore, should either organization forget its interdependence with the other, member states – the group that ultimately governs both organizations – will remind them. Member states often called on the WHO and UNICEF to cooperate on immunization programs during the annual meetings of the WHA. Similarly, Muraskin reveals that member states' insistence that the WHO be included in the new CVI program, as much as the WHO's own efforts to prevent such an outcome, kept the CVI from being independent of the WHO, as its creators originally hoped (2005). Similar dynamics help explain why the World Bank could not take over the WHO's health mandate, despite having much greater financial resources than the WHO. While the World Bank may see investment in health as part of its development mission, it does not have the expertise in public health and medicine that would allow it to carry out work in this area alone.

Power and the World Health Organization

Traditionally, political sociologists think of states as autonomous, sovereign units, little influenced by external pressures. This image of states has been subject of many critiques, from Wallerstein's world-systems analysis to the real-politik, bellicist accounts looking at how states use their military might to influence one another. Such accounts point to two sources of power over states: economic and military resources. However, the

WHO, like many IGOs,[17] relies on neither: it has no military and little economic resources of its own. This makes its success increasing vaccination coverage worldwide even more puzzling. How can an organization that lacks traditional sources of power, like the WHO, influence state behavior?

One major theory that could account for this influence is John W. Meyer's world society theory.[18] According to Meyer, international organizations affect state practice through a process of institutional isomorphism: in states' general quest for survival and stability, they seek legitimacy through adherence to broadly accepted rational "myths," especially those perpetuated by international organizations like the UN. This perspective sees the UN and its subsidiary organizations, like the WHO and UNICEF, as the main movers behind the creation of a rationalized world society, in which all states are converging around a relatively uniform form with relatively uniform commitments and values – the modern, democratic, liberal nation state (for a broad overview, see Meyer et al. 1997).

World society theory has been applied to many areas of global convergence, from the rise of the nation state itself to education, science, human rights and environmental issues (Cole 2005; Drori and Meyer 2006; Hafner-Burton and Tsutsui 2005; Schofer and Hironaka 2005; Schofer and Meyer 2005; True and Mintrom 2001). However, world society theory is not really a theory of power. It sees international organizations (IOs) as nodes in the diffusion of global norms, not as actors able to exert power in the world. States' connections to these key nodes of diffusion, either through membership in IGOs or through their citizens' participation in INGOs, socialize them to these norms.

Furthermore, Meyer and his associates explain the paradoxical finding that states converge on specific, global norms despite their profound differences in resources, history and culture by drawing on the idea of decoupling. This idea explains the separation often found in formal organizations (including states) between policy (or discourse) and practice. According to this theory, states and other formal organizations often adopt ambiguous and relatively unassessable formal rules and norms while emphasizing individuals' ability to work informally around them. Thus, what states *say* they do and what they *actually* do can often diverge. However, widespread decoupling is not seen in the case of immunization, where changing global norms affected not only state policies (i.e., recommended vaccine schedules) but also state practices (i.e., actual levels of vaccination coverage). Thus, while world society theory may easily explain states' normative support for ambitious immunization and disease reduction goals, it is less able to explain the actual changes in state practices seen since the beginning of the EPI.

When examining domains in which global norms and practices are tightly coupled, such as childhood immunization, questions of power are central. To be successful, global immunization programs need not only to gain support from all countries in the world but also to marshal the resources necessary to sustain such an effort, from vaccines to refrigeration, from medical personnel to medical research. In addition, such efforts require extending the availability of immunization services and

[17] Some IGOs, like the World Bank and the IMF command fairly substantial economic resources, while others, like the UN, have some military powers.

[18] For a more thorough overview of this theoretical tradition, see Chapter 3.

mobilizing populations to convince mothers and other caregivers to immunize their children.

In other words, these global programs need to incite states to develop what Michael Mann calls "infrastructural power."[19] Mann defines infrastructural power as "the institutional capacity of a central state… to penetrate its territories and logistically implement decisions. This is collective power, 'power through' society, coordinating social life through state infrastructures" (Mann 1993 59). This type of power has long interested historical and political sociologists who study the rise of the modern state in Europe (Tilly 1992). These studies place great emphasis on the importance of interstate conflict in inciting states to develop infrastructural power in Europe, yet its development outside of Europe and in the contemporary state system, which involves significantly less interstate conflict, remains understudied. Indeed, most studies looking at this type of power in non-European contexts focus on failures to develop it or its dysfunctions, rather than successes (see, for example Ferguson 1994; Scott 1998). Further, studies of contemporary war show that, far from developing state power, contemporary conflicts tend to weaken states. This makes it even more important to elucidate ways in which infrastructural power has developed in non-European and contemporary contexts.

As the world society literature shows, international organizations play a key role in promoting the development of infrastructural power in countries around the world. However, this literature ignores the power mechanisms that enable IOs to exert this influence. For insight on this question, we must turn to recent work on international relations. Traditionally, international relations scholars have maintained that IOs are not autonomous actors capable of exercising power in their own right. Instead, they have argued that such organizations are institutions created by rationally acting states in order to solve collective action problems.

This perspective follows Max Weber's famous definition of power as "the probability that one actor within a social relationship will be in a position to carry out his own will despite resistance" (1978 53) and of the state as "a human community that (successfully) claims the *monopoly of the legitimate use of physical force* within a given territory" (emphasis in the original 1946 78). IGOs almost never have a monopoly on the legitimate use of physical force and thus are generally incapable of forcing others to carry out their wishes. Further, they are the historical creations of nation states, meant to serve the interests of the latter, which generally maintain final control over policies. For example, the ultimate directing body of the WHO is the WHA, made up of all member states. This body passes resolutions setting WHO policy and approves the organization's biennial budget.

However, more recently, constructivist scholars have taken a new look at IOs, arguing that they can be (semi-)autonomous actors in their own right and that they can exert power over states. In addition to challenging the idea that IOs are not actors, constructivist theories also challenge traditional definitions of power, exploring institutional, structural and productive dimensions of power in addition to more traditional compulsory power (see, for example Barnett and Duvall 2005b). Much of the work in this tradition breaks with the Weberian theories of power, drawing instead on Foucault or Gramsci. However, others look deeper into Weber's work for inspiration. For example, Michael Barnett and Martha Finnemore's *Rules for the World* (2004) provides a

[19] Foucauldian scholars use the terms "disciplinary power" or "biopower" to describe this type of power.

particularly compelling account of how IGOs can be semi-autonomous actors with the power to influence state behavior. Their account draws heavily from three key Weberian ideas: domination, legitimacy and bureaucracy.

If Weber's definition of power places heavy emphasis on compulsion, his definition of domination is much broader. It is "the probability that a command with a given specific content will be obeyed by a given group of persons" (1978 53). This concept receives far more attention in Weber's work than power. Volume two of his massive magnum opus, *Economy and Society* is dedicated almost exclusively to an exegesis of the various types of domination. In it, Weber refines his definition of domination to exclude things like market interactions, arriving at the following definition:

> [T]he situation in which the manifested will (*command*) of the *ruler* or rulers is meant to influence the conduct of one or more others (*the ruled*) and actually does influence it in such a way that their conduct to a socially relevant degree occurs as if the ruled had made the content of the command the maxim of their conduct for its own sake. (946)

Thus, domination becomes synonymous with legitimate domination, or authority (the term preferred by Barnett and Finnemore), in that the ruled perceive it to be their duty to obey, regardless of their personal interests.

Legitimacy makes this type of power possible by providing a rationale for obedience. Weber identifies legal-rational legitimacy as the main type undergirding modern forms of domination, like bureaucracy. He identifies several important characteristics of legal-rational legitimacy and bureaucracy, including its impersonality, formalistic spirit, fixed jurisdiction, hierarchy, documentation, officials with specialized training who treat their administrative duties as a vocation, and written rules (217-23, 956-8).

The emphasis placed on specialization and technical expertise has particular implications for legal-rational bureaucracies' ability to exercise authority. Weber notes that bureaucracy's reliance on technical expertise creates the biggest obstacle to the chief's domination of ruling organizations. In this sense, the bureaucratic officials have a "monopoly of knowledge,"[20] which ironically allows them to dominate their purported chief, despite their lack of access to more material resources. Thus, Weber notes, "Generally speaking, the highest-ranking career official is more likely to get his way in the long run than his nominal superior… who is not a specialist" (224), an assertion he reiterates in his discussion of the power position of bureaucracy (990-4).

Barnett and Finnemore draw heavily on Weber's theories of domination, legitimacy and bureaucracy in their own account of the main bases for IGOs' power (2004; 2005). They contest theories that do not view IGOs as autonomous actors, including utilitarian schools of thought in international relations and in institutionalist schools of thought in sociology (like world society theory). Instead, they argue that IGOs can be powerful actors in the world, thanks in large part to their bureaucratic organization and the legitimacy they hold. In particular, they argue that IGOs are "rationalized liberal actors" (2005 169). They point to three foundations of IGOs' authority: the authority they

[20] Weber remarks: "Bureaucratic administration means fundamentally domination through knowledge" (225).

are delegated from states, their moral authority deriving from their mandate to protect a widely held principle and their expert authority (2005 171-4). This authority enables IGOs to exert three kinds of power: compulsory power (in limited cases) by using material or normative resources to coerce behavior (they particularly point to the use of shaming behavior here); institutional power through their agenda-setting and classification powers; and productive power through defining problems that need to be solved and crafting solutions to those problems (2005 175-81).

This perspective can explain much of the WHO's influence over global immunization practices since the 1970s. As Chapter 3 shows, the WHO was able to keep control over the agenda for global immunization throughout the 1980s and 1990s, first through the review and recommendation activities of its Global Advisory Group (GAG) and then through the Strategic Advisory Group of Experts (SAGE). Further, any weakening of the WHO did not strengthen nation states so much as international conferences of experts, like the conferences on polio, measles and neo-natal tetanus held in the mid-1980s, and new supranational groups, like the Task Force for Child Survival, founded in 1984 or GAVI, founded in 2000. Further, as seen in Chapter 4, this influence had a significant effect on agreed-upon global norms of responsibility for child health. This change is seen not only in the substantive content of agreed-upon norms (which shift from one emphasizing primary state responsibility to one emphasizing shared global responsibility) but also in funding and donation practices. The WHO's influence is even more apparent in the analyses of EPI programs in Malawi and Cameroon found in Chapters 5 and 6. There we see the extraordinary deference local officials paid to WHO recommendations.

Nevertheless, the theory leaves one lingering question: why do states invest IGOs, like the WHO, with so much legitimacy? While the WHO certainly is a bureaucratic organization with a highly respected expert staff, it is not the only such organization in the world. Indeed, neither IGOs in general nor the WHO in particular has experienced whole-hearted global support in recent decades. Challenges to the WHO included the freezing of its regular budget in the 1980s and the subsequent rise in the importance of extra-budgetary funding (over which the organization itself has less control) and the controversies of the Nakajima years in the 1990s, when then-WHO Director-General Nakajima faced significant criticism.

In her book, *The World Health Organization between North and South* (2012), Nitsan Chorev explores these limits to WHO's power and how the organization adapts to them in order to maintain its influence on the global stage. She looks at the WHO's response to two major changes in global politics, the new economic order of the 1970s and the neoliberal turn of the 1990s. Both changes posed challenges to the WHO, obliging it to adapt to a changing global climate. However, Chorev argues that this adaptation was "strategic" – the WHO did not simply follow the demands of new nation states, in the first case, or major donor countries in the second. Instead, it responded to this pressure to create new global health strategies. In the 1970s, Director-General Halfdan Mahler played a key role in this adaptation by inaugurating the WHO's new Primary Health Care program and its "Health for All by the Year 2000" campaign. At the turn of the millennium, Director-General Gro Brundtland oversaw a similar major program shift, responding to the neoliberal turn by emphasizing the links between health

and economics development and by inaugurating a new openness to working with the private sector.

In a series of books on various global immunization efforts, including the International Task Force on Hepatitis B Immunization (1995), the CVI (1998) and GAVI (2005), William Muraskin offers a different picture of the challenges to the WHO's power and influence over global health. His research reviews multiple global efforts that often placed organizers at odds with the WHO. His studies paint a detailed picture of the internal politics behind many recent efforts to promote childhood immunization, and they also show many challenges to both the WHO's legitimacy and its global power. Yet, in each account the WHO ultimately plays a vital role, ensuring either the success or failure of the various initiatives. His discussion of the CVI is particularly interesting, as this initiative originally sought to be independent of the WHO. In Muraskin's account, its failure to achieve this independence and its failure as an initiative are largely synonymous. The initiative was ultimately abandoned and replaced by GAVI in 2000, but GAVI never sought independence from the WHO, instead making a concerted effort to include that organization as a key player from the very start.

Muraskin's accounts show that the WHO's leadership role in global health has been contested. Yet they also show how important support from the WHO has ultimately been for global health efforts. Inoue and Drori's article, "The Global Institutionalization of Health as a Social Concern" (2006) also highlights the WHO's central position in global network of international health organizations. In their article, they look at health from a world polity perspective, exploring the broad orientations in IOs concerned with health and links between them. They note:

> [The] network of health-related international organizations is tightly woven, with only three or four central organizational nodes, most pronouncedly centered around the WHO. (206)

As with Muraskin's accounts, the WHO's central position in the network of health IOs underscores its influence in global health. Yet, as with those accounts, it does not explain why the WHO has such influence.

To better appreciate the sources of IGO power we must draw not only Weber but also Simmel. In other words, IGOs are not only expert-driven bureaucracies benefiting from legitimacy, but they also occupy a particular place in global society from which they derive power. Simmel's analysis of the triad is particularly helpful in elucidating how IGOs' position may endow them with power (Simmel 1950). Simmel's analysis of group size and its social implications is a key inspiration for contemporary network analysis and has been applied to analyses of relationships between individuals, organizations and states. Here, organizations including both IGOs and nation states are the relevant social units, and I explore implications of Simmel's analysis of the triad.

Simmel argues that society begins with the triad because a sense of a social other (society) separate from unique individuals is only possible in groups of three or more people. He goes on to analyze a series of triadic power relations, including the mediator, the *tertius gaudens*, and divide and conquer. The mediator's role in a triadic relationship is most similar to the role generally played by IGOs. Nation states originally created the vast majority of IGOs specifically to help mediate interstate relationships and resolve or

avoid potential interstate conflicts. Mediating interstate conflicts is the main activity of some IGOs, like the WTO. The WHO plays a smaller mediation role: its primary duties involve facilitating the spread of important health information to and between states and advising states on health matters. However, in this role, too, we see the emphasis on the mediating and arbitrating role.

IGOs' primary roles as mediators, distributors of information and arbitrators is why many neo-realist international relations scholars do not consider them actors in their own right, instead arguing that they are institutions created by states to overcome collective-action problems. World polity theory holds a similar perspective, seeing them as diffusers of global norms. However, as Simmel reveals, the mediator holds a position of power: other social actors invest the mediator with the power to decide points of dispute between the other two (or more) parties. The position is a delicate one: the mediator must be both interested enough to play the role and disinterested enough to be non-partisan. This condition being met, the mediator has considerable power to influence other parties in the network and even to arbitrate disputes.

The mediator holds a position of power, but it is limited. Mediators help decide points of contention, but have little independent initiative of their own. In contrast, the *tertius gaudens* benefits from conflict between other (often more objectively powerful) parties to realize their own independent goals. IGOs often find themselves in this happy position as well: they were created by nation states to help them overcome their intractable conflicts, but they can benefit from this very conflict to pursue their own agendas.

The WHO, as with all IGOs forming part of the UN system, was created at the beginning of the Cold War, and this conflict marks much of its history. Although interstate conflict has been less intense in the post-Cold War era, it has not gone away. Persistent conflicts still exist between, for example, donor countries and aid-receiving countries, the United States and Europe, and the developed and developing world. These conflicts give the WHO more power to influence global health agendas than otherwise warranted by its limited resources. As Simmel notes, the *tertius gaudens* benefits from a privileged position as long as the main parties (in this case, nation states) do not unite against it. Although this has happened – for example, when WHO member states froze the regular budget in the 1980s – it is a fairly rare occurrence, especially where global health policy itself is concerned. Instead, any accord generally requires the WHO's assent, even when the organization does not play a key role in creating a program.

Disease eradication policies, which are discussed in detail in Chapter 3, highlight this dynamic particularly well. The EPI was inspired and built on the success of the WHO's smallpox eradication program. However, it assiduously avoided any focus on disease eradication for its first 14 years, until the beginning of the PEI in 1988. During that time, various member states regularly called for new eradication programs, but the WHO Secretariat resisted such calls. Further, facing increasing pressure for such programs, the Secretariat laid out specific criteria that needed to be met before it would consider beginning a new eradication program, including successful regional disease elimination programs. It was not until these criteria were met that the WHO accepted the polio eradication program.[21]

[21] This major change in focus was also accompanied by a change in WHO leadership, from Halfdan Mahler to Hiroshi Nakajima. Mahler was notably uninterested in disease eradication, instead making primary

We must combine these Weberian and Simmelian theories of power to appreciate how IGOs like the WHO can exert power over areas of interest to them. First, the very situations leading to their creation put them in a potentially powerful position. Created to resolve intractable interstate conflict, they can profit from that very conflict the further an agenda very different from what those states might have wanted absent the IGOs' influence. To exert this power, they must maintain a credible position as non-partisan actors separate from the endless conflicts between nation states. This perceived neutrality is a fundamental requirement for them to maintain their influence. However, neutrality is not enough: it is reinforced by expertise and bureaucratic organization.

The bases of IGOs' power have important implications for how IGOs themselves can be influenced and how that power can be circumscribed. Although nation states can and have challenged IGOs' power directly by, for example, withholding dues or simply leaving organizations, this is not necessarily the biggest threat to IGO power. It can even reinforce their appearance of neutrality if they refuse to alter their behavior in the face of overt pressure from a single nation state. Challenges are much more likely to be effective if they come from groups with as much perceived neutrality and expertise as IGOs themselves. As seen in Chapter 3, immunization policy at the WHO provides an excellent illustration of this. As the EPI program becomes more consolidated, nation states themselves influence policy developments less and less. At first, direction falls on an in-house expert group: the GAG. However, by the mid-1980s new, outside groups gain influence, including the international conferences on specific vaccine-preventable diseases and the Task Force for Child Survival.

The Task Force is particularly interesting here because it represents a new and increasingly influential type of group: supranational coalitions. The Task Force brought together various actors interested in global health, including the WHO, UNICEF, donor-country and aid-receiving country representatives, and representatives from major health NGOs. This system makes various IGOs one among a coalition of partners, including different groups of nation states and other major donors. By doing so, it removes them from their powerful mediator position – a position that the supranational coalition itself comes to play. This model has been widely copied, including by the CVI (ultimately unsuccessfully) and GAVI (more successfully).

Studying Power at the WHO

The study of power is always a complicated affair, especially when we abandon the most restrictive definitions, allowing only compulsory forms of power, for ones that include subtler forms of domination: the institutional, structural or productive forms of power (for a review of the types of power, see Barnett and Duvall 2005a). This task become more complicated when we look at power on the global level, which inevitably entails examination of global-local interactions. These considerations reveal two key methodological questions I must address in this dissertation. First, how can we study power? And second, how can we best combine study at global and local levels?

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health care the cornerstone of his director-generalship. In contrast, numerous disease eradication and elimination programs began while Nakajima was Director-General, including polio, neo-natal tetanus, guinea, leprosy and others.

Asking about power inevitably involves asking about causality, a fraught topic in the social sciences. The surest way to establish causality involves experimental methods with treatment and control groups, like the double-blind trials that are standard in biomedical research. However, such methods are generally impossible in the social sciences. Occasionally, "natural experiments" (where various policy or other political changes mimic experimental methods) may allow quasi-experimental studies, as in Robert Putnam's *Making Democracy Work* (1993). However, examples are few and far between, and those that do exist are often controversial. Clearly, social scientists interested in questions of causality cannot limit themselves to the few situations that could qualify as natural experiments. As a result, researchers have developed other methods to delve into questions of causality, even if no perfect solution has yet been found.

Broadly speaking, most quantitative methods used in the social sciences derive from an attempt to mimic at least some of the benefits of formal experimental research. These methods allow researchers to establish associations between variables, controlling for various confounding factors. However, a truism of all quantitative research is that correlation does not establish causation. An association may exist, but that does not mean that a causal relationship does. Quantitative analyses cannot demonstrate causality without considering time. After all, a cause must precede an effect. Within statistics, various time-series methods have been developed to address this issue. Yet, despite the wealth of sophisticated statistical methods currently available, none provides a completely satisfactory solution (see discussion in Brady 2004).

Quantitative methods are not the only social scientific methods that tackle questions of causality and power. This is also a key concern for many scholars carrying out historical-comparative research. Drawing on a very different methodological repertoire involving process tracing, comparison and counterfactual thinking, historical-comparative theorists have long explored change and the workings of power. Exploring processes carried out over decades or even centuries, historical comparativists have turned a theoretical lens on the nature of temporality itself (for some recent expositions on this matter, see Abbot 2001; Adams et al. 2005; Pierson 2004; Sewell 2005). This attempt to take history seriously has often led historical comparativists to question many of the theoretical assumptions undergirding quantitative research (Abbot 2001; Pierson 2004) as they focus on how historical processes and local particularities change the very way social actors act and react in their worlds. These insights have even led to advances in statistical research, such as time-series analyses, which include sequencing and temporality as key analytic factors.

Debate between the two methodological schools has often been bitter, with some historical comparativists questioning the fundamental bases of much quantitative research while some quantitative researchers, in turn, criticize historical-comparative research for being too particularistic and lacking generalizability. However, others have tried to overcome this conflict, bridging the gap between quantitative and qualitative methods in an attempt to draw on the advantages of both (see Brady and Collier 2004; Brady et al. 2006; Lieberman 2005).

In my own research, I follow this latter strategy. I begin with a quantitative analysis of vaccination coverage, using fixed effects methods. This establishes that IGO-ties, broadly, have an effect on vaccination coverage. However, as with most quantitative

methods, it provides little insight as to how IGOs have this influence. The remainder of the dissertation uses historical-comparative methods to explore this question.

Using pluralistic methods overcomes some of the limits of either purely quantitative or purely qualitative methodologies, helping us better understand the workings of power over time. However, studying global processes adds still another complication to my research: how can I bridge the gap between the global and the local? The campaigns I study are global, and yet their success depends on local level changes. Establishing global policies and goals means nothing if they are not enacted on the local level.

Studying the global is fraught with difficulties. Studies of global campaigns tend to focus either on the global or the local level, often excluding consideration of both. Muraskin's works, discussed above, often face this critique: they ignore the local level, leaving unexamined how and even if the global policy changes he so aptly unveils are implemented. However, similar critiques can be leveled at studies focusing on the local level, which often pay little attention to the global-level dynamics shaping the efforts they study at the local level, presenting the global as largely static, in contrast to the dynamic local. This is true of even the best local level research on global campaigns, like the works of James Ferguson (1994; 2006).

Pluralistic methods, such as Evan Lieberman's nested case method (2005), can help overcome this problem to a certain extent. Through use of residual analysis, this method allows researchers to place cases in broad comparative perspective, revealing whether and how they are exceptional and even, if using panel data as I do, how each case's position relative to the others changes over time. However, pluralistic methods alone cannot solve the global-local problem. A large-N, global study may reveal broad influences and trends over time, but it cannot give insight into global-level dynamics driving the phenomena under study. Doing so requires in-depth qualitative research at the global level itself. Herein we find the key challenge researchers face when trying to combine study of the global and local: they must consider dynamic processes at both levels and interactions between them. Neither the global nor the local is static, and over-simplified static portrayals of either will always prove lacking.

In this dissertation, I tackle the dual problems of studying power and studying global-local interactions. To address the first problem, I use pluralistic methods. To address the second, I carry out in depth, qualitative research at both the global and local levels. Drawing on material from the WHO Archives and Library, I examine both the development of global immunization policies and norms regarding immunization and the implementation of immunization campaigns in two African countries: Cameroon and Malawi. In the following chapter overview, I briefly discuss how chapters of my dissertation address both my key question, how does the WHO exercise power, and the key methodological challenges of studying power and global-local interactions.

Chapter Overview

This dissertation explores the various aspects of IGOs' power through a case study of the WHO's immunization campaigns from 1974 to the present. Chapters 2 through 6 form the analytic heart of the dissertation, exploring the WHO's power in its many different facets and on multiple levels. Finally, Chapter 7 brings the different

strands explored in Chapters 2 though 6 back together for a final reflection on IGOs and power. Here, I briefly summarize Chapters 2 through 6 and review the main aspect of IGO power explored in each.

Chapter 2: IGOs, INGOS and Immunization

Chapter 2 begins with a very basic question: does IGO membership, in general, influence immunization coverage? Placing this question in conversation with the world polity literature, it also explores the influence of INGO ties. To answer the question, I use fixed effects analyses of vaccination coverage with four commonly used vaccines: the polio vaccine, the measles vaccine, the DPT (diphtheria, pertussis and tetanus) vaccine and the BCG (Bacillus Calmette-Guérin) vaccine, which is intended to provide protection against tuberculosis.

Previous studies examining the different influences of IGO versus INGO ties over national practices have mostly focused on human or women's rights and have emphasized the key role played by INGOs in influencing national practices. (Cole 2006; True and Mintrom 2001; Tsutsui and Wotipka 2004). However, I find that IGOs generally have a positive influence on vaccination coverage while INGOs' influence is either not statistically significant or negative. Variation in INGO ties' influence on vaccination coverage with different vaccines suggests that their (negative) influence is particularly strong for "controversial" vaccines, like DPT and BCG. In addition, analysis by national income (high- versus medium- and low-income) shows that INGOs' influence is particularly strong and negative in high-income countries.[22]

Chapter 2 establishes that IGO ties do influence vaccination coverage at the national level. However, it does not reveal how such ties exert influence, nor does it provide insight into how global immunization policies and norms have changed over the past decades. Elucidating these questions is the main task of Chapters 3 through 6. Chapters 3 and 4 examine the global level, while Chapters 5 and 6 focus on case studies of Cameroon and Malawi.

Chapter 3: Persistence and Change in Global Immunization Programs

Chapter 3 looks at how global immunization programs changed from the beginning of the EPI in 1974 to the end of the 20th century. It shows that the EPI began with a focus on experimenting to find the best tactics for carrying out routine immunization services in developing countries. However, it was quickly absorbed by the WHO's Health for All by the Year 2000 campaign, established in 1977. This campaign had two major implications for the EPI program. First, it tied the program to the PHC movement. In support of PHC goals, the EPI began promoting "integrated" immunization programs, i.e., programs where immunization services were provided along with other mother-child health services. Chapters 4 and 5 show the important consequences this shift had on the Cameroonian EPI. Second, the PHC-EPI campaign established the program's first major goal: achieving universal childhood immunization by 1990 as part of the broader "Health for All by the Year 2000" effort. As shown in Chapter 3, these two

[22] As INGOs' effect was clearest for "controversial" vaccines, their increased impact in high-income countries is not especially surprising. The vaccine controversies in question had a much greater impact in high-income countries, where the generally low rates of vaccine-preventable diseases and of communicable diseases in general made vaccines' benefits less discernible.

aspects of the EPI were not always compatible, particularly as the focus on meeting the 1990-goal led to new openness to "accelerated," and hence non-integrated, immunization services.

Two factors had a particularly important influence over program developments after 1977: newly developed tools of knowledge, i.e., methods of estimating vaccination coverage or disease burden, and the rising influence of international conferences or supranational coalitions on the WHO's immunization programs. Changes in tools of knowledge made possible a major shift in program focus from vaccination coverage in general to disease reduction, particularly for measles, polio and neo-natal tetanus (NNT) in the late 1980s. That same period saw international conferences or groups gain increasing influence over WHO policy, with recommendations from the Task Force for Child Survival being particularly influential.

During the 1990s, the WHO's immunization programs became much more fragmented than during the heyday of the Health for All campaign. With different sub-campaigns focusing on polio eradication, vaccine development, and measles and neo-natal tetanus control, there was little of the unity-of-vision found in the earlier campaign. In addition, lack of unity meant that different campaigns relied on the same basic pools of donor funds, and all of the campaigns suffered from budget worries in this period. More unity was established after 2000, with the creation of GAVI, which brought most of the campaigns together into one program again and also, importantly, brought in a major new source of funding: the Bill and Melinda Gates Foundation. However, GAVI's creation solidified the trend towards supranationalization of immunization programs, with the WHO becoming one actor in a coalition of actors interested in immunization.

From the time the EPI program began to the present, childhood immunization has never ceased to be a major focus of the global health community. Yet, as Chapter 3 shows, beneath this persistence lies a constantly changing program. Policies have changed considerably, either due to efforts internal to the EPI itself or to external pressure. At the same time, the actors involved in this global health effort have also changed. While the WHO remains a key actor, it is not the only key actor anymore, especially with the rise of a new supranational coalition: GAVI.

Chapter 4: Global Solidarity and Immunization

Chapter 4 maintains Chapter 3's focus on the global level but switches from analyzing policy changes, mainly influenced by various advisory or expert groups, to looking at changes in the global norms. In particular, it explores how the sense of responsibility for immunization has changed since the EPI began and what implications this has had for fund-raising efforts. This chapter highlights how the EPI helped inaugurate a major shift in global perceptions of responsibility for immunization. When the program began, immunization was seen as a national matter, with each nation state having primary responsibility to establish, maintain and fund immunization programs. The global community had a negligible role: global funds and advice were available to help establish programs in the short term only.

As the EPI became part of the Health for All campaign, this perception changed. Childhood immunization came to be seen as a right that nation states and the global community had a joint duty to ensure. This view was remarkably persistent, continuing from the late 1970s, when it first began to be articulated, through the present. However,

debate continued on the division of responsibility between global and national powers and on which parties were responsible in the case of any program setbacks or failures.

Through an analysis of contributions to the Voluntary Fund for Health Promotion (VFHP), Chapter 4 also explores the extent to which donors acted on newly voiced norms of global responsibility. This analysis shows that, although complaints about funding shortfalls generally increased over time, becoming particularly acute in the 1990s, donations steadily increased throughout the entire period. Indeed, donors acted on new norms by increasing contributions to immunization programs. However, as program goals expanded, donations were not able to keep up with the programs' expanding funding needs.

Chapters 5 and 6: The EPI in Cameroon and Malawi

Chapters 3 and 4 explore power within the WHO and on the global level, but the WHO's immunization programs' primary goals involved changing practices on the ground in developing countries. Chapters 5 and 6 thus switch levels of analysis from the global to the local, examining the implementation of EPI programs in Cameroon and Malawi. The two cases are chosen using Evan Lieberman's nested case analysis method (2005). Residual analysis of the fixed-effects analyses presented in Chapter 2 reveal that vaccination coverage in Cameroon is generally much lower than predicted by the analyses whereas coverage in Malawi is generally much higher. These chapters explore why.

The analysis shows how international advisers' lack of awareness of historical legacies unwittingly favored program developments in Malawi while impeding them in Cameroon. In Malawi, long-standing cooperation between government and missionary health providers had led to the creation of an extensive, clinic-based system of maternal and child services long before such "integrated" services became the PHC ideal. As the WHO came to embrace the PHC vision, they increasingly praised Malawi's program for its excellent integrated services. In Cameroon, on the other hand, the colonial government had created a divided health care system where extremely limited curative services were supplemented by extensive, mobile health campaigns led by the country's *grandes endémies* teams. When Cameroon first adapted the *grandes endémies* system to routine childhood vaccination, WHO advisers hailed the effort as an admirable experiment in vaccination in the developing world. However, as the global program came to embrace the PHC vision, this praise was replaced by harsh critiques of Cameroon's lamentably vertical and non-integrated immunization program. This radical change provoked a local backlash as mid-level program managers challenged global advisers' assumptions about integration's superiority over more vertical programs.

PART I, CHAPTER 2

IGOS, INGOS AND IMMUNIZATION: GLOBAL CIVIL SOCIETY, THE SOCIETY OF STATES AND THE SPREAD OF HEALTH PRACTICES

Global immunization campaigns are carried out by a rich array of different global actors, each with its own varied motivations and goals. This includes traditional IGOs, like the WHO, UNICEF and the World Bank, and INGOs, like Save the Children and Rotary International. It also includes important internationally oriented philanthropic organizations, like the Bill and Melinda Gates Foundation, and state-run international development agencies, like USAID and SIDA. Populating this complicated mesh of international and internationally oriented organizations are public health activists and professionals, with their own various motivations and orientations.

These various people and groups have overseen an enormous global change in immunization practices as countries (and donors) around the world came to embrace the idea of childhood immunization for all. When the EPI began in 1974, estimates of global coverage with the four vaccines used in that program did not even exist. As seen in Figure 2.1, global coverage has risen dramatically since 1980, when coverage estimates first became available.

[Figure 2.1 about here]

What role did the myriad different actors and organizations involved in these efforts play in changing global immunization practices? This chapter seeks to answer this question broadly by examining the influence of two types of international organizations, IGOs and INGOs, on vaccination coverage. In so doing, it engages with a broader debate within the world society literature about the roles played by these different types of global actors in the spread of global norms and practices more generally.

In this study, I bring examination of a new area, public health, into dialogue with previous studies in the world society literature looking at women's rights and human rights to ask when and how INGOs and IGOs matter for the diffusion of global norms and practices. In particular, I look at how IGO and INGO ties affect vaccination coverage with four commonly used vaccines: BCG vaccine, DPT vaccine, polio vaccine and measles vaccine. I find that IGO ties have a much more important, positive effect on vaccination coverage than INGO ties. In addition, I look at how IGO and INGOs effects on public health practices differ in high-income versus middle and low-income countries.

Below, I provide an overview of world society theory, with particular focus on the literature's consideration of the relative effects of different types of international organizations on the spread of global norms and practices and on global inequality in nations ties to such organizations. I then provide a broad overview the history and structure international organization around health in general and immunization in particular. I pay particular attention to differences between this area and human rights.

Finally, in my analysis I examine the influence of IGO and INGO ties on vaccination coverage with four vaccines: polio, measles DPT and BCG. In contrast to studies looking at human rights, I find that IGOs generally play an important role in promoting immunization, whereas INGOs generally have no effect. Indeed, in two cases, DPT and BCG coverage, INGOs

have a negative effect. In addition, when comparing high-income to middle and low-income countries, I find that INGOs' negative effect on vaccination coverage only appears for high-income countries and that IGO ties are more likely to have a positive effect on vaccination coverage in middle and low income countries.

These findings have three main implications. First, they suggest that IGO networks and interstate ties are especially important for spreading norms and practices that are generally uncontroversial and strongly associated with the state, like mass immunization. Second, they suggest that global civil social ties are especially influential for issues strongly linked to transnational social movements, such as women's and human rights, but also use of certain vaccines, like DPT and BCG. Finally, ties to IGOs and INGOs affect high-income countries differently from low and middle-income countries, at least for vaccination. IGOs are less influential in the former and more influential in the latter. INGOs' influence, on the other hand, is more prominent among high-income countries.

IGOs, INGOs and the Spread of Global Norms and Practices

How do different types of international organizations spread policies and practices globally? As studies of world society deal with increasingly rich data and grow in methodological sophistication, this question is becoming increasingly salient. In particular, much scholarship focuses on the relative roles of IGOs and INGOs. These two broad types of organizations represent very different types of global ties and very different types of world society.

IGOs' members are states themselves. Under their auspices, states meet to discuss and attempt to resolve common concerns; theoretically, policies and practices diffuse in the process. This IGO-based world society is a society of states, relatively isolated from broader popular participation and interference. INGOs represent a very different sort of world society: a global civil society. As non-governmental organizations, INGOs members are people who join as individuals, not as representatives of particular states. Theoretically, the global networks created this way do influence state policies and practices, but they do so indirectly through their mobilization of states' citizens, who put pressure on states to adopt policies in keeping with global norms.

Recent studies have especially emphasized the importance of INGOs, global civil society and transnational social movements in the spread of global norms. This is seen in major works focusing on the importance of INGOs in world society (Boli and Thomas 1999), in studies of transnational social movements (Keck and Sikkink 1998) and in recent concerns about different levels of connection to INGOs or transnational social movements in high and low-income countries (Beckfield 2003; Hughes et al. 2009; Smith and Wiest 2005). This emphasis on the importance of global civil society and INGO ties seems justified by those few studies that explore the relative importance of INGO versus IGO ties on the spread of global norms, all of which examine the case of human rights and women's rights (Hafner-Burton and Tsutsui 2005; True and Mintrom 2001; Tsutsui and Wotipka 2004). All suggest that INGO ties play a more significant role in the spread of global norms than IGO ties. Yet studies looking exclusively at IGO ties still continue to show effects (see for example Boehmer et al. 2004). How are we to reconcile these contradictory findings?

We need to broaden our inquiry to ask not only whether IGOs and INGOs have different effects on the diffusion of global norms cross-nationally, but also when these differences are

apparent. In other words, we need to ask whether IGO and INGO effects vary depending on the issue area and type of state concerned. World society studies look at many different issues, from education to the environment to human rights to peace and global trade. Yet findings from different areas are rarely constructively placed in dialogue with each other. Studies have also explored inequality in countries' IGO and INGO ties, with findings showing particular inequality in ties to INGOS (Beckfield 2003; Beckfield 2008; Hughes et al. 2009). Yet few studies explore the implications this inequality has for the diffusion of policies and practices (For an exception, see Smith and Wiest 2005).

IGOs and INGOs' Role in World Society Theory

What role do IGOs and INGOs play in the diffusion of global norms, according to world society theory? Before turning to contemporary debates and findings, this section addresses this question, providing a general overview of world society theory's view of the structure of world society and how norms and practices spread within it.

World society theory first developed to explain the puzzling and historically unprecedented homogeneity of modern state forms (Meyer 1980; Meyer et al. 1997a; Thomas and Meyer 1984) and the seemingly universal spread of primary education (Boli and Ramirez 1987; Meyer et al. 1992; Ramirez and Meyer 1980). However, the clearest formulation of the theory can be found in "World Society and the Nation-State," in which John Meyer and his associates (1997a) argue that state policy and form are heavily influenced by world cultural scripts. Thus, world society theory is a cultural theory of cognition taking its inspiration from the phenomenological tradition (Meyer 2008; Meyer et al. 1997a; Meyer and Jepperson 2000). In a parallel with phenomenological theories of subject formation (see esp. Berger and Luckmann 1966), world society theory sees the international environment as a socializing force that integrates its subjects into a pre-given and taken-for-granted institutional reality.

But what is this taken-for-granted reality? And who are the subjects socialized into it? The cultural world envisioned by world society theory is a notably cohesive one centered on core features of liberal, western modernity. In their analysis of INGOs founded between 1875 and 1988, Boli and Thomas (1997) identify five basic principles of world society: universalism, individualism, rational voluntaristic authority, rational progress, and world citizenship. Much of the literature stresses the important role of scientists and other professionals in shaping the cultural content of world society (see for example Meyer et al. 1997a), and this emphasis can clearly be seen in the topics often studied by world society scholars. Work in the field focuses on education (Drori and Moon 2006; Frank and Gabler 2006; Schofer and Meyer 2005) and science (Drori and Meyer 2006; Drori et al. 2003); individual rights, including human rights (Cole 2005; Cole 2006; Hafner-Burton 2005; Hafner-Burton and Tsutsui 2005; Tsutsui and Wotipka 2004) and the rights of women and sexual minorities (Bradley and Ramirez 1996; Frank and McEneaney 1999; Frank and Meyer 2002; True and Mintrom 2001); the spread of market-oriented economic principles (Henisz et al. 2005; Ingram et al. 2005); and environmental protection (Frank et al. 2000; Meyer et al. 1997b; Schofer and Hironaka 2005).

The subjects created in and by this rational, scientific and technocratic world are endowed with agency and rationality, leading them to espouse its precepts. However, beyond this similarity, they are quite diverse, including not only states but also individuals and organizations (Meyer 2008; Meyer et al. 1997a; Meyer and Jepperson 2000). Indeed, while earlier theoretical formulations focus on the states' central role in world society (Meyer et al. 1997a), later works see more parity between these three sets of actors (Meyer and Jepperson 2000), and the most

recent formulations have begun to abandon the state to focus more on organizations (Drori et al. 2006; Meyer 2008).

This diversity of actors complicates world society theory's theories about how global norms are diffused worldwide. Global norms are spread directly to states, particularly through their involvement in IGOs, in general, and in the UN system, in particular. But such norms also spread to individuals and organizations. INGOs play a much larger role in diffusion at this level, as these are the organizations that individuals and non-state organizations participate in directly. These individuals and organizations can then place added pressure on states to conform to global norms if their direct connections to world society are insufficient to convince them to do so.

Therefore, we see two main pathways by which global norms enter state policy and practice. The first (direct) pathway socializes states into global norms through their direct associational ties with world society, mainly in the form of membership in IGOs. This pathway creates a sort of society of states. The second (indirect) pathway socializes individuals and organizations acting within particular states into global norms through their own associational ties with world society, mainly in the form of participation in INGOs. These individuals and organizations, in turn, place pressure on states to adopt and conform to global norms. Rather than a society of states, this pathway creates a sort of global civil society that, as with national civil societies, affects states.

Given the complexity of this model, many question the assumed cultural homogeneity of world society. With such a diversity of actors and issue areas in the system, is the cultural world being promoted really as uniform and uncontentious as the theory suggests? The next section turns to this question through an examination of possible sources of cohesion and conflict in world society.

Cohesion and Conflict in World Society

Several potential sources of conflict are apparent in the general model. First, world society gives rise to three broad sets of actors – states, individuals and organizations – who, even if they are all rationally constituted, are not all endowed with the same interests and orientations. Indeed, the basic description of individuals and organizations makes it clear that their agency is often pitted against states (see for example Boli and Thomas 1997 187-8).

Second, given the sheer number of organizations and domains encompassed by world society, some conflict seems inevitable, even if all the domains are rationalized as the theory suggests. As Weber showed in "Religious Rejections of the World and Their Directions" (1948), rationalizations in different spheres can conflict with one another in their ultimate ends and orientations. Furthermore, even if we accept that rationality characterizes the major part of values within world society, we would still expect some countervailing (or even counter-hegemonic) tendencies within the system.

Finally, differences in various actors' positions in the world system could lead to conflict. This theory is especially well developed in world system theory (Arrighi 1994; Arrighi and Silver 1999; Wallerstein 1974), but recent studies in the world society theory tradition also point to systematic and persistent inequality in ties to world society (Beckfield 2003; Beckfield 2008; Hughes et al. 2009). These persistent inequalities could also lead to a lack of cohesion and even conflict, given their implications for the spread of global norms.

These three considerations – the different structures of states' ties to IGOs versus INGOs, the differently constituted actors within world society and the potential conflicts arising within the cultural system itself – lead to questions about whether the norms spread by world society are

cohesive and uniform. Potential conflicts seem particularly likely between the effects of IGO ties (which are with states) and INGO ties (which are with individuals).

Recent studies dealing with human rights and women's rights have put the assumed uniformity of world society's effects at the state and individual level to the test by differentiating between the effects of IGO (or other state) ties and INGO ties on various policies or practices. For example, looking at the case of human rights, Tsutsui and Wotipka (2004) show that participation in INGOs, but not IGOs, increased likelihood of participation in specifically human-rights related INGOs. Similarly, Cole (2006) finds that participation in INGOs, but not membership in IGOs, is positively associated with the likelihood of a petition being filed against a country for human rights abuses. True and Mintrom (2001) found similar results in their examination of states' adoption of gender mainstreaming institutions.[1] They find that states' citizens' participation in INGOs and in the most recent UN conference on women's rights are positively associated with states' adoption of gender mainstreaming institutions, while IGO membership has no significant effect.

The above studies generally suggest that INGOs are more effective at promoting the spread of world-cultural values than are IGOs. This suggests that world-cultural values may spread more easily through individuals and their links to world society than through states. In other words, global civil society more effectively spreads global norms than the society of states. However, these two world societies are not necessarily in conflict. One (civil society) is simply much more effective than the other (state society).

Hafner-Burton and Tsutsui's findings (2005) go further in their examination of world social influences on states' human rights practices. As in the above studies, they look at global civil social effects by counting ties to INGOs, but they use ratification of human rights treaties, rather than IGO ties, as their measure of connections to the society of states. As with the studies discussed above, Hafner-Burton and Tsutsui find that greater INGO ties have a positive and significant influence on human rights practices. However, they also find that more treaty ratifications have a negative and significant impact.

Although human rights treaties are not directly militating against human rights, Hafner-Burton and Tsutsui's findings do suggest that states use such treaties in a disingenuous way: they serve as "empty promises" that deflect attention from states' actual practices. INGO ties, on the other hand, create a more tightly coupled social world. Citizens, by mobilizing in INGOs, can help make the "empty promises" of human rights treaty ratification less empty by pressuring states to comply with those treaties (Hafner-Burton and Tsutsui 2005). Hafner-Burton and Tsutsui's findings suggest that world society may be a divided world. One the one hand, in global civil society, we find a tightly coupled system characterized by genuine commitment to world cultural values. On the other hand, in the society of states, we find a decoupled world in which states embrace world cultural values in their policies but act according to their own interests in reality. Only the activity of global civil society can truly push states to bring their practices in line with their policies.

Scholars have only recently begun to examine how equitable states' ties to world society are. In his ground-breaking 2003 study, Jason Beckfield finds that inequality in the number of states' ties to INGOs is both greater and more persistent than is inequality in the number of states' ties to IGOs; he finds that wealthy, core states have many more ties to INGOs than

[1] True and Mintrom define gender mainstreaming as "efforts to scrutinize and reinvent processes of policy formulation and implementation across all issue areas to address and rectify persistent and emergent disparities between men and women" (2001 28).

poorer, peripheral states. Hughes' network-based measure of states' ties to INGOs found even greater levels of inequality than Beckfield's measure, a simple count, revealed (Hughes et al. 2009).

This inequality is especially troubling given the apparent importance of INGOs for spreading global norms. It suggests that we live in a world in which wealthy, core countries have greater and greater access to such norms, while poorer peripheral countries are increasingly left out. However, this may not entirely be the case. Jackie Smith and Dawn Wiest's analysis of the influence of countries' ties to a subset of INGOs, transnational social movements, finds that both trade and IGO ties promoted such ties more in low income countries than in high-income countries (2005). Their findings are hopeful and suggestive – perhaps inequality and exclusion are not the only stories to be told about comparative INGO ties – but more studies are clearly needed to flesh out our understanding of how the influence of different types of organizational ties vary across different types of states.

Implications: A Divided World?

Findings about the different roles of IGOs and INGOs in the spread of global human rights and women's rights norms suggest that INGO and IGO ties are very different from one another. At best, INGOs are much more effective at diffusing world-cultural values than IGOs. At worst, IGO connections and direct ties between states and the global society of states are counterproductive in diffusing such values, allowing states to express support for world cultural values while counteracting them in practice.

However, before accepting this conclusion we must ask ourselves: how universal are the implications of the above studies? The world society literature in general tends to emphasize the importance of INGOs over IGOs as key nodes in the diffusion of global norms. This emphasis is explicit in the key edited volume introducing the theory, *Constructing World Culture: International Nongovernmental Organization since 1875* (Boli and Thomas 1999). It can also be seen in the measures of ties to world society many studies use. Often this measure combines INGO and IGO membership (see for example Frank et al. 2000; Schofer and Hironaka 2005). Given that there are far more INGOs than IGOs, this technique is likely to give more weight to INGO effects than IGO effects. Other studies ignore IGOs entirely (see for example Schofer and Meyer 2005).

If the current emphasis on INGOs' influence is justified, than we would expect to see this influence in most, if not all, areas of global organization, giving rise to the following proposition:

> *Proposition 1a: INGOs have a greater influence over the spread of global norms than IGOs.*

However, there is reason to think that the emphasis on INGOS is misplaced. I argue that INGOs and IGOs have different effects on the spread of global norms in different areas. As seen above, all of the prior studies showing that INGOs have a more powerful effect on the spread of global norms look at two related issue areas: human rights and women's rights. These two areas share one common feature: a social movement heritage in which activists promoting these norms are often in conflict with states.

I argue that a social movement heritage has important implications for the relative importance of INGOs versus IGOs in spreading global norms. Consider the following quote from Boli and Thomas' discussion of the cultural content of world society:

> Some INGOs, including sports, human rights, and environmental bodies, dramatically reify the world polity; *human rights and environmental INGOs are especially prominent because of their conflicts with states over world-cultural principles.* But most INGOs unobtrusively foster intellectual, technical, and economic rationalization that is so thoroughly institutionalized that they are hardly seen as actors, despite the enormous effects they have on definitions of reality, material infrastructure, household products, school texts, and much more. (1997 187, emphasis added)

This quote acknowledges that global organization around different issues differs in important ways, but Boli and Thomas do not go on to consider the implications of these differences for INGOs' influence.

I suggest that these differences have important implications for the role of IGOs versus INGOs in the spread of global norms. As seen in the literature, in areas with strong social-movement backgrounds, global civil social forces are especially important in spreading global norms. Transnational social movements form part of global civil society, so this finding suggests that they are important in the spread of global norms. Citizens and activists, not states, are the primary actors at work here. However, in other more "technical" and "unobtrusive" domains this may not be the case. In areas where state actors are especially prominent, IGO influences ought to predominate. This gives the following counter-proposition:

> *Proposition 1b: In controversial domains with a social movement background, like human rights and women's rights, INGOs' influence predominates. In more "unobtrusive" and "technical" domains, and especially those that have close state ties, IGOs' influence is greater.*

Finally, it is unclear what implications the findings about systematic inequality in INGO ties have for the spread of global norms. To explore this issue further, I test the following null hypothesis:

> *Proposition 2: IGO ties and INGO ties have similar effects across different types of states.*

Health and World Society

There is a long history of international organization around health, and health organizations make up a large percentage of international organizations worldwide. Boli and Thomas found that 14.9% of INGOs in 1988 were in the health or medical sector, second only to industry/trade/industrial groups (1997 183). Nevertheless, almost no studies in the world society literature look at health. One notable exception is Inoue and Drori's "The Globalization of Health as a Social Concern" (2006), discussed below. However, even this exception does not examine the effects of connections to world society on health policies or practices. In addition to improving our understanding of the relative role of IGOs versus INGOs in the spread of international norms, this study adds a consideration of this important area of global organizing to the current literature.

Below I discuss parallels between the health field and other areas of international organization commonly studied by world society theorists. I then discuss how an exanimation of childhood immunization, in particular, may help address some of the lingering questions about the relationship between IGOs, INGOs, wealth and the spread of global norms.

Trends in International Health Organization

The neglect of health by world society studies is all the more surprising considering the scope of global organization around health. As Inoue and Drori (2006) make clear, global organization around health has a very long history. They create a sample of 264 international organizations whose primary goal is health-related from the 1999/2000 Yearbook of International Organizations and code the founding dates and general orientation of each. The earliest founding date in their sample is 1650 (204-5).

Most early organizations were religious and non-governmental in nature, but intergovernmental organization around health also has a long history. The modern era of such international health organization dates back to 1851, when the first international sanitary conference was held in Paris. This and later international sanitary conferences led to the creation of the first health IGOs, with the founding of the Pan-American Sanitary Bureau (now the Pan-American Health Organization or PAHO) in 1902 and the Office International d'Hygiene Publique – the first global health IGO – in 1907.

As in many other areas, the number of international health organizations grew rapidly after World War II. There are currently over 2000 health IOs, making up approximately 5% of all IOs (Inoue and Drori 2006 205). The general orientation of international health organizations is quite similar to that of international organizations in other areas. Organizations with a professional, scientific and technocratic orientation dominate. Inoue and Drori divide their sample into four types, based on their basic orientation: professional, charitable, developmental and human rights. Professional organizations dominate the field, with twice as many organizations as any other type. Organizations are more of less equally divided between the remaining three types: charitable organizations are most common, but that category is followed closely by development organizations, which is followed closely in turn by human rights organizations (210).

Health and Immunization

The close parallel between the development of the international health regime and other domains of international organization often explored by world society theorists suggests that health is a good area to explore using this perspective. Furthermore, health in general and childhood immunization in particular provides a case that addresses some of the lingering questions about the relative weight of INGOs over IGOs in the spread of global norms.

As mentioned above, current exploration of the relative impact of IGOs and INGOs on the spread of global norms focuses exclusively on issues powerfully affected by transnational social movements. This orientation may account for the relative importance of INGOs in spreading global norms in these areas. Although many health issues, like the global AIDS movement, have also been at the epicenter of transnational social movements, professional and technocratic considerations have generally played a large role in this domain. This is particularly true for preventive health issues, like immunization.

The technocratic and professional nature of global organization around health can be seen in the centrality of the WHO in the field of international health organizations. Inoue and Drori

note that "the network of health-related international organizations is tightly woven, with only three or four central organizational nodes, most pronouncedly centered around the WHO." (2006 207) It is also seen in the predominance of professional, developmental and charitable orientations over human rights (Inoue and Drori 2006 210). Both of these factors suggest that, if proposition 1b is correct, IGOs may play a more important role in spreading global health norms than INGOs. On the other hand, if proposition 1a is correct, INGOs should predominate in this area.

Childhood immunization is a particularly good area to explore in testing these propositions. As with many other aspects of preventive health, immunization enjoys widespread support among public health experts and governments but is less popular than other (especially curative) health interventions among patients and the general public (Gauri and Khaleghian 2002 2110-1). Indeed, public health experts are very concerned about the causes of popular resistance to immunization and the best means of overcoming such resistance.

As discussed in Chapter 1, global organization around immunization has a long history in which the WHO and other health IGOs (especially UNICEF) have played a central role. The central role of IGOs in promoting immunization is coupled with a general emphasis on the important role of states in all aspects of immunization programs. The ideal put forth by the EPI stresses the key role of states, and particularly their ministries of health, in creating national vaccination schedules according to which all children should be immunized and in delivering vaccines through a network of public health clinics. In this vision, providing and encouraging immunization is seen as a core part of the states' role as protectors of public health.

The centrality of IGOs to global efforts to promote immunization and the key place states hold in global visions of how immunization programs ought to be carried out make immunization an ideal test case of the relative roles of IGOs versus INGOs in promoting global norms. This area provides a stark contrast to human rights and women's rights organization in several respects: there is little history of social movements promoting immunization; IGOs are centrally involved in its promotion; and the global ideal emphasizes states' central role in immunization programs. As citizens, we hold governments accountable for human rights and women's rights. Immunization, on the other hand, is something governments urge upon us, sometimes in the face of popular indifference or even hostility.

Vaccine Controversies: DPT and the Vaccine Safety Movement

I argue above that the social movement heritage of human rights and women's rights may account for INGOs' influence in these domains. Immunization provides a stark contrast, as there is little history of social movements strongly promoting immunization. However, this does not mean that social movements have no interest in immunization. On the contrary, recent years have seen the emergence of a strong vaccine safety and anti-vaccination movement, especially in high-income countries.

This movement either argues against vaccination in general or against certain vaccines, which they see as particularly dangerous. Movements questioning the safety and value of particular vaccines have been particularly influential, leading to some very large studies of vaccine safety and even to the development of new vaccines and major changes in national vaccination policy. This movement is a force to take into consideration here.

All the vaccines I examine have been the subjects of some controversy. For instance, a sub-state of Nigeria stopped vaccinating against polio in 2001 due to fears that the polio vaccine would sterilize girls (Brookes and Khan 2007; Renne 2006). Although this fear did not spread

beyond Nigeria, polio did, reintroducing the disease to most of sub-Saharan Africa, from which it had already been eliminated once. Transnational controversy has surrounded the other three vaccines under consideration here: DPT, BCG and measles.

The BCG controversy is unique among vaccine controversies because it has included a large number of public health experts. Early efficacy studies showed radically different efficacy levels for the vaccine, ranging from none in a 1979 Indian study to 84% in a British study (Comstock and Palmer 1966; Hart and Sutherland 1977; Tuberculosis Prevention Trial 1979). These divergent findings understandably led to debate about whether to use the vaccine, and if so, where and when. Some high-income countries with low rates of tuberculosis, including the United States, do not routinely immunize against tuberculosis, but the vaccine is widely used in the developing world.

DPT vaccine has been the subject of much controversy due to concerns about reactions to the vaccine, in particular to the DPT vaccine containing whole-cell pertussis (Allen 2007 251-293). The pertussis vaccine controversy heated up in 1974, with the publication of an article arguing that the vaccine caused neurological complications in some children (Kulenkampff et al. 1974). This article helped launch a vibrant anti-vaccination movement that even succeeded in removing DPT vaccine from the recommended vaccination schedules in some countries (notably Sweden). Gangarosa et al. (1998) compare pertussis incidence rates in countries with active anti-vaccination movements, countries with controversy but no organized movement and countries with no substantial controversy. They show drops in DPT coverage and rising numbers of cases in many countries due to the controversy and to anti-vaccination movements.

More recently, some have blamed measles vaccination (the measles, mumps and rubella (MMR) vaccine in particular) for the increasing incidence of autism. A 1998 article in *The Lancet* argued that MMR vaccination was associated with the onset of autism (Wakefield et al. 1998). The furor gave rise to numerous studies and reviews, none of which found a link between the use of MMR vaccine and autism. In addition, reexamination of Wakefield's study led to a partial retraction in 2004 and a full retraction in 2010. However, the controversy is still ongoing.

The relative timing of the various controversies is especially important to consider here. The DPT and BCG vaccine controversies began before 1980, when my data begin. In contrast, the MMR vaccine controversy began 1998, making it unlikely that it would have a significant impact in my study, which looks at the period from 1980-2001. For DPT, Gangarosa et al. show that the timing of controversy varied across the countries in their sample, but generally began to wane in the mid-1970s to early 1980s. How long the controversy lasted varied by country, with some countries, like Japan and England, experiencing only a few years of disruption, whereas in others, like Sweden and the Russian Federation, the controversy had a lasting impact on pertussis vaccine coverage (Gangarosa et al. 1998 357-8). Ultimately, the controversy over the whole-cell pertussis vaccine led to the development of new, acellular vaccines. Japan introduced an acellular vaccine as early as 1981 and Sweden began using one in 1996 (Olin and Hallander 1999). The cheaper whole-cell pertussis vaccine continues to be advocated by the WHO and used in much of the developing world (2010).

This begs the question: what effect, if any, do these controversies and vaccine-safety movements have on DPT coverage rates? If, as I suggest above, transnational social movements' effects on the diffusion of global norms are captured by INGO ties, than we would expect a negative association between INGO ties and DPT coverage in this case. The BCG case is more complicated: although subject to controversy, this controversy mostly confined itself to professional circles and did not spark a more popular movement, as was the case for DPT. Given

the high concentration of professional organizations among INGOs, this controversy might have similar effects to the DPT controversy. However, given the close association between public health professionals and the state, especially around questions of immunization policy, the controversy might have been mediated through IGOs instead.

Hypotheses

Below, I use the case of immunization to test three hypotheses about the relative importance of IGOs and INGOs in the promotion of global norms and about the nature of the norms they promote. If, as suggested by the literature, INGOs are the central organizations spreading world culture in all areas, then we should see support for the following hypothesis:

> *Hypothesis 1a: States' ties to INGOs play a greater role in promoting vaccination coverage than their ties to IGOs.*

If, on the other hand, the influence of IGOs and INGOs varies depending on the general orientation of global organization around a particular issue, then we should find the following:

> *Hypothesis 1b: States' ties to IGOs play a greater role in promoting vaccination coverage than their ties to INGOs.*

Further, if transnational social movements intensify INGOs' influence, and given the presence of a transnational social movement questioning the safety of DPT vaccine during the time period under consideration:

> *Hypothesis 2a: In the case of DPT, INGO ties have a negative effect on vaccination coverage.*

Scientific controversy may have a similar effect on INGOs' influence, in which case:

> *Hypothesis 2b: In the case of BCG, INGO ties have a negative effect on vaccination coverage.*

However, in the public health realm such scientific controversy might find expression within the state, and thus be mediated through IGO ties instead, in which case:

> *Hypothesis 2c: In the case of BCG, IGO ties have a negative effect on vaccination coverage.*

In addition, I consider whether effects might vary by state. Data limitations prevent me from examining regional effects, so I confine myself to seeing how effects differ by income-level. As the literature provides little insight into potential differences here, I simply test a null hypothesis.

> *Hypothesis 3: IGO and INGO ties have similar effects on vaccination coverage in high-income and low-income states.*

I test these three sets of hypotheses by examining the effects of IGOs and INGOs on vaccination coverage for the four vaccines originally supported by the EPI: polio vaccine, measles vaccine, BCG vaccine and DPT vaccine. To test Hypothesis 3, I carry out separate analyses for high-income and for low- and middle-income countries.

Data and Methods

Following Gauri and Khaleghian (2002) and Khalegian (2004), I use vaccination coverage data from the WHO and UNICEF (2007a) as my dependent variable. In their 2002 study, Gauri and Khaleghian test the extent to which any problems with the data in this dataset vary systematically according to other national characteristics, like income. Systematic errors would make these data unreliable for studies such as this one. They compare the WHO/UNICEF data with data from the surveys carried out as part of the USAID's Demographic and Health Surveys (DHS) project. They find that reports were comparable for measles vaccine and find no evidence of systematic bias for DPT coverage, although WHO/UNICEF estimates were consistently higher than DHS estimates for this vaccine (2115-7).

I examine vaccination coverage for DPT vaccine, BCG vaccine, measles vaccine and polio vaccine, the four vaccines for which data are available for the longest time period. As three doses of vaccine are recommended for polio and DPT, I look at coverage for the third dose in these cases. In all cases, these data are the WHO's best estimate of the percent of one-year olds who have received the recommended doses of vaccine at the appropriate age.

To test my hypotheses, I use counts of countries' ties to IGOs and INGOs. The IGO measure is a count of the number of IGOs in which countries have membership. The INGO measure, on the other hand, counts the number of INGOs with members who are citizens of that country. Both variables are drawn from measures found in the Union of International Associations' *Yearbook of International Organizations*.

As all scholars looking at the effect of global level phenomena acknowledge, state-level factors also have an important influence on most areas examined. Therefore, I include indicators of relevant state-level factors in this analysis. In particular, I control for political, social, economic and health characteristics likely to affect vaccination coverage. As I use fixed-effects regression, I include only time-variant variables.[2]

On the political level, I follow previous studies of vaccination coverage (Gauri and Khaleghian 2002; Khaleghian 2004) and include measures drawn from the Polity IV dataset (Marshall and Jaggers 2007), indicating how democratic and how durable countries are. The democracy index rates how democratic a country is, on a scale from one to 10, with 10 being very democratic. The durability measure counts how many years a government has been in existence. Major changes in government, like the fall of communism or a coup, reset the count; normal transitions do not. In addition, I include Polity IV's autocracy index in this analysis, which is structured similarly to the democracy index. While democracies should presumably protect their citizens' health because of citizens' influence over government, autocracies may be more efficient in public health campaigns for a different reason: control over their populations.

[2] Many variables are excluded from analysis because they are not time-variant or did not exist over a long enough time period to be included in this study, including measures of ethnic diversity, health spending, numerous measures of availability of healthcare, GINI coefficients, measures of countries' land-area and geographic controls.

As autocracies tend to have greater levels of control over their populations, autocratic governments are often highly effective in undertaking public health campaigns.

As a last political variable, I include a binary indicator for the presence of armed conflict drawn from Wimmer and Min's dataset (2006; 2007). Unlike other datasets including information on armed conflict, e.g., Correlates of War dataset, Wimmer and Min's dataset includes information on the presence of war in a territory, rather than on whether or not a country is engaged in combat. Thus, for example, there was no armed conflict in the US over the time period, despite the fact that the US was involved in several extra-territorial armed conflicts. This territorial variable is much better than standard war variables when trying to assess the impact of armed conflict on public services like immunization. After all, it is the direct presence of conflict that is likely to have a disruptive effect on the administration of vaccines to infants, not a country's involvement in extra-territorial war.

I include two health measures: a lagged incidence count of the number of polio, measles and pertussis cases, depending on the analysis[3] (2007b), and the infant mortality rate[4] (2008). It seems plausible that countries respond to levels of vaccine-preventable disease through their immunization efforts, stepping up efforts in response to disease outbreaks. The lagged incidence count would capture this effect. In contrast, the infant mortality rate serves as a general indicator of the state of infant and child health in the country. In addition, it can serve as a proxy for the quality of health care services. I exclude other, more direct measures of health services, like numbers of doctors or measures of health spending, because of missing or poor quality data.[5]

For general economic and social measures, I draw several variables from the World Bank's World Development Indicators dataset (2008), including GDP per capita, population size, population density, and youth population (i.e., the proportion of the population under 15 years of age). As with the health indicators, missing or poor quality data prevented me from including many relevant social indicators, like measures of ethnic fractionalization, general levels of inequality and literacy rates.[6]

Data Structure and Descriptive Statistics

Most data included in my analysis are country-year data for the years 1980-2001, giving me a balanced panel of data. Data on vaccination coverage only became widely available in 1980, so my beginning date derives from data availability for my dependent variables. The end year derives from constraints in Wimmer and Min's data, which extend only to this year. Of 192 countries for which the WHO has data on vaccination coverage, 135 were included in my analysis of polio coverage, 134 in my analysis of measles and DPT coverage, and 124 in my analysis of BCG coverage. All exclusions were made on the basis of data constraints, and a full list of excluded countries is available upon request.

Where possible, I include yearly data by country for the years 1980-2001. Data were periodically missing for many variables, and some variables, like infant mortality rate, were not collected annually in most countries.[7] To address this problem, I interpolated values from

[3] I do not include an incidence count for tuberculosis due to the limited protection provided by the BCG vaccine.
[4] The infant mortality rate measures the number of infant (under one year of age) deaths per 1000 live births.
[5] Available data directly measuring availability of health services are not generally available as early as 1980 or are not time-variant.
[6] Again, these data are rarely available as early as 1980 or are not time-variant.
[7] Most countries report infant mortality rate every five years. However, a small number of wealthy countries report annually. For this reason, when calculating means and standard deviations in the raw data for Table 2, only the years 1980, 1985, 1990, 1995 and 2000 were included.

surrounding years for all variables except population, youth population and the armed conflict indicator, for which there were no missing data, and the state durability measure, as missing data for this variable generally indicated transitional periods. However, I did not extrapolate values. New data points were created only when a country reported data on that variable in the preceding year and the following year.

Table 2.1 shows the frequency of missing data for all variables of interest for raw and interpolated data, where relevant.

[Table 2.1 about here]

As can be seen in Table 2.2, means and standard deviations for interpolated data are comparable to those of the raw data.

[Table 2.2 about here]

Table 2.3 shows means, standard deviations, minimum and maximum values and number of observations for the data used in my analyses. I include within-group, between-group and overall standard deviations in recognition of the paneled nature of my data.

[Table 2.3 about here]

Methods

To take account of the grouped nature of panel data, I use fixed-effects models for all analyses. The fixed-effect model effectively introduces a dummy variable for each country and year in my analysis, thus controlling for constant country and year differences. To further control for overall trends in the dependent variable (vaccination coverage increases over the entire period), I include a lag of the dependent variable in the analysis. This gives the formula:

$$y_{it} = \beta y_i(t\text{-}1) + \beta ow + \beta 1 wx_{it} + \alpha_i D_i + \varepsilon_i \upsilon$$

The major advantage of this approach is that it controls for all unmeasured variables that vary systematically by country or by year. Thus, results cannot be skewed by some unmeasured or unknown systemic state-level characteristic or a similarly unknown and unmeasured systematic temporal characteristic. As I control for systematic variation by country and year and include the lagged dependent variable, this analysis can be considered a strong test of the relationship between IGOs, INGOs and vaccination coverage.

The fixed-effects operator does not allow the inclusion of time-invariant variables and excludes all systematic effects of constant differences between countries. As a result, it arguably loses efficiency relative to other estimators. However, alternative approaches, including random-effects models, require the additional, strong assumption that time-invariant unobserved variables are independent of measured variables (for a detailed discussion see Halaby 2004; Petersen 2004). As a result, the advantages of the random-effects models in terms of efficiency and the variables that can be included in the analysis come at the price of stronger assumptions, posing a greater risk of invalid estimators.

There are ways to overcome this problem, but given that my independent variables of interest are both time-variant, I use fixed-effects models for my analysis. Nevertheless, the robust

controls on systematic time and country effects, along with the inclusion of the lagged dependent variable, control for much of observed variation. Therefore, results that are still significant in the face of these strong controls are especially noteworthy.

Findings and Discussion

For each dependent variable in my analysis, I report results from three models. Model 1 includes the IGO ties and the control variables discussed above. Model 2 includes INGO ties and the control variables. Finally, model 3 includes both IGO ties and INGO ties and the control variables. Tables 2.4a and 2.4b shows the results of regressions for all countries.

[Tables 2.4a and 2.4b about here]

The world society tie measures are of most interest here, as they allow us to distinguish between competing hypotheses. Hypotheses 1a and 1b considered the relative importance of IGO and INGO ties in promoting immunization:

> *Hypothesis 1a: States' ties to INGOs play a greater role in promoting vaccination coverage than their ties to IGOs.*
> *Hypothesis 1b: States' ties to IGOs play a greater role in promoting vaccination coverage than their ties to INGOs.*

Results show clear support for hypothesis 1b over hypothesis 1a. Models of polio, measles and BCG vaccine coverage all show a positive and significant effect of IGO ties, and the full model for DPT vaccine coverage is weakly positive for this measure. INGO ties, on the other hand, do not have a significant positive effect on vaccine coverage in any model.

Hypotheses 2a, 2b and 2c spoke to a different issue: the possible implications of controversy for IGO and INGO effects:

> *Hypothesis 2a: In the case of DPT, INGO ties have a negative effect on vaccination coverage.*
> *Hypothesis 2b: In the case of BCG, INGO ties have a negative effect on vaccination coverage.*
> *Hypothesis 2c: In the case of BCG, IGO ties have a negative effect on vaccination coverage.*

In support of hypothesis 2a and 2b, INGO ties have a negative and significant effect on vaccination coverage for DPT and BCG vaccines. Hypothesis 2c receives no support: IGO ties continue to have a positive effect on coverage for BCG vaccine, as with other vaccines. This suggests that both the effects of scientific controversy and of transnational social movements are mediated through INGO ties, even in the case of scientific fields strongly associated with the state, like public health.

Thus, in stark contrast to findings in previous studies that look at human rights and women's right, in all three cases explored here, IGO ties promote immunization whereas INGO ties either have no effect or a negative effect. This strongly suggests that world society and its effects are bifurcated. IGOs and INGOs not only spread global norms differently but this

diffusion works differently in different domains. While INGO ties may be paramount for issues strongly linked to transnational social movements, like human rights, IGO ties have a greater influence for less controversial and more technical areas of global organizing, like childhood immunization.

The different patterns seen across the four cases confirm the power of controversy to affect vaccination coverage through the influence of INGOs. In the case of DPT and BCG, controversy about the vaccine's safety or efficacy, and the associated transnational social movement arguing against its use in the case of DPT, seem to have effectively undermined efforts to promote use of the respective vaccine. Interestingly, the DPT controversy seems to have weakened the efficacy of IGOs in promoting DPT coverage, although the scientific controversy around BCG vaccine did not have a similar effect: in the DPT models, IGOs have only a weakly positive effect in the full model.

In addition to testing the general impact of IGO and INGO ties on vaccination coverage, I look at how this impact differs depending on state wealth. Table 2.5 shows the results for the Model 3 regressions for two different groups of states: high-income states and medium- and low-income states.

[Table 2.5 about here]

These models test hypothesis 3:

> *Hypothesis 3: IGO and INGO ties have similar effects on vaccination coverage in high-income and low-income states.*

My findings give mixed support for hypothesis 3. IGO ties tend to have a similar effect in both high-income and middle- and low-income states, being positive and significant in both cases for three of the four vaccines (polio, DPT and BCG). INGO ties' effects prove more variable. As in the regressions looking at all cases, INGO ties do not have a significant impact on vaccination coverage for polio and measles (although the sign is negative in all cases). However, for the "controversial" DPT and BCG vaccines, they have a negative and significant impact only for high-income states, not for middle- and low-income ones.

As these are the two cases where regressions looking at all cases similarly found negative and significant effects, this finding is especially interesting. It suggests that the INGO effects we saw in the full model derive primarily from the INGO-mediated effects the controversies provoked only in high-income countries. The controversies did not have similar effects in low- and middle-income countries. As previous studies show that high-income countries also have more INGO ties than middle- and low-income countries, this means that, in this case, INGOs are both more present in high-income countries and have greater (negative) effects on vaccination coverage in these countries.

We may well ask why INGO effects are more powerful in high-income countries than in middle- and low-income countries. The fact that this difference only appears for controversial vaccines suggests that this finding is not universally applicable to all global norms. But how widely applicable is this finding? It may be that it holds in all controversial and social movement cases, in which case we would expect similar findings for human and women's rights issues, for example.

However, it may be that the specific psychology and rationale behind vaccine controversies are more influential here. Most high-income countries have longer histories of vaccination and much lower rates of vaccine-preventable disease than middle- and low-income countries. With little lived experience of these diseases, it is much easier for the public to underestimate the risks associated with the diseases while over-estimating the risks associated with the vaccines. This skewed perception helps explain public fears of measles and pertussis vaccines. Rather than fearing measles, parents fear that measles vaccine will cause autism, for example. Rather than fearing pertussis, parents fear neurological complications from the pertussis vaccine. In middle- and low-income countries, which often have more recent experiences with vaccine-preventable diseases and where these diseases are often more deadly, this skewed perception of the relative risks of vaccines versus vaccine-preventable disease is less likely to emerge.[8]

A different rationale may undergird INGOs' effect in the case of BCG. Consider the CDC's position concerning BCG vaccination:

> BCG is not generally recommended for use in the United States because of the low risk of infection with *Mycobacterium tuberculosis*, the variable effectiveness of the vaccine against adult pulmonary TB, and the vaccine's potential interference with tuberculin skin test reactivity. The BCG vaccine should be considered only for very select persons who meet specific criteria and in consultation with a TB expert. (Division of Tuberculosis Elimination 2010)

As seen here, two rationales justify the US policy against general use of BCG vaccine: the vaccine does not provide enough protection and it interferes with disease surveillance (the tuberculin skin test). But these rationales are only applicable "because of low risk of infection." Where risk of infection is higher (i.e. middle- and low-income countries, especially given the strong association of between poverty and tuberculosis), these rationales do not hold.

The above examples show how the findings about INGOs' effects on BCG and DPT coverage may have very case-specific explanations. However, they may also suggest a broader mediation of INGO-effects by wealth. Without more study looking at different cases, it is impossible to know.

Conclusion

Overall, my findings suggest that IGOs' and INGOs' roles in the spread of global norms are starkly different. In general, IGO ties promote vaccination coverage. However, they do so best in the absence of significant controversy, as in the cases of polio and measles vaccines. This suggests that they may be the primary node for the spread of the uncontroversial and invisible norms that Boli and Thomas claim form the concern of the bulk of INGOs (Boli and Thomas 1997 187).

[8] Despite higher incidence of vaccine-preventable diseases, vaccine controversies still exist in the developing world. However, the fears and arguments against vaccines tend to differ from those found in high-income countries. Instead of arguing that vaccines in general or a specific type of vaccine are dangerous, scares tend to arise from suspicion that a particular batch of vaccine is contaminated or corrupted in some way. Rumors that the vaccine includes sterilizing agents are particularly common in Africa, for example.

This raises an interesting question about the role of INGOs in promoting norms in these areas. Do they simply not matter for the spread of uncontroversial norms and practices associated with the public sphere, like much childhood immunization? Given the sheer number of INGOs compared to IGOs, this seems unlikely. INGOs like Save the Children and Rotary International are considered key partners in global efforts to promote immunization. Instead, I propose that the absence of an INGO effect here is due to the way those INGOs that promote immunization work. They typically work in concert with IGOs, like the WHO and UNICEF. Many are even officially affiliated with those organizations.

These developmental and charitable INGOs may also be important in a way that is not captured by measures of INGO ties. What matters most is where they carry out projects, not where they have members. For example, Save the Children, UK is a major partner in the WHO's EPI campaign and was heavily involved with immunization efforts in Malawi from the 1970s through the late 1980s.[9] This branch of the international Save the Children organization is based in the UK, not in Malawi, yet its activities are unlikely to affect vaccination coverage in the UK. Furthermore, although it is not a Malawian organization, it clearly affected vaccination coverage in Malawi.

This presents a stark contrast to the potential effects of, for example, UNICEF and the WHO. IGOs are unlikely to be active in non-member countries, so they are equally unlikely to influence norms or practices in a non-member country. In addition, IGO ties may mediate INGOs influence as well. As developmental and charitable INGOs often work in concert with IGOs, countries' ties to IGOs may be an important source of access to these resources. This would amplify the importance of IGO membership despite an important role for INGOs.

However, findings are very different in the presence of controversy. Here INGO ties matter more than IGO ties and have a significant negative influence on vaccination coverage. A measure of INGO ties seems to serve as a proxy for transnational social movement effects. They are strongest in cases with significant global controversy and mobilization. This is seen both in the findings of previous studies looking at women's rights and human rights issues and in my own findings related to DPT and BCG coverage.

My findings also highlight important fissures within world society. Unlike the case of human rights, where international treaties and INGOs both favor human rights, even if states' commitment to those principles are suspect (Hafner-Burton and Tsutsui 2005), in this case these two international forces are pulling in opposite directions – one favoring continued immunization while the other argues against it. This provides stark evidence that, at least in some cases, there is less agreement about global norms than world society theory generally supposes.

In sum, this study clearly demonstrates that IGOs' and INGOs' influences on the diffusion of global norms are mediated by the nature of norms being diffused and by the general structure of global organization around those issues. However, while it is clear that these two types of organizations work to spread norms in different ways, the nature of these differences remains unclear.

In particular, the role of IGOs needs further elaboration. I suggest that two general features of immunization efforts made it particularly likely that IGOs would have an effect on coverage in this domain: the general lack of controversy surrounding such efforts and the strong association between mass immunization and the state. If this pattern holds generally, we would see a similarly strong IGO influence in the case of education, another domain strongly associated with the state. Previous studies show that INGO ties have a significant positive influence on

[9] Save the Children, UK's involvement in Malawi's EPI is discussed in Part II, Chapter 6.

higher education enrollment (Schofer and Meyer 2005), which was not the case for vaccination coverage. However, no study simultaneously examines the influence of IGOs and INGOs on education. Do IGOs have a positive influence in this case, too? And if not, what implications would this have for the general influence of IGOs versus INGOs on the spread of global norms.

PART I, CHAPTER 3

PERSISTENCE AND CHANGE IN GLOBAL IMMUNIZATION PROGRAMS

In the 37 years since the WHO began the EPI, it has never stopped promoting broad-based immunization programs. However, despite this persistence, the immunization programs themselves have constantly changed. Efforts to promote broad-based immunization programs officially began in 1974 when the WHA passed a resolution creating the EPI. However, at that early date the organization had few ideas about how immunization programs ought to be organized in the developing world – the main target of efforts. Even by 1977, when the program entered its operational phase, ideas about how such programs should be run were only beginning to coalesce around a new model – primary health care – as the EPI became an integral part of that new program and of WHO Director-General Halfdan Mahler's "Health for All by the Year 2000" campaign.

No sooner had the nature of the PHC approach solidified in the late 1970s and early 1980s than major aspects of it came under fire in the face of stagnating vaccination coverage in some parts of the developing world. The organization struggled to meet its ambitious goal of universal childhood immunization by 1990,[1] adopting new tactics to do so. However, greater changes were in store. In the late 1980s, program goals underwent significant changes, shifting from a focus on increasing vaccination coverage to a focus on disease reduction targets, including goals to decrease measles mortality by 90%, to eradicate polio and to eliminate neo-natal tetanus as a public health problem. In 1988, the WHA adopted the goal of eradicating polio by the year 2000, and a year later it set two additional targets: the NNT elimination and significant decreases in measles mortality. The early 1990s brought further changes, with the creation of a new vaccine research program, the CVI, in 1991, and the beginning of efforts to introduce new vaccines, particularly the hepatitis B vaccine, into the EPI in 1992.

These changes created an increasingly fragmented program in the 1990s. Three major new efforts had been added to the original EPI program: polio eradication and other targeted disease-control efforts, vaccine research and integration of new vaccines into the EPI. Each effort had its own particular logistical needs and faced its own particular challenges, breaking the strategic unity at the heart of the original PHC-centered EPI campaign. This change found expression in the changing shape of program advice, as the WHO ended meetings of its Global Advisory Group, first created in 1978 to advise the EPI, replacing it with the Strategic Advisory Group of Experts, which gave expert advice to all the various elements of the expanding immunization program. However, changing advisory bodies could not overcome a more pressing problem facing the expanding program: financial constraints. New programs and old struggled to meet their various goals while drawing on the same donor pool, creating major financial constraints for all programs, as discussed in greater detail in Chapter 4. The monetary problems created by the diversifying program were only (mostly) solved when the

[1] Eventually defined as 80% global coverage with the four EPI vaccines: BCG, DPT, measles and polio vaccines.

nascent Bill & Melinda Gates Foundation began its Children's Vaccine Program, pouring tens of millions of new dollars into all of the WHO's immunization programs.[2]

This chapter examines programmatic changes in the WHO's immunization programs during the volatile years from the beginning of the EPI in 1974 through the end of the 20th century. It pays particular attention to changes in the programs' driving visions and in major program policies. I draw on four main sources in tracing these developments: (1) debate and decisions made at the annual meetings of the WHA, which sets official WHO policy, (2) the WHO's technical documents related to immunization programs, (3) reports and proceedings from the meetings of advisory groups, like the GAG and SAGE, and (4) publications about immunization programs appearing in the *Weekly Epidemiological Record* (*WER*).[3]

The EPI's first quarter century was marked by frequent changes as the program developed tactics for carrying out immunization in the developing world, established its first concrete program goals, struggled to meet those goals and then tried to build and expand on its early experiences. In tracing these developments, this chapter is divided into three sections, covering three overlapping time periods. The first looks at the first eight years of the program, from 1974 to 1982, during which the program shifted from a novel experiment to a key component of the WHO's PHC program and Health for All campaign. The second section looks at the key years of the Health for All campaign, from 1982 to 1988, when the PHC approach to immunization dominated program policy. It pays particular attention to the discovery and response to high "drop-out rates" – i.e. the percent of children who, after receiving initial doses of vaccines, failed to complete the recommended series – and to efforts to achieve universal childhood immunization.

Finally, the third section looks at major shifts in program policies for the 1990s and difficulties arising from them during that decade. This was a turbulent period for the WHO's immunization programs, and many major new programs began during it. Reflecting this turbulence, this section is divided into three subsections. Major policy shifts truly began in 1988, when the WHA passed a resolution calling for the eradication of polio by 2000, but these changes were presaged by years of discussion and debate within the GAG. The first subsection traces these beginnings, tracing the discussion of disease reduction within the GAG and how it ultimately led to a shift in policy from one that emphasized vaccination coverage to one that emphasized disease reduction targets. A second subsection focuses on programmatic changes, as the WHO began major new

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[2] For a detailed discussion of the creation of the Children's Vaccine Program and an insightful look at internal politics between global health leaders struggling to sustain and expand children's immunization during this period, see Muraskin, William. 1998. *The Politics of International Health: The Children's Vaccine Initiative and the Struggle to Develop Vaccines for the Third World*. New York: State University of New York Press.

[3] I identified articles using the *WER*'s annual subject index for each year from 1977 to 2000. "EPI" entered the subject index in 1977, and continued as the only dominant subject heading until 1993. In 1994, a second major subject heading entered the index: the GPV of "Global Programme for Vaccines and Immunization." In 1998, the subject "Vaccines and Immunizations" displaced both of these subjects. For all periods, subject headings existed for individual vaccine preventable disease as well. However, prior to 1998 most of the articles listed in these subject headings either were also listed under the more general immunization subject headings or did not focus on subjects directly relevant to WHO's immunization programs. As a result, I exclude these articles prior to 1998. *WER* articles are brief and generally include no author, although information on sources is available. They summarize findings from numerous sources, including other published articles, national reports, meeting reports and findings from WHO-led evaluations.

programs, like polio eradication, while continuing its universal childhood immunization effort. This section also looks at the growing influence of other international health organizations and groups over WHO policy during this period. The last subsection explores fallout from these program changes, particularly focusing on how program strategies came to diverge as the programs adopted more disease specific or particularistic goals.

The EPI Experiment: 1974 to 1977

A few years after it began, the EPI become a core component of the WHO's PHC program. Focused on developing basic health services (including immunization) and on a "horizontal" approach to health, the PHC movement developed throughout the 1970s before reaching its zenith with the 1978 International Conference on Primary Health Care in Alma Ata, USSR, which issued the "Declaration of Alma Ata," outlining the principles of this approach to health care. Within the WHO, this movement was particularly associated with the "Health for All by the Year 2000" campaign, which included universal childhood immunization by the year 1990 as one of it goals. However, while the link between the two programs emerged early on,[4] it did not exist at the very beginning of the EPI. Instead, the program emphasized innovation and experimentation in its first years as it sought to develop childhood immunization programs suited to the developing world.

Little was known about how to carry out childhood immunization programs in the developing world in 1974. This lack of knowledge was clear at the new program's inaugural seminar in November of that year: the *First WHO Seminar on the Expansion of the Use of Immunization in Developing Countries*, held in Kumasi, Ghana. The conference specifically addressed the problems African countries faced in beginning immunization programs, with participants coming from 11 Anglophone African countries[5] and from one regional health organization, the *Organisation de coopération et de coordination pour la lutte contre les grandes endémies* (OCCGE).[6]

The final report highlights how much was unknown about running immunization programs in the developing world, identifying many areas where practices and materials better-suited to the needs and constraints faced by developing countries needed to be developed or where knowledge was more generally inadequate, including disease surveillance,[7] anticipated program costs,[8] cold chain maintenance,[9] methods of vaccine

[4] The 1976 EPI progress report first explicitly linked the EPI to PHC, declaring: "WHO encourages the idea that routine childhood immunization should be regarded as part of primary health care, delivered by the basic health services. The need for, and provision of, maternal and child health services to most populations in the developing world appear best served by a holistic approach to the planning and implementation of national programmes, and of WHO's potential contribution to them." See A29/16. 1976. "Expanded Programme on Immunization: Progress Report by the Director General." pg. 2

[5] Ethiopia, Ghana, Kenya, Liberia, Nigeria, Sierra Leone, Somalia, Sudan, Uganda, Tanzania and Zambia.

[6] The OCCGE represented many of the countries of the former French West Africa. It existed from 1960 to 1998, when it joined with Anglophone West African Health Community to form the West African Health Organization (WAHO).

[7] A29/16. 1976. "Expanded Programme on Immunization: Progress Report by the Director General." pg. 3.

[8] *Ibid.* pg. 6.

[9] *Ibid.* pg. 8.

administration,[10] ideal vaccine schedules,[11] methods of program assessment[12] and ideal coverage targets.[13] In the face of the many unknowns, recommendations focused almost exclusively on the need for research and experimentation. The report notes:

> Since the conventional immunization strategies of developed countries are not feasible elsewhere, owing to the existence of so many constraints, new strategies must be devised that take account of local epidemiological conditions and population densities...
>
> The planning of countrywide or provincial immunization strategies must be undertaken by people who really know about local conditions. Although WHO has experience of various strategies in different countries, which might be helpful for technical comparisons, the main social political, and administrative elements of the strategy are most likely to be suitable and acceptable if they arise from local experience and new ideas.[14]

The call for experimentation did not go unanswered. The WHO itself established an experimental immunization program in Kenya, which served as a laboratory for assessing different vaccine delivery strategies, disease trends and morbidity/mortality, and even vaccine schedules.[15] As discussed in greater detail in Chapter 6, OCEAC, with aid from the CDC and USAID, established another experimental program in Yaoundé, Cameroon. A series of articles on the EPI program appearing in the *Weekly Epidemiological Record* (*WER*) starting in 1977 give some details about these and other experimental programs, showing the range of strategies applied in these early years.[16]

Consider programs in Kenya, Burma, Indonesia and Cameroon. Kenya's program aimed to reduce the incidence of polio, tuberculosis, measles, tetanus and pertussis and originally concentrated on equipping fixed health centers, so that they could offer vaccinations with all four EPI vaccines daily, and on improving training and reporting. However, an early external program evaluation[17] showed that coverage dropped

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[10] *Ibid.* pg. 9-10.

[11] *Ibid.* pg. 10-11. This section particularly illustrates the fundamental lack of knowledge facing the program. Unanswered questions included the ideal age for measles vaccination and the number of doses of DPT vaccine needed to establish immunity. It advances a tentative vaccine schedule with included two sessions, one before and one after six months of age. However, it called for further studies on the advisability of a two- versus three-dose schedule. The two-dose schedule would quickly be rejected in light of such studies.

[12] *Ibid.* pg. 11-12.

[13] *Ibid.* pg. 13.

[14] *Ibid.* pgs. 19-20.

[15] See the series of technical papers detailing aspects of the program from a 1976 meeting of an EPI working group. EPI/WG/76/1-24.

[16] Between 1977 and 1978, 17 articles about 12 different programs appeared in the *WER*. Articles discussed programs in Kenya, Burma, Indonesia, Egypt, Cameroon, Sri Lanka, Tanzania, the Philippines, Brazil, Barbados, Bangladesh and the Dominican Republic.

[17] Unfortunately, the *WER* article (1977, 52(10), pgs 93-4) provides little information on who carried out this evaluation. It simply notes: "A team consisting of a statistical officer, a public health officer and a vaccinator undertook the assessment" (94), with no information about evaluators' organizational affiliations. The working paper from which this article is drawn likely includes more detail, but this paper is not generally available.

significantly as distance from health centers increased, so Kenya began a two-year experiment testing mixed strategies in one rural district early on. The mixed component involved a mobile team holding semi-annual vaccination sessions in villages without easy access to fixed health centers. Burma had similar targets and also vaccinated through fixed center, but included only three of the four vaccines (polio, DPT and BCG) in its programs. In addition, centers offered vaccinations only during the first week of each month due to cold chain limitations. Indonesia differed both in terms of objectives (which concentrated on vaccine coverage targets for DPT and BCG vaccines only) and strategy. Instead of concentrating on fixed centers, Indonesia used both fixed centers and its former smallpox vaccination teams, which traveled to villages four times per year to hold vaccination sessions. Finally, Cameroon had a mobile vaccination team travel to fixed centers on a monthly basis to offer vaccinations with all four EPI vaccines.

Early discussions and experimental programs gave little hint of the goal and strategy the EPI would adopt in 1977 when it became part of the WHO's PHC program and adopted the 1990 universal child vaccination goal. Of eight country programs[18] discussed during a 1976 meeting of the EPI Working Group, only one self-consciously pursued a "primary health care" strategy,[19] and none adopted universal childhood immunization as a major program objective, with most instead adopting disease control objectives.[20] The working group did discuss PHC, which was one of four "general issues" discussed by the group,[21] but group members were skeptical of the approach. The discussion focused on Guinea Bissau, which had instituted a PHC approach to health care following the end of a war for independence. Group members voiced skepticism about how applicable tactics employed in Guinea Bissau would be to "other situations without the same degree of village cohesion" and noted that Guinea-Bissau-style PHC (ostensibly "community generated, community implemented and community evaluated") often led to "call[s] for curative, hospital care – not preventive medicine." The group developed another definition of PHC, which was seen as more compatible with the EPI: "health care integrated with social, economic and agricultural development."[22]

Experimental programs expressed a decided preference for program objectives tied to reductions in disease burden,[23] but these goals were hampered by the poor quality

[18] The working group reviewed extensive operational and vaccine research carried out as part of Kenya's program as well as plans from Ghana, Indonesia, Burma, Sudan, the Philippines, Egypt and Nepal. See EPI/WG/76.1-24.

[19] The Sudanese program was self-consciously designed as a "primary health care" program. See EPI/WG/76.18. "EPI Country Profile: Sudan."

[20] For example, Burma's program objectives included an 80% drop in polio cases, 75% drop in diphtheria cases, 62.5% drop in pertussis cases, 60% drop in neo-natal tetanus cases, 39.7% drop in tuberculosis cases and 26.8% drop in overall tetanus cases over a five-year period.

[21] The other three included: coordination of assistance, vaccine supplies and procurement, and future policies and strategies.

[22] "Report of the WHO Working Group on the Expanded Programme on Immunization." EPI/WG/76.24. pg. 23-4. Although the report notes points of discussion, it does not indicate which members of the group voiced which opinions.

[23] Vaccination coverage targets set goals for the percent of the target population, generally children under one or two years of age, to be vaccinated. Disease reduction targets, on the other hand, set goals related to reported disease incidence, seeking to decrease disease burdens by a certain amount over a fixed period. The former, although much easier to measure, also ignores the main purpose of vaccination: preventing disease. After all, a high coverage rate is meaningless if defective vaccines do not provide protection against target diseases. However, the latter also posed significant problems: disease surveillance was often

of most disease surveillance data. Data presented varied considerably in source and quality, ranging from a two-year active surveillance study of measles and pertussis in Kenya to pediatrician's assessments of the seriousness of polio and pertussis in the Philippines and Nepal, respectively. Only polio included any kind of comparable data, with both Burma and Ghana reporting results of school-based residual paralysis surveys. Measles data were particularly bad: three of the eight countries included no data on measles burden[24] and only Kenya purported to offer reliable measles data.

Program organizers also recognized the need to evaluate vaccine coverage,[25] but even this proved a challenge for early programs. A discussion of Kenya's program highlighted difficulties assessing vaccination coverage:

> While we have been able to do an independent assessment of coverage of smallpox and BCG vaccination, we have not been able to repeat the same exercise with other vaccinations. The reason being that we have not evolved a simple reliable method which does not entail serological determination. Issuing of cards, after vaccination and the checking how many children have had such cards for particular immunization have been made on a limited basis.[26]

Other countries relied on "scar marker" systems, with BCG and/or smallpox vaccinations serving as indicators that other vaccines had been given. Coverage would then be evaluated using "scar surveys." For example, Burma's vaccination schedule called for BCG vaccine to be administered simultaneously with the first dose of polio and DPT vaccines and for smallpox vaccine to be administered simultaneously with the third dose

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very poor, making disease burden data virtually meaningless. Among early EPI programs, Kenya's objectives included reduction of disease incidence by 20% for polio, 50% for tuberculosis, 25% for measles, 50% for tetanus and 75% for pertussis by 1984. Burma's objectives included an 80% reduction in polio incidence, 75% reduction in diphtheria, 62.5% reduction in pertussis, 60% reduction in neo-natal tetanus, 39.7% reduction in tuberculosis and 26.8% reduction in tetanus by 1982. Egypt's objectives included an "immediate and sustained" 80% reduction in cases of paralytic polio, maintaining steady reduction of tuberculosis cases and a 50% reduction in measles cases, 80% reduction in neo-natal tetanus cases, 60% reduction in total tetanus cases, and total prevention of diphtheria over the following five years. Indonesia, the Philippines and Sudan broke with this trend, instead instituting vaccination coverage objectives, whereas Nepal's goals focused on access to immunization and program expansion.

[24] Many experimental programs both lacked data on measles morbidity and mortality and did not include measles immunization in their programs. Of countries presenting at the meeting, Indonesia, Burma and Sudan included no data on measles. Indeed, Indonesia and Burma included no discussion of measles at all and followed other Asian countries in not including measles immunization in their early EPI plans. The Philippines and Nepal's plans hint as to why. Both excluded measles immunization from their programs despite high known levels of measles morbidity and mortality, and both cited "technical feasibility" in justifying this choice, with the Philippines also pointing to financial constrains. (See EPI/WG/76.19&76.22). The group's final report (EPI/WG/76.24) acknowledges that measles was generally considered to be less of a health problem in Asia than in Africa at that time, although it lists better data on measles burden, morbidity and mortality in Asia as one of the EPI's operational research goals.

[25] The working group's discussion of country programs lauded programs for setting "quantifiable" targets, but also noted: "Evaluation of both process (vaccine potency, team performance, coverage rates) as well as outcome (disease morbidity and mortality) must be incorporated in programmes from the beginning." EPI/WG/76.24 pg. 19-20.

[26] Karuga, W. Koinange. "Immunizations in Kenya." EPI/WG/76.5. pg. 2.

of each.[27] Program managers would then use scar surveys to evaluate coverage with all four vaccines, a method subject to many limitations.[28] Indonesia, Sudan and the Philippines used (or planned to use) similar "scar marker" systems, whereas Ghana and Egypt indicated no specific coverage evaluation system. Nepal followed a different tactic, using colored cards:

> Each immunization level of the infant (1st, 2nd and 3rd DPT given) will be automatically exchanged for the next colour at the next immunization session. In this way returned cards can be used to count numbers of second and third attendances at each session. Also, for sampling of target populations the colour of the cards in the houses will provide clear indicators of coverage.[29]

None of these systems was ultimately adopted by the EPI.[30] Instead, the program would endorse a similar to the card-check technique: cluster-sample immunization surveys. This system is first discussed in the EPI Field Manual, published in 1977.[31] The method estimated coverage by randomly selecting 30 villages per region and then sufficient households to identify at least seven children in the target ages per village. Evaluators would then review selected children's vaccination cards, which indicated when and which vaccinations children had received to determine vaccination coverage.[32] Vaccination cards overcame the limits of scar marker systems,[33] while the cluster-sampling method ensured that coverage could be estimated at relatively little expense and despite the lack of population registers.

The development of cluster-sample immunization surveys likely explains why the EPI adopted universal childhood immunization as its first major program goal, despite

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[27] As with other Asian countries at that time, Burma did not include measles vaccine in its national vaccination program.

[28] There were many problems with this system. First, only two of the five vaccines endorsed by the EPI program (BCG and smallpox) produced scars. Using these vaccinations as markers for non-scarifying measles, polio or DPT vaccines required evaluators to assume that vaccinators followed procedures correctly and that the population did not have access to vaccination from sources not integrated into the national program. Second, the marker system required the continued use of smallpox vaccination – a procedure that would no longer be necessary after 1980 with the eradication of smallpox. Third, only two "markers" were possible while polio and DPT vaccine required three doses (although some studies explored the efficacy of two-dose regimens, none of which would ultimately be endorsed by the program) and measles vaccine was not generally effective if administered before nine-months (although the ideal age for measles vaccination was an open question in 1976, with some arguing for measles vaccination starting at six months – the program would ultimately recommend nine-months). Simply put, even assuming markers were a reliable indicator of vaccination with non-scarifying vaccines, there were not enough markers to show that all seven non-scarifying vaccinations had occurred.

[29] "EPI Country Profile: Nepal." EPI/WG/76.22. pg. 2.

[30] As discussed below, the EPI instead endorsed a system relying vaccination cards (and mother/care-taker recall).

[31] "Expanded Programme on Immunization (EPI) Field Manual 1977." EPI/G. Book V: Programme Evaluation, Section 2: Evaluation of Coverage.

[32] In practice, evaluators also relied on interviews with mothers to determine vaccination coverage levels, although results generally distinguished estimates derived from cards alone from those supplemented by such information.

[33] In practice, rates of card-retention varied and reported coverage often also included data based on mother/care-giver recall. As surveyors asked only about the previous year, recall was likely fairly accurate.

the decided preference for disease control targets in early national programs. It was possible to assess vaccination coverage, whereas there was no way to truly gauge effects on disease trends at that time. The following section explores the adoption of this new goal and the development of a PHC approach to immunization as the EPI became part of the WHO's Health for All campaign and PHC program.

PHC and Universal Childhood Immunization

Starting in 1977, emphasis began shifting from experimentation to primary health care as the EPI became a key component of the WHO's Health for All campaign. A year later, the creation of the EPI's GAG helped give further precision to the program and proved particularly important for providing more coherent program development. Yet, this coherence remained incomplete due to a fundamental tension within the Health for All campaign itself. This campaign sought to encourage the development of primary health care, but it also instituted specific Health for All goals. For immunization, the PHC approach and the Health for All goal, universal childhood immunization by 1990,[34] would prove to be only partially compatible. Although these tensions were not fully apparent in the early years of PHC, the development of these two defining features of the early EPI program highlights their independence from one another.

Pursuing Universal Childhood Immunization and Defining PHC

The late 1970s and early 1980s saw a major change in the program, as it became a major part of the WHO's Health for All campaign with its emphasis on the importance of primary health care. In 1977, the WHA passed a resolution endorsing the EPI's first major program goal: achieving universal childhood immunization by the year 1990.[35] A year later, another resolution emphasized the EPI's link to the newly established primary health care program.[36] At this early date, there were few hints that the two goals (PHC and universal childhood immunization) would prove more difficult to link in practice than in theory. Cluster-sample coverage surveys were giving the first reliable data on vaccination coverage in the developing world, and the newly created GAG was only beginning to define PHC's meaning for childhood immunization.

The new cluster-sample method proved very popular and was used extensively by national EPIs throughout the world.[37] Articles detailing results of such surveys began appearing in the *Weekly Epidemiological Record* as early as 1979.[38] That year, four

[34] As part of this broader campaign, the WHO sought "to provide immunization against [polio, measles, diphtheria, tetanus, pertussis and tuberculosis] to every child in the world by 1990." See 1977. "Expanded Programme on Immunization: Progress Report by the Director-General." Dated 19 April 1977. A30/13. The report was endorsed by the WHA in resolution WHA30.53.

[35] See 1977. "The Expanded Programme on Immunization." Dated 19 May 1977. WHA30.53. The resolution endorses program goals and policies detailed in greater detail in the 1977 progress report. See 1977. "Expanded Programme on Immunization: Progress report by the Director-General." Dated 19 April 1977. A30/13.

[36] See 1978. "Expanded Programme on Immunization." Dated 24 May 1978. WHA31.53.

[37] Both Cameroon and Malawi relied on almost entirely on this method to assess vaccination coverage for their programs through 1990. See discussion in Part II, Chapters 5 and 6.

[38] These articles reported results of evaluations carried out in 1978.

articles from three countries[39] reported results of coverage evaluations using the new method. From 1979 to 1982, the vast majority of articles reporting vaccination coverage figures explicitly cited the WHO's cluster-sampling method, with seven new articles appearing in 1980, 11 in 1981 and seven again in 1982.[40] These 25 reports came from 21 different countries many from the developing world,[41] including Algeria, the Ivory Coast, Papua New Guinea, Turkey, Thailand, the Congo, India, the Democratic Republic of the Congo,[42] Botswana, Sri Lanka, Burma, Yemen, Kenya, Indonesia, Gabon, Rwanda, Morocco, the Gambia, Bahrain, China and Jordan.

Cluster-sample vaccination coverage surveys were an essential tool in pursuing the goal of universal childhood vaccination. The surveys, along with later attempts to improve routine reporting on vaccination coverage to elicit the same information,[43] made program progress visible, allowing the global community as a whole and program directors in particular to assess progress and impediments to reaching the universal childhood immunization goal. The surveys could be (and often were) combined with assessments of reasons for non-participation as well, giving even more important information to program managers.

The cluster-sample immunization survey provided the programs with essential information needed to track progress in individual programs, but tracking progress toward meeting the global goal required more systematic global information systems. EPI staff and the GAG focused extensively on this essential problem from 1977 onwards. Improving global data on childhood vaccination coverage was one of the program's major focuses in its early years. Its importance can be seen clearly in GAG reviews. During this period, the GAG was divided into three working groups: global strategies, program implementation and research and development. The global strategies group focused on promoting a PHC approach to immunization, on encouraging increased funding from both the global and local levels, and on information and evaluation systems, broadly understood. The program implementation group focused on training, the cold chain,[44] program operations and expansion on the national level, and program evaluation.

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[39] Algeria, the Ivory Coast and Papua New Guinea.

[40] Ten articles, total, reported on vaccination coverage in 1980: the three others came from Canada, the USA and Brazil. In 1981, 15 total articles appeared, with those not explicitly referencing the cluster-sampling method coming from the UK, Poland, Australia, and the Netherlands. In 1982, 13 total articles appeared, with countries not explicitly referencing the method including Canada, Panama, Bolivia (which reported on a new extensive EPI review method in use in the Americas, with no specific reference to methods used to assess vaccination coverage), Syria and Cuba.

[41] Latin American countries are notably absent from the list, and articles about their activities either do not specify coverage assessment methods used or make it clear that they did not use the cluster-sample technique. Available assessments make it clear that both immunization systems overall and reporting systems in particular were generally better developed in the Americas than elsewhere in the world, allowing most countries in Latin America to rely on routine reporting systems to assess vaccination coverage.

[42] Known then as Zaire.

[43] An article appearing in the *WER* in 1981 detailed a new reporting method that, by providing accurate information on immunizations by age group, would allow public health personnel to estimate vaccination coverage. See 1981. "Expanded Programme on Immunization: Graphic Monitoring of Vaccination coverage." WER. 56(11). pg. 85.

[44] Training and the cold chain development seem to be the two most important activities carried out by the EPI at this time. The first dealt with the enormous human resources problem faced by the program: there simply were not enough personnel knowledgeable about vaccination techniques, vaccine handling and

Finally, the research and development group reviewed research on information systems, on improving vaccines (with a focus on improving the four vaccines used by the program), on equipment (especially the cold chain) and on improving "methods" (i.e. used in vaccine manufacturing or shipping). All groups were concerned with assessing coverage in some way (information systems, evaluation).

However, there was much work to be done. In 1977, knowledge about vaccination coverage was generally so poor that EPI staff did not even attempt to estimate it in their progress report. The next year's report drew on reports of total immunizations given in 42 countries to establish coverage estimates for BCG, DPT, polio and measles vaccines. Although the EPI staff used assumptions that surely led to over-estimates of coverage,[45] estimates were still very low for all vaccines except BCG, at 7% each for DPT and measles, 8% for polio and 59% for BCG.[46]

Given this lack of information, establishing reliable information systems was a major program goal, and the GAG reviewed progress in this area at its annual meetings. Progress was clear but slow. By 1979, the GAG's global overview reported coverage levels in two countries (Brazil and Egypt) and in parts of six others (India, Indonesia, the Philippines, Thailand, Turkey and Burma).[47] The 1980 report compiled coverage estimates from 71 vaccination coverage surveys carried out in 1979 and 1980.[48] By 1981, coverage estimates were available from parts of three of the six WHO regions: covering 60% of the Americas, 19% of South-East Asia and 99% of the Eastern Mediterranean, although estimated coverage remained well below the goals established for 1983.[49] No

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program management to run programs in most developing countries. The EPI helped organize scores of training sessions for program managers and mid-level health workers around the world and created and distributed materials for use in training for these groups and basic-level health workers. Cold chain management and cold chain research was another major activity, and the EPI also carried out training for cold chain managers, assessed cold chains around the world, and developed manuals for use by cold chain technicians. It also invested in cold chain expansion, one of the many objects of UNICEF funding in the early program. Finally, the program invested in major research to develop new cold chain materials better-suited to the needs of developing countries.

[45] Information included total vaccinations given, and estimates assumed that no vaccine was improperly administered and that all children beginning vaccination series for polio and DPT vaccine completed them.

[46] The report details the assumptions used and likely relation to actual coverage: "The following assumptions permit a rough estimate to be made of that number: (a) that all reported immunizations were given properly with potent vaccine, to children who were susceptible to the diseases in question; (b) that individual children received a series of three DPT and three poliomyelitis immunizations and one measles or BCG immunization; and (c) that, in continuing programmes, the annual number of births provides an estimate of the size of the target population for these immunizations. ...It should be emphasized that the assumptions used provide data which undoubtedly err in showing higher coverage rates of susceptible children than were actually being achieved." See A31/21. 1978. "Expanded Programme on Immunization: Progress Report by the Director-General." Dated 31 March 1978. pg. 8-9.

[47] See EPI/GAG/79/WP.4. 1979. "EPI Global Overview." Annex 3, pg. 12.

[48] See EPI/GAG/80/WP.4. 1980. "EPI Global Overview." pg. 6.

[49] In the Americas, coverage was 54% with BCG, 37% for three doses DPT, 34% for three doses polio and 37% for measles. In South-east Asia, comparable figures were 17% for BCG, 15% for DPT, 2% for polio and only 0.1% for measles (the later two vaccines were often not included in programs because of cold chain or cost constraints, especially in the early years of the EPI). In the Eastern Mediterranean, it was 25% for BCG, 22% for DPT, 24% for polio and 31% for measles. See EPI/GEN/81/12. 1981. "Report of the Expanded Programme on Immunization Global Advisory Group Meeting: 19-22 October 1981, Washington, D.C." Annex 5, pg. 5.

coverage estimates were yet available for Africa, Europe or the Western Pacific.[50] The GAG's review summarized the situation nicely:

> Despite the considerable improvement in EPI-related information systems which has occurred in recent years, much remains to be done. As of end 1981, vaccination coverage was not known for 129 countries/areas, and reports on the incidence of the six EPI target disease had been received from only 85 countries or areas for the calendar year ending in December 1980. Information on the quality of vaccines being used was incomplete for 73 countries or areas.[51]

Thus, 1977 saw the EPI in possession of a method that would allow it to assess vaccination coverage, although use of this method and hence accurate data on coverage levels remained very limited. The following years saw considerable efforts to improve information systems to establish a reliable picture of vaccination coverage worldwide. In contrast, the other key component of the program, the PHC approach, remained entirely undefined in 1977. It was only after the creation of the Global Advisory Group in 1978 that policy recommendations began to clearly articulate what a PHC approach to immunization entailed. In their first report, issued in 1979, the GAG gave precise advice on this point:

> In achieving its own goals, the EPI contributes directly to the broader goals of primary health care. The EPI seeks to establish permanent immunization services which reach a high proportion of newborns and pregnant women as these populations are continuously being replenished. Such services are most cheaply and most sensibly provided as a component of more comprehensive preventive and curative health services, as, for example, maternal and child health services. The addition of immunization services, in turn, strengthens such other services. The EPI is therefore committed to primary health care by intent, as well as necessity, as this approach provides the most rational context for the provision of immunization services.[52]

In other words, the PHC approach to immunization requires permanent and continuous services that are part of "more comprehensive preventive and curative health services," preferably in the form of integrated maternal and child health services.

The GAG argued that integration was the best method for increasing vaccination coverage, but this was not the only reason it favored this integrated approach. Integration was also seen as an important means of using immunization to further maternal and child

[50] Reasons for lack of information varied. In Africa, such information was not generally available, whereas Europe only began actively participating in the EPI in the 1980s, when the region established regional immunization objectives that were often quite different from global objectives that were directed more at developing countries.

[51] EPI/GAG/81/12. 1981. "Report of the Expanded Programme on Immunization Global Advisory Group Meeting, 19-22 October 1981, Washington, D.C." pg. 13.

[52] EPI/GAG/79/REPORT. 1979. Report of the Expanded Programme on Immunization Global Advisory Group Meeting: 12-16 November 1978, New Delhi, India. pg. 10

health more generally, thus strengthening the entire PHC system. New immunization clinics could also provide nutrition services, track children's growth and development and offer basic curative services as well. Refrigerators used to store vaccine could (and were) used to store other heat-sensitive drugs, just as vaccination delivery systems could be used to deliver other drugs as well. Further, mobile vaccination clinics could add maternal and child health services as well, thereby expanding access to many aspects of PHC beyond immunization.

In subsequent meetings, the GAG reaffirmed its commitment to integrated immunization programs as the best tactic towards pursuing broader PHC goals, emphasizing the need to integrate immunization with other maternal and child health services. For instance, the 1980 GAG report notes that a PHC approach:

> might frequently include counselling and interventions related to nutrition (especially breastfeeding and weaning), child spacing, malaria, the control of diarrhoeal diseases, and the related problems of clean water and sanitation.[53]

After four years of meetings, the group developed more specific recommendations for the WHO, including a five-point action plan submitted to the WHA for approval in 1982. The first point of the plan was:

> (1) Promote EPI within the context of primary health care:
>
> - develop mechanisms to enable the community to participate as an active partner in programme planning, implementation and evaluation, providing technical and logistical resources to support these functions; and
> - deliver immunization services with other health services, particularly those directed towards mothers and children, so that they are mutually supportive.[54]

The WHA approved the plan and re-affirmed its commitment to the 1990 universal immunization goal in a 1982 EPI resolution.[55]

If 1982 saw growing clarity about and commitment to the PHC approach to immunization, it also saw nascent concerns about progress towards meeting the program's universal childhood immunization goal. The lack of information about coverage before the early 1980s made questions about program progress impossible to answer before this date. Instead, program organizers focused on establishing immunization programs organized along PHC lines and on improving global information systems. The two often went hand-in-hand: new programs often started with national or

[53] EPI/GEN/80/1. 1980. "Report of the Expanded Programme on Immunization Global Advisory Group Meeting: 20-23 October 1980, Geneva." pg. 3.
[54] A35/9. 1982. "Expanded Programme on Immunization: Progress and evaluation report by the Director-General." Also found as annex to EPI/GEN/81/12. 1981. "Report of the Expanded Programme on Immunization Global Advisory Group Meeting: 19-22 October 1981, Washington, D.C." Annex 5, pg. 39.
[55] WHA35.31. 1982. "Expanded Programme on Immunization." Dated 14 May 1982.

regional training sessions, and participants always carried out a cluster-sample coverage survey as part of their training.

However, as global information improved, actual progress raising coverage became of greater and greater concern. The GAG first expressed concern about the programs ability to meet its 1990 goal in 1981, when it noted that "much additional progress" was needed to meet coverage goals set for 1983, considered an initial step towards the more ambitious 1990 goal.[56] Wording was more forceful in the Director-General's 1982 EPI Progress Report, finalized by the GAG at its 1981 meeting. While detailing the progress made since 1977, it noted:

> But such progress is not enough: without major acceleration, the EPI risks failure in reaching all children of the world by 1990. Challenges for the immediate future can be grouped under five headings: human resources, primary health care, programme adaptation, material resources and research and development.[57]

Member states were more sanguine about these goals in the early years. Only two member states mention concern about coverage or the attainability of the 1990 goal during WHA debates in 1977, 1978 and 1979: Yugoslavia during the 1977 debate establishing the goal and Nigeria in 1979.[58] This indifference persisted in the 1981 debate, even though the Executive Board representative who opened debate on the communicable disease program noted both the 1983 goal (50% coverage with EPI antigens) and the actual (much lower) levels of coverage, where such figures were known at all:

> For the 1982-1983 period the specific target was 50% coverage of the population by immunization services by the end of 1983. Information systems were being strengthened to provide estimates of the vaccination coverage currently being achieved. For example, in the Eastern Mediterranean Region about 20% of children in their first year of life were receiving a third dose of DPT and poliomyelitis vaccines, and 18% a measles immunization. It was hoped that coverage estimates from all regions would be available for inclusion in a comprehensive review to be presented to the Board and the Health Assembly in 1982.[59]

Despite this invitation for comment on coverage levels, no country questioned the targets. Only the Pakistani delegate paid particular attention to coverage in his remarks, declaring:

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[56] EPI/GAG/81/12. 1981. "Report of the Expanded Programme on Immunization Global Advisory Group: 19-22 October 1981, Washington, D.C." pg. 11.

[57] EPI/GAG/80/WP.1. 1980. "DRAFT: Expanded Programme on Immunization Progress and Evaluation Report by the Director-General." pg. 2.

[58] Debates in 1977 and 1978 concerned proposed WHA resolutions regarding the EPI program. In 1979, discussion occurred as part of the WHA's overall review of the biennial program budget.

[59] A34/A/SR/9. 1981. "Committee A: Provisional Summary Record of the Ninth Meeting." Dated 18 May 1981. pg. 14. Comments from Executive Board report.

> WHO should place adequate emphasis on developing the methodology for achieving complete coverage by poliomyelitis and DPT vaccines in the 50% of the population that was the target for the biennium. That was the crux of the problem in countries where the literacy rate was low, the fertility was high, and the main concern of parents was to find food for the family.[60]

However, this situation would soon change as the 1990 deadline approached and as actual coverage and progress achieving coverage targets became clearer. The next section explores developments during the mid-1980s, when the program began fixing its attention more fully on challenges to achieving its 1990 goal.

Health for All in Crisis? The race to 1990

In 1982, WHO member states reaffirmed their commitment to the EPI, to the 1990 universal childhood immunization goal and to the PHC approach to immunization by passing a new EPI resolution endorsing a five-point action plan developed by the GAG.[61] That year also saw growth in concern about the EPI's progress toward meeting the universal childhood immunization goal. During debate, three countries' delegates[62] voiced concern about the feasibility of achieving the 1990 goal. Questions continued during debates about the WHO's program and budget in 1983 and 1985, with Chile questioning the attainability of the goal in 1983 and Finland, the Netherlands and Iran questioning its feasibility in 1985.

During this period, the GAG and EPI directors began seriously focusing on reasons why vaccination coverage often remained low, even after services became available and on ways to increase coverage where it remained low. This debate focused on efforts to meet the 1990 universal childhood immunization goal, and on the realization that adaptations made in an effort to achieve this goal did not always co-exist easily with the other main feature of the EPI program, its tie to the broader PHC program. This section discusses two ways the EPI responded to the problem of low coverage: (1) focus on the drop-out rate and (2) accelerated strategies.

Concern about the "drop-out rate" (i.e., the difference between coverage rates for first and subsequent doses of DPT and polio vaccines, or more generally the difference in coverage rates for any vaccination versus the complete series of recommended childhood vaccinations) emerged from investigations into reasons for continuing low vaccination coverage. Early information systems, which often only reported numbers of vaccines administered, were not sensitive enough to even identify this problem. Indeed, most articles about national EPI programs appearing in *WER* in 1977 and 1978 did not report on vaccination coverage by dose at all. However, the EPI's cluster-sample coverage surveys changed that, and in so doing, they brought the problem of high drop-out rates to light.

Of 52 articles published in *WER* between 1978 and 1985 that mention studies using the cluster sample coverage survey technique, only three fail to mention coverage

[60] A34/A/SR/10. 1981. "Committee A: Provisional Summary Record of the Tenth Meeting." Dated 18 May 1981. pg. 8. Comments from Pakistani delegate.
[61] WHA35.31. 1982. "Expanded Programme on Immunization." Dated 14 May 1982.
[62] India, Nigeria, Denmark and the Netherlands.

by dose. Thirty-five articles went beyond merely reporting coverage by dose to comment on the difference between coverage with one dose and full coverage (17 articles) or to mention the "drop" between first and subsequent doses of multi-dose vaccines or the "drop-out rate" (23 articles). These articles reflected a more general trend toward greater precision in coverage figures and more focus on the drop-out rate and the general problem of non-completion. From 1977 to 1985, 97 articles published in *WER* discussed vaccination coverage. Sixty-six of them discussed vaccination coverage by dose, with 22 discussing difference in coverage between first and subsequent doses of multi-dose vaccines and 28 specifically mention the "drop" in coverage between first and subsequent doses of multi-dose vaccines or the drop-out rate. There is a clear trend towards more focus on this "drop" or the drop-out rate over time, as can be seen in Figure 3.1, which shows what percentage of *WER* articles discussing vaccination coverage (1) reported coverage by dose, (2) discussed the difference in coverage between first and subsequent doses of multi-dose vaccines or (3) mentioned the "drop" in coverage or the drop-out rate.

[Figure 3.1 about here]

The first mention of the drop-out rate is in found in a review of Sri Lanka's EPI published in 1980. It notes:

> The drop-out rate between the second and the third doses for both DPT and OPV vaccines was found to be quite high - about 30%.[63]

That same year, the EPI Global Status Report commented on findings from the various coverage surveys carried out to date, noting differences both between coverage for first and subsequent doses of DPT and polio vaccines and differences between first dose coverage and measles vaccine coverage:

> Over one third of the surveys showed vaccination coverage of 75% or more for BCG and the first dose of poliomyelitis, and 26% showed this level of coverage for the first DPT. No survey showed this level of coverage for measles immunization. This may reflect an increased difficulty in reaching children of approximately nine months of age who are 'too small to walk and too big to carry'. Most surveys showed a drop off between the first and third DPT and poliomyelitis immunizations of approximately 30%.[64]

In response to that report, the GAG recommended studying the reasons for low and non-participation whenever survey results indicated that either was a problem.[65]

Sri Lanka had already begun such a study and published their results two years later, in 1982.[66] Their findings emphasized one major problem: refusal to vaccinate

[63] 1980. WER 55(43). pg. 330.
[64] 1980. WER 55(21). pg. 157.
[65] 1981. WER 56(2). pg. 11.
[66] 1982. WER 57(32). pg. 241-2.

mildly ill children. Seventy-one percent of mothers interviewed cited this as the reason their children had not completed the recommended immunization series. Similar studies in other countries did not always find the same reason for failure to complete vaccination series. A study of Yemen's program published the same year found that ignorance was the primary reason for failure to complete immunization series.[67] Further studies confirmed the importance of these two broad reasons: caregiver ignorance and mild illness, in other programs with high drop-out rates.

The two problems demanded very different responses. Recommendations for how to combat caregivers' ignorance emphasized the need for better health education, but it was less clear what to do about mild illness. In 1981, the WHO had no official position or recommendation about vaccinating mildly ill children. Member states had asked for greater clarity on both this and ideal vaccination schedules since the first years of the EPI,[68] and one of the three early GAG working groups, the Research & Development Working Group, focused on this problem, along with other pressing research problems facing the early program.[69] However, it would not issue a formal recommendation on the subject until 1983.

By 1982, the GAG had developed a set of recommendations on vaccine contraindications, emphasizing that risk of adverse reactions from the vaccines was very low, even in mildly ill or malnourished children. They concluded:

> [H]ealth workers should use every opportunity to immunize eligible children. The great majority of children attending health facilities are suffering from minor illnesses, frequently combined with malnutrition, and should be considered eligible for immunization.[70]

They prepared a draft paper on vaccine contraindications that was then circulated widely for discussion and possible amendment. The paper was reviewed again in 1983, when the GAG formally approved the document,[71] which became the official EPI position.[72] The report especially emphasized the need to immunize ill and malnourished children against measles, which affected malnourished children more severely than others and circulated widely in hospitals and health centers.

This position on vaccine contraindications opened up a new possibility for those concerned with continuing low coverage and with high drop-out and low-completion rates: immunizing children brought to health services for other reasons. From 1983 to 1985, three studies published in the *WER* explored possibilities for increasing coverage by focusing on mildly ill children. The first was carried out in Cameroon, where

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[67] 1982. WER 57(28). pg. 217-20.

[68] For instance, the Ghanese delegate asked for clarification about the earliest ages at which various EPI vaccines could be administered during the 1974 debate. Two years later, the Nigerian delegate asked whether it was safe to vaccinate malnourished children.

[69] Developing disease surveillance methods and improving the cold chain were also major foci.

[70] EPI/GEN/82/6. 1982. "Report of the Expanded Programme on Immunization Global Advisory Group Meeting, 18-22 October 1982, Brazzaville." pg. 4

[71] See overview in EPI/GEN/83/7. 1983. "Report of the Expanded Programme on Immunization Global Advisory Group Meeting, 31 October – 4 November 1983, Manila." pg. 31.

[72] See EPI/GEN/83/6 Rev. 1. 1983. "Indications and Contraindications for Vaccines Used in the Expanded Programme on Immunization." and 1984. *WER* 59(3). pg. 13.

investigators surveyed parents who brought their children to clinics for services about their willingness to vaccinate their children, if recommended: they found high levels of willingness to participate in immunization programs.[73] In 1984, a study carried out in Pakistan assessed the immunization status of children attending a health clinic and investigated reasons for non- or partial vaccination coverage, finding mild illness as the main reason. Finally, a 1985 study, carried out in a hospital in India, reviewed hospital records to determine what percentage of patients at a pediatric out-clinic were eligible for and in need of vaccinations, finding that some 50% of patients fell into this category.[74]

These studies, the growing concern with persisting low vaccination coverage and the growing emphasis on the desirability of immunizing mildly ill children, especially in developing countries where access to health services was limited, culminated in the GAG including two recommendations related to these issues among three general and four specific actions recommended for the EPI in the report from their 1985 meeting:

> Provide immunization at every contact point. Immunization should be offered by all curative and preventive health services, even to children suffering from malnutrition or minor illness. Health workers should review the immunization needs of mother and child and provide the right immunizations at the right time. To ensure maximum possible protection at minimum cost, simplified schedules should be used in keeping with national needs, and excessive contraindications should be removed. If it is not possible to offer immunizations at a particular contact, referral should be made to the first available opportunity.
>
> Reduce drop-out rates between first and last immunizations. The measures recommended are to:
> - determine the drop-out rate through systematic review of health facility records or surveys;
> - identify reasons for non-participation and adopt measures to solve problems. Actions may include:
>
> - strengthening the participation of communities in immunization programmes, including the public, private and voluntary sectors and schools;
> - providing immunization services at more convenient times and places and increasing the use of regularly scheduled 'outreach' clinics;
> - better informing parents of the need to return for further immunizations and of times and places for doing so;
> - better identifying children who are eligible for immunization and actively seeking out those who are missed.[75]

[73] 1983. *WER* 58(5). pg. 29.
[74] 1985. *WER* 60(31). pg. 237.
[75] WHA/EPI/GEN/86/2. 1986. "Report of the Expanded Programme on Immunization Global Advisory Group Meeting, 4-8 November 1985, Copenhagen." Annex 4: EB77/27. pg. 17. The two goals mentioned are the first two "4 specific actions" recommended by the GAG.

The WHA received the GAG's report for its 1986 meeting and adopted the policies in a resolution passed that year.[76]

While focused on increasing vaccination coverage in an effort to meet the 1990 universal childhood immunization goal, these recommendations fit well into the PHC approach advocated by the EPI. They emphasized greater integration and community involvement, key aspects of the PHC approach to immunization. However, these recommendations were not the only response to low coverage developed over the period. The second response, accelerated strategies, fit less well with the PHC approach.

First mention of such strategies appeared in the 1983 GAG report, which included the following among three global conclusions and recommendations:

> Experimentation with innovative strategies to increase vaccine delivery may provide bases for significant operational changes provided the following general criteria are met: epidemiological relevance, technical validity, adequate monitoring and proper evaluation.[77]

The GAG followed up on this recommendation in their 1984 meeting, reviewing use of two general strategies: intensified activities (and particularly "national immunization days"), which were being used in Brazil, Colombia and Egypt, and a simplified vaccination schedule involving a two-dose DPT/IPV in place of the standard three-dose DPT/OPV schedule, which was being tested in Burkina Faso, Mali and Senegal.[78] Based on its review, it recommended further use of the first approach, intensified activities,[79] to meet the 1990 goal. As a further aid to member states, the EPI prepared a special guide to planning such accelerated services.[80] Finally, two recommendations regarding such approaches were among the three general actions recommended for the EPI and approved by the WHA in 1986:

> Adopt a mix of complementary strategies for programme acceleration. In countries where coverage is unsatisfactory or disease transmission persists, use intensified approaches such as national immunization days to

[76] WHA39.30. 1986. Expanded Programme on Immunization. Dated 16 May 1986.

[77] EPI/GEN/83/7. 1983. "Report of the Expanded Programme on Immunization Global Advisory Group Meeting, 31 October – 4 November 1983, Manila." pg. 4.

[78] EPI/GEN/85/1. 1984. "Report of the Expanded Programme on Immunization Global Advisory Group Meeting, 21-25 October 1984, Alexandria." pg. 14. OPV is oral polio vaccine, a live-virus vaccine delivered in drop form. IPV is inactivated polio vaccine, a killed-virus vaccine requiring injection.

[79] The group specifically recommended four potential intensified strategies:

> 1. accelerated implementation of existing plans;
> 2. use of periodic rounds of intensified activity ('pulses' or 'rounds');
> 3. designation of one or more days each year as national immunization days; on these days, all children in the target age group are immunized without regard to their previous immunization status; frequently only one vaccine is used (usually oral polio vaccine) and no attempt is made to complete the child's [immunization] record;
> 4. designation of one or more days each year as national immunization days; all vaccines are available and used according to the child's needs; each dose given is entered on the child's record. (EPI/GEN/85/1 pg. 3).

[80] WA 110 85PL. 1985. "Planning principles for accelerated immunization activities: a joint WHO/UNICEF statement." WHO Expanded Programme on Immunization.

> strengthen existing services and bring about rapid and sustained increases in vaccination coverage. Such approaches (including national immunization days) should use all EPI antigens whenever possible and should also consider provision of tetanus toxoid to women of childbearing age. A single national day could be proclaimed, or a series of single days, several consecutive days, or weeks.
>
> Ensure that rapid increases in coverage can be sustained through mechanisms which strengthen the delivery of other primary health care interventions. Accelerated efforts often represent extraordinary efforts. A major challenge will be to ensure that the progress made is maintained and that all immunization activities serve to strengthen the development of primary health care. Care must be taken to ensure complete immunization of all newborns on a continuing basis.[81]

These two recommendations regarding alternative strategies particularly reveal the unease caused by new accelerated efforts, with the first urging adoption of new approaches while the second warns against potential problems countries must guard against in doing so. Unlike efforts focused on decreasing the drop-out rate or ensuring immunization at all contact points, accelerated efforts did not fit easily into the primary health care model adopted in the late 1970s and early 1980s. While the original PHC approach emphasized integration and routine health services, new "accelerated" efforts generally focused only on immunization and were the very opposite of "routine," instead employing mass immunization tactics. However, with the 1990 deadline approaching and some notable successes from early experiments with such approaches, they received a half-hearted green light from the EPI, entering official policy in 1986.

Accelerated strategies, and particularly "National Immunization Days" (NIDs) would gain greater popularity in the 1990s. They first gained a key place in program policies as part of the polio eradication campaign and gained greater prominence in intensified measles control efforts towards the end of the decade. Before discussing this shift, I first explore a greater change: the shift in focus from vaccination coverage to disease reduction.

Immunization Post-PHC: New Goals, New Focuses and New Problems in the 1990s

Shifting Focus: From Vaccination coverage to Disease Reduction

Disease reduction targets finally entered official EPI policy in 1986, after which they gained an increasingly important part in the EPI's major program goals. However, official policy change resulted from much earlier efforts. Indeed, disease reduction targets had been much more popular than coverage targets for the earliest EPI programs, as discussed above. Only the lack of reliable disease surveillance data led to an exclusive

[81] WHA/EPI/GEN/86/2. 1986. "Report of the Expanded Programme on Immunization Global Advisory Group Meeting, 4-8 November 1985, Copenhagen." Annex 4: EB77/27. pg. 17. These are the second and third general recommendations. The first concerned the need for collaboration between different government ministries, different organizations, individuals and the public and private sectors to further program goals.

focus on vaccination coverage in early program goals. However, this same lack led to concerted efforts to develop the means of gaining such reliable data from the earliest moments of the program, and this focus intensified in the 1980s, even as new efforts and recommendations focused on increasing vaccination coverage.

In its first discussions of disease surveillance, the GAG simply emphasized the desirability of developing disease surveillance, in general, and of disease reduction goals in particular, calling for "the creation of simple national, Regional and global information systems which measure... morbidity and morality from the target diseases" in 1979[82] and endorsing "the principle of setting targets for the reduction of EPI diseases at the national, regional and global levels" and sentinel surveillance systems in 1980.[83] The GAG discussed disease reduction targets again in 1981 but decided that it was "premature" to set such targets at that time. However, they did urge further focus on three particular diseases: measles, polio and NNT.[84] This focus would continue throughout the rest of the period: increasing the priority for control of these three diseases was one of the four specific actions recommended to and endorsed by the WHA at their 1986 meeting.[85]

If the GAG could not endorse disease reduction targets in 1981, efforts to improve disease surveillance began offering hope for change soon after that. The GAG discussed developments in each of their annual meetings from 1982 through 1985, and these discussions reflect both overall developments in disease surveillance and how the particularities of these developments shaped program policies, particularly by leading to a focus on polio, measles and NNT.

During these years, GAG meetings often included special discussion of disease surveillance or particular vaccine preventable diseases in addition to its more general review of the EPI.[86] In 1982, the GAG discussed six special topics, three of which were dedicated to measles, polio and NNT.[87] In 1983, "disease surveillance and control" was

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[82] EPI/GAG/79/REPORT. 1979. "Report of the Expanded Programme on Immunization Global Advisory Group Meeting, 12-16 November 1979, New Delhi, India." pg. 4. The report also called for improved vaccination coverage data, as discussed in the previous sections.

[83] EPI/GEN/80/1. 1980. "Reporting of the Expanded Programme on Immunization Global Advisory Group Meeting, 20-23 October 1980, Geneva." pgs. 3-4.

[84] EPI/GEN/81/12. 1981. "Report of the Expanded Programme on Immunization Global Advisory Group Meeting, 19-22 October 1981, Washington, DC." pg. 13-4. Regional elimination efforts were welcomed as a necessary first step for global eradication efforts.

[85] A39/15. 1985. "Expanded Programme on Immunization: Progress and evaluation report by the Director-General." Dated 19 November 1985. pg. 18. This document was prepared by the GAG at their 1985 meeting and then considered by the Executive Board in 1985 before going before the WHA in 1986.

[86] This organization marked a change from GAG meetings in 1978-1980. Those years, the programs included review of the global and regional programs along with meeting of three special "working groups" dedicated to (1) global strategies, (2) program implementation and (3) research and development. 1981 was the first year the GAG did not convene these three working groups, instead focusing on eight areas "identified in 1980 for follow up": (1) the GAG's function and structure, (2) disease reduction targets, (3) evaluation in countries with well-developed immunization programs, (4) EPI training materials for PHC workers, (5) vaccine quality control, (6) cold chain research and development, (7) instrument sterilization and (8) research and development updates. From 1982 through 1985, the group always reviewed the global and regional programs and carried out an in depth review of one regional program, but it also convened meetings on various special topics.

[87] The others were vaccine contraindications, joint program reviews and health education/community participation. In addition, the GAG reviewed global and regional progress and carried out an indepth review of the EPI in Africa as part of its regular review activities.

one of only three special topics discussed by the group. In 1984, three of the four special topics of discussion focused on either a particular disease or disease surveillance, including discussions focused on pertussis,[88] on sentinel surveillance systems and on the surveillance of polio, measles and NNT. These subjects received less attention in 1985, when the group finished preparing a new report and resolution for consideration by the WHA, but the WHA did discuss a new global surveillance system using "local area monitoring" to better track global disease trends.

WER articles reflected this growing interest in disease surveillance and in specific EPI target diseases. Figure 3.2 shows what percent of total EPI-related articles focused on these topics from 1977 to 1986 and the three-year moving average of the same.

[Figure 3.2 about here]

After an early spike in 1979, there is a clear upward trend starting in 1982 and continuing throughout the end of this period, when over 50% of all EPI-related articles focused either on disease surveillance generally or on a specific EPI disease. As in GAG discussions, there was a particular focus on three vaccine-preventable diseases: polio, measles and NNT. Over 70% of all disease surveillance and disease specific articles published in this period focused on one or more of these three diseases, with 25.7% discussing measles, 25% polio and 23.4% NNT.

A paper on disease surveillance and disease reduction targets prepared for and discussed at the 1983 GAG meeting[89] shows why these three diseases excited particular interest: disease surveillance was far easier for these than for the other three EPI target diseases. With regards to measles, the paper declares: "Sentinel surveillance[90] of measles cases may be the single best indicator of immunization programme effectiveness." It also highlighted the ease with which measles surveys could be carried out, both to confirm findings from sentinel surveillance systems and to carry out disease surveillance in areas where few measles cases ever came to the attention of health personnel.

The same paper noted three methods for polio surveillance: sentinel case surveillance at health facilities, sentinel lameness surveys of school children, and house-to-house polio lameness surveys. The latter was considered less appropriate as a means of continuous surveillance due to the large sample sizes required but was considered appropriate to document initial levels of polio and to provide precise estimates of program impact at later stages.

Unlike for polio and measles, sentinel surveillance was not considered a particularly desirable method for NNT surveillance, especially as NNT was an especially large problem in areas where few women received formal medical care when giving birth, instead relying on "traditional birth attendants." In contrast, surveys could provide excellent data on NNT cases due to the relative ease of diagnosis based on interviews with mothers. While not as simple as measles surveys, such surveys were seen as an ideal

[88] On this subject, discussion focused primarily on the challenges of pertussis surveillance and on the controversial whole-cell pertussis vaccine.

[89] EPI/GAG/83/WP.8. 1983. Dondero, Timothy. "EPI Target Disease Surveillance and Disease Reduction Targets." Dated July 1983.

[90] Sentinel surveillance is a system wherein certain zones, areas or facilities carry out more extensive disease surveillance and reporting than others, serving as an indicator for more general disease trends. The method is described in detail in the report as the preferred disease surveillance method for the EPI program.

way of documenting reductions in cases, even though less reliable sentinel methods were considered more practical for routine reporting purposes.

In contrast to these three diseases, pertussis, diphtheria and tuberculosis posed major surveillance challenges. Difficulties diagnosing pertussis meant that "surveillance by any method [was] more difficult and less reliable" than for measles.[91] Diphtheria presented similar problems, as its diagnosis required a laboratory "competent to perform diagnostic tests in suspected cases of tonsillar diphtheria."[92] In addition, this disease was relatively rare, creating still greater disease surveillance challenges. Finally, difficulties encountered with tuberculosis surveillance included problems diagnosing the disease and long incubation periods. In addition, many countries had (and still have) separate tuberculosis control programs using non-immunization based control methods,[93] meaning that any disease trends would not reflect effects of the EPI program alone.

This paper makes it clear that pragmatic considerations primarily drove the new focus on measles, polio and NNT. While all three were certainly major health problems, so were the other three EPI target diseases (particularly tuberculosis and pertussis). But disease surveillance, and hence ability to see immunization's impact on disease incidence, was far easier for polio, measles and NNT. The relative ease of surveillance for these disease meant that they could be the basis for global disease reduction targets, a long-term goal of the program, and a particular goal for the post-1990 period, a period during which program advisers wanted to move the program from vaccination coverage targets to disease reduction targets.[94]

This new interest in particular vaccine-preventable diseases and in disease reduction targets also found voice in three international meetings: one on measles and one on NNT in 1982 and a third on polio in 1983.[95] In addition to highlighting the interest in disease surveillance and, particularly, documenting disease reduction, these meetings each manifested another interest: eradication or elimination of the target disease. Both the measles and polio meetings emphasized the technical feasibility of eradicating those diseases. In summarizing the measles meeting, Samuel Katz emphasized the desirability of eradication, noting: "Although an initial goal is to use immunizations as a means of measles control an eventual goal must be that of measles eradication."[96] The polio

[91] EPI/GAG/83/WP.8. 1983. Dondero, Timothy. "EPI Target Disease Surveillance and Disease Reduction Targets." Dated July 1983. pg. 6. While the paper dedicates almost a full page to a discussion of appropriate surveillance methods for polio, measles and NNT, respectively, it contains only three sentences on pertussis surveillance, one of which highlights its difficulties.

[92] EPI/GAG/83/WP.8. 1983. Dondero, Timothy. "EPI Target Disease Surveillance and Disease Reduction Targets." Dated July 1983. pg. 7.

[93] BCG is of limited use in tuberculosis control because it does not provide protection against the most common, pulmonary forms of the disease. It was not the only or even the main TB control method used by most countries.

[94] In their 1981 report, the GAG recommended that national, regional and global programs be capable of setting disease reduction targets by 1988. See EPI/GEN/81/12. 1981. "Report of the Expanded Programme on Immunization Global Advisory Group Meeting, 19-22 October 1981, Washington, DC." pg. 15.

[95] In 1982 and 1983, the US hosted international symposia on measles immunization and poliomyelitis control, respectively. On measles, see EPI/GAG/82/WP.10. 1982. Samuel L. Katz. "Measles: A World Wide Update." For polio, see EPI/GAG/83/WP.9. 1983. "Conclusions on the International Symposium on Poliomyelitis Control, Washington, March 1983." From the 22-25 February 1982, the Eastern Mediterranean and South-east Asians regions hosted an International Meeting on Prevention of Neonatal Tetanus in Lahore, Pakistan. See discussion in EPI/GEN/82/6 and A35/SR/A and 1982. WER 57(18).

[96] EPI/GAG/82/WP.10. Katz, Samuel L. 1982. "Measles: A World Wide Update." pg. 3.

meeting came to a similar conclusion, as emphasized in the introduction to the symposium's report:

> In March 1983, a major international symposium was held in Washington to review the current situation of poliomyelitis in the world, and to examine the available and projected strategies, tools and methodologies which could be used to achieve the control or elimination of the paralytic disease within the foreseeable future. ... The major conclusion of the meeting was that there are probably very few, if any, technical problems remaining to block this goal.[97]

Even the NNT conference highlighted this new focus, despite the fact that NNT is not eradicable,[98] calling for an "elimination" target, defined as "zero deaths [per 1000 live births] by the year 2000."[99]

Some WHA delegates echoed these calls, with calls for greater focus on and ultimately the eradication or elimination of measles and NNT[100] in 1982. EPI director Ralph Henderson tried to discourage renewed calls for a new eradication campaign, pointedly responding to the US delegates call for a measles eradication program by declaring that "The WHO Secretariat was not ready to embrace" a new global eradication goal. Instead, he urged particular regions and countries to lead the way with more geographically limited (i.e. national or regional) elimination programs.[101] Both Europe and the Americas answered the call. In 1984, the European region adopted a wide array of disease reduction goals, including elimination of polio, NNT, diphtheria, measles and congenital rubella. In 1985, the Americas started a regional polio elimination program.

Despite extensive discussions of disease surveillance, disease control and even the eradication or elimination of certain vaccine-preventable diseases, increasing vaccination coverage remained the EPI's primary focus when the WHA reaffirmed its support of the program in an EPI resolution in 1986. The 1986 EPI resolution paid relatively scant attention to disease surveillance and disease reduction targets, with only one of seven points related to that theme: "increase priority for the control of measles, poliomyelitis

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[97] EPI/GAG/83/WP.9. 1983. "Conclusions on the International Symposium on Poliomyelitis Control, Washington, March 1983." pg. 1. The 1997 Dahlem Conference on Disease Eradication established uniform definitions of eradication and elimination, with "eradication" referring to situations like smallpox, where the disease causing agent no longer circulates in the wild and no people in the world are at risk of contracting the disease. "Elimination" applies to situations in which no cases of the disease occur in a specific area but in which people still are at risk from disease-causing agents. However, this meeting was still 14 years in the future in 1983, so "elimination" may have been equivalent to "eradication" for the polio symposium. In any case, paralytic polio disease cannot be permanently eliminated if the disease is not eradicated.

[98] The *C. tetani* endospore exists widely in the wild and cannot be eradicated. People are therefore always at risk of tetanus if not protected by vaccination.

[99] 1982. WER 57(18). pg. 139.

[100] Delegates from Egypt and Iran called for a particular focus on neo-natal tetanus, while delegates from the US and Senegal placed particular emphasis on measles. The American delegate called for a measles eradication program, while the Egyptian delegate noted that the international symposium on neo-natal tetanus recommended the elimination of neo-natal tetanus mortality by the year 2000.

[101] A36/A/SR/12. 1983. "Committee A: Provisional Summary Record of the Twelfth Meeting." pg. 5. Henderson went on to urge developed countries to lead the way by demonstrating that measles eradication was possible through their own efforts to combat the disease.

and neonatal tetanus."[102] Ultimately, these extensive discussions remained harbingers of things to come after 1986, with the beginning of a global polio eradication initiative in 1988 and ambitious disease reduction targets for measles and NNT in 1989.

Moving On and Declaring Victory

As 1990 approached, the GAG maintained a focus on the universal childhood immunization goal, which came to mean 80% global coverage by the end of the decade. However, the group focused far more on other matters, setting the ground for and then launching new program focuses for the 1990s. GAG meeting discussions, conclusions and recommendations reflect these changing program interests. From 1986 to 1990,[103] the GAG considered 16 different special topics[104] and issued recommendations on 19 different issue areas.[105]

Discussion topics and overall conclusions and recommendations reveal the group's focus on new disease control objectives, and particularly on measles, polio and NNT. Measles and polio received special attention at all five meetings, while the GAG discussed NNT elimination in three meetings in 1988, 1989 and 1990. The three diseases were also often the subject of specific recommendations, with the group issuing recommendations related to measles control all five years and to polio eradication and NNT control/elimination from 1987 onward. The only other subjects to receive such continuous attention from the GAG were new efforts to integrate vitamin A and iodine supplementation programs into immunization services: the GAG discussed this topic all five years and issued conclusions and recommendations related to it all five years as well.

By the late 1980s, this focus on targeted disease control entered official EPI policy. In 1988, the WHA passed a new resolution calling for the global eradication of polio by the year 2000.[106] In 1989 it passed a new EPI resolution reaffirming the polio

[102] 1986. "Expanded Programme on Immunization: Progress and evaluation report by the Director-General." Dated 6 March 1986. WHA39/15. This point and the other six were endorsed by the WHA in resolution WHA39.30.

[103] After 1990, full GAG reports are no longer available, although summaries of future meetings appear in the *Weekly Epidemiological Record*.

[104] Topics discussed include accelerated programs (1987), urban immunization (1989), overall coverage and disease control (1990), BCG policy (1990), program sustainability (1990), local area monitoring (1986, 1987), HIV's implications for immunization (1987, 1988), NNT control (1988, 1989, and as part of discussion of overall coverage and disease control in 1990), social mobilization (1986, 1987, 1988), new vaccines (2 sessions in 1987, 1990), management and information systems, including new EPI software developed during the period (1988, 1989, 1990), research and development (1986,1987, 1988, 1989), polio elimination/eradication (every year), measles control (every year) and vitamin A and iodine supplementation (every year).

[105] Conclusions and recommendations concerned missed opportunities (1987), social mobilization (1987), the role of collaborating organizations (1988), urban immunization (1989), adverse events (1990), the cold chain and logistics (1986, 1990), HIV's implications for immunization (1986, 1987), research and development (1986, 1987), accelerated programs (1987, 1988), EPI software (1988, 1989), surveillance (1986, 1987, 1990), sterilization and syringes (1986, 1988, 1990), new vaccines (1986, 1987, 1990), overall coverage (1986, 1987, 1988, 1989), polio eradication (1987, 1988, 1989, 1990), NNT control (1987, 1988, 1989, 1990), measles control (every year) and vitamin A and iodine supplementation (every year).

[106] WHA41.28. 1988. "Global Eradication of Poliomyelitis by the Year 2000." Dated 13 May 1988.

eradication goal and adding goals for eliminating NNT and reducing measles by 90% compared to pre-EPI levels by 1995.[107]

These goals answer calls seen in the mid-1980s for new eradication and elimination campaigns, but one may well ask why calls for polio eradication and NNT elimination entered official policy while calls for measles eradication were ignored. Measles had been an early candidate for eradication with good reason: it is theoretically eradicable and was (and remains) the most deadly vaccine-preventable disease targeted by the EPI. However, by 1986 polio had eclipsed it as the only serious eradication candidate. The GAG's discussion of the Americas' polio elimination campaign in 1986[108] was quickly followed by its call for a global polio eradication campaign in 1987.[109]

Many factors contributed to this choice, including elimination efforts in the Americas and Europe[110] and Rotary International's willingness to commit substantial resources to eradication activities as part of their own polio eradication effort, begun in 1985. However, technical factors were at least as influential as these political ones: polio had simply proven easier to control and eliminate than measles over the first decade of the EPI. This is made clear by the different points raised in the GAG's conclusions and recommendations regarding poliomyelitis eradication versus measles control. In discussing the former, the GAG highlighted the success of the initiative in the Americas, declaring:

> The poliomyelitis eradication initiative in the Americas is commended. The commitment of the countries in the Region to eradicating this disease by 1990 has served to accelerate the progress of the EPI itself and has made the programme more effective in contributing to the development of the primary health care system as a whole...
>
> Global poliomyelitis eradication can now be envisioned. The general success of the EPI, the success of the existing eradication initiative in the Americas and the adoption of the eradication goal by Europe all point toward the inevitability of global eradication. Efforts should now be pursued to adopt this goal, using it as a means to strengthen and accelerate the impact of the EPI in preventing all of the target diseases and a means to increase its contributions to building the primary health care infrastructure.[111]

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[107] WHA42.32. 1989. "Expanded Programme on Immunization." Dated 19 May 1989. Other goals included sustaining (and achieving) "full vaccination coverage" with all EPI antigens, improving disease surveillance, introducing new and improved vaccines as they became available, promoting other PHC interventions that were "appropriate for the programme's delivery system and target populations" and research and development activities in support of all those activities.

[108] WHO/EPI/GEN/87/1. 1986. "Report of the Expanded Programme on Immunization Global Advisory Group Meeting, 13-17 October 1986, New Delhi." pgs. 42-44.

[109] WHO/EPI/GEN/88.1 1987. "Report of the Expanded Programme on Immunization Global Advisory Group Meeting, 9-13 November 1987, Washington, D.C." pgs. 24-5.

[110] European efforts targeted almost all vaccine-preventable diseases, including measles.

[111] EPI/GEN/88.1. 1987. "Report of the Expanded Programme on Immunization Global Advisory Group meeting, 9-13 November, Washington, D.C." pg. 4.

In contrast, the major conclusions regarding measles control highlighted the challenges facing such efforts:

> Measles control is made difficult because of continued disease transmission in areas with moderate to high coverage and a high incidence of measles in children less than nine months of age.
>
> Strategies for increasing the impact of immunization services on disease incidence should be further explored.[112]

While measles was by far the deadlier of the two diseases, previous efforts had shown polio to be easier to control. Even though at least three doses of polio vaccine were needed to impart full immunity, it could be administered at a very young age: the EPI's earliest vaccine schedule recommendations had urged vaccination starting at two-months, and the late 1980s saw this age pushed even earlier, urging an additional dose at birth. In contrast, measles vaccine could not be recommended earlier than nine-months of age, as maternal antibodies prevented the vaccine from imparting immunity before that time. Developing a measles vaccine that imparted immunity at earlier ages had been a major EPI research goal since the start of the program, but despite concerted efforts to develop a new vaccine, none yet existed in the late 1980s.[113] This proved a major impediment to control efforts for two reasons. First, although vaccination had not proved effective in protecting young children from measles, those children could and did catch measles. Withholding measles vaccination until nine months of age created a large pool of susceptibles that made it difficult to interrupt measles transmission. Second, measles coverage stubbornly remained among the lowest of all vaccines included in the EPI:[114] care givers often failed to bring children to health centers for measles vaccination, which occurred three months after the last dose of DPT and polio vaccines in most vaccine schedules.[115]

The WHA enthusiastically echoed the GAG's recommendation during debate in 1988, when they debated a polio-eradication resolution introduced by 17 member states.[116] Thirty-two countries spoke up in support of the new program, and the resolution

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[112] EPI/GEN/88.1. 1987. "Report of the Expanded Programme on Immunization Global Advisory Group meeting, 9-13 November, Washington, D.C." pg. 5.

[113] This is still true today: measles vaccine rarely provides protection before six-months of age due to maternal antibodies. This effect almost entirely wears off by 12-months of age and has mostly worn off by nine-months of age. In 2008, the WHO switched from the one-dose after nine-months of age strategy it had advocated since the early 1980s to a two-dose strategy, with the second dose administered after one-year of age, in an attempt to better control measles. See 2009. WER 84(35), 349-360.

[114] Coverage was generally lower than that for all other vaccines targeted at children. However, tetanus vaccine coverage among pregnant women was consistently the absolute lowest of all antigens included in the EPI.

[115] As seen in discussion of the drop-out rate, earlier, programs also had difficulty getting caregivers to return for 2nd and 3rd doses of DPT and polio vaccines. Measles vaccination suffered from the same practical constraints facing multi-dose vaccines, but the longer wait time made it even harder for parents to remember or keep appointments. In addition, the greater age (and therefore weight) of a nine-month old infant may also have been an impediment, especially where parents had to carry children significant distances to reach health clinics.

[116] Resolution sponsors included: Brazil, Canada, China, Cyprus, France, Hungary, Indonesia, Italy, New Zealand, Pakistan, Sri Lanka, Sweden, Thailand, USSR, USA, Zaire, Zimbabwe.

quickly passed. Interestingly, debate did not refer to the GAG's recommendation, made in November 1987. Instead, the resolution responded to recommendations made by the Task Force for Child Survival, a group founded in 1984 that united major groups interested in the EPI, including the WHO, UNICEF, the World Bank, UNDP, the Rockefeller Foundation and representatives from bilateral and multilateral development agencies and from developing countries. The group held its first meeting in Bellagio, Italy in 1984, its second in Cartagena, Colombia in 1985 and its third in Talloires, France in 1988.[117]

At their third meeting, the Task Force issued the "Declaration of Talloires," which recommended many global health targets for the year 2000. Immunization was not the Task Force's only focus (it also supported diarrhoeal disease programs, initiatives to control respiratory infections and "safe motherhood and family planning" programs), but three of its recommendations related to immunization: the global eradication of polio, "virtual elimination of neonatal tetanus" and a 90% reduction in measles cases and 95% reduction in measles deaths "compared with pre-immunization levels."[118]

The polio eradication resolution was put forth during the WHA's discussion of the Declaration of Talloires, but Talloires also influenced the recommendations made by the GAG in their 1989 EPI progress report. The report recommended numerous program actions for the 1990s, including pursuit of all three goals recommended in Declaration of Talloires.[119] However, the report also called for the pursuit of goals not mentioned in the Declaration, including achieving and sustaining full vaccination coverage in all countries, introducing new and improved vaccines into national programs,[120] promoting other PHC interventions (including nutrition, diarrhoeal disease control, birth spacing, and vitamin A and iodine supplementation) and research and development in support of program goals.[121] Ultimately, the 1989 resolution adopted all of these goals and also encouraged improved disease surveillance.[122]

The Task Force's influence over EPI policy heralded a general waning of the GAG's influence over EPI policy throughout the late 1980s and early 1990s and a waning of the WHO's exclusive control over global immunization policies. In addition to the Task Force for Child Survival, the late 1980s and early 1990s saw the formation of a slew

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[117] See A41/10 Add. 1. 1988. "Collaboration within the United Nations System – General Matters: International cooperation for child survival and development." Dated 12 April 1988. Proceedings from the first conference may be available in Halstead, Scott B. 1985. Good health at low cost: proceedings of a conference held at the Bellagio Conference Center Bellagio, Italy, April 29-May 3, 1985. Rockefeller Foundation. An overview of the second conference can be found in 1986. "Protecting the world's children: 'Bellagio II' at Cartagena, Colombia 1985." Task Force for Child Survival. The above includes the "Declaration of Talloires," issued by the 3rd meeting, but no copy of program proceedings is available at the WHO.

[118] A41/10. 1988. "Declaration of Talloires." Dated 12 March 1988. In "Collaboration within the United Nations System – General Matters: International collaboration for child health and survival." Dated 12 April 1988. Add. 1. pg. 3.

[119] It even encouraged the elimination of neo-natal tetanus by 1995 instead of 2000.

[120] It names hepatitis B vaccine, yellow fever vaccine and Japanese encephalitis vaccine as ones that could currently be added to vaccination programs, at least in some countries. In addition, it cited many new or improved vaccines that could become available in the near future.

[121] A42/10. 1989. "Expanded Programme on Immunization: Progress and evaluation report." Dated 6 March 1989. pgs. 15-9.

[122] WHA42.32. 1989. "Expanded Programme on Immunization." Dated 19 May 1989.

of new groups offering advice to the EPI both within and outside of the WHO. Within the WHO, a new EPI research and development group was established in 1987.[123] Further, the beginning of the polio eradication campaign in 1988 heralded the beginning of annual "Consultations on Polio Eradication," with the GAG serving mainly to endorse recommendations and plans made by those consultations.[124] Finally, the EPI established a technical consultation group, Technet, in 1990 to forward operational and logistics research and ensure more efficient communication of the results of such research, especially related to cold chain procedures, safe sterilization and injection practices and vehicle use and costs.

Outside of the WHO, the Children's Vaccine Initiative (CVI) began with the goal of fostering vaccine research to make better (more heat stable, fewer doses required, safer, and multi-disease) children's vaccines in 1990-91. Like the Task Force for Child Survival, the CVI brought together a coalition of partners interested in fostering such vaccine research, including both the WHO and UNICEF. In 1990, the GAG, and hence the EPI, "welcomed and endorsed" the CVI,[125] and the WHA endorsed it in 1991.[126] However, neither the GAG nor the EPI seem to have played an active role in fostering the new initiative. Indeed, William Muraskin's account of the rise and fall of the CVI (1998) highlights the WHO's reluctance to embark on the new initiative.[127]

All of these groups, in addition to ongoing international conferences about specific diseases like tetanus and measles, exerted a notable influence over new policy directions pursued by the EPI in the late 1980s and early 1990s. They reflect a rapidly fragmenting program: as the realization of the goal of universal childhood immunization approached, no single new goal appeared to take its place. Instead, supporters of childhood immunization advanced many, disparate new goals, including disease control goals related to measles, NNT and, especially, polio, various research goals, including the pragmatic operational research supported by the EPI's research and development group and the more visionary vaccine development research supported by the CVI, and goals related to the integration of both new vaccines and other health activities into the EPI.

These shifting priorities anticipated the achievement of "universal childhood immunization" by several years. Major program shifts officially began in 1988, even though the universal childhood immunization goal was not met until 1992. In fact, the program did not even offer a definition of what "universal childhood immunization" meant in terms of concrete targets until late 1988. The GAG finally gave a precise target

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[123] WHO/EPI/GEN/88.1. 1987. "Report of the Expanded Programme on Immunization Global Advisory Group Meeting, 9-13 November 1987, Washington, D.C." pg. 25-6.

[124] See discussions of polio eradication in GAG reports for 1988, 1989 and 1990. After 1990, full copies of GAG reports are no longer available, although summaries in the *Weekly Epidemiological Record* make it clear that meetings continued through 1994, after which the group seems to have been replaced by the Strategic Advisory Group of Experts as the EPI itself was transformed into part of the Global Program on Vaccination.

[125] WHO/EPI/GEN/91.3. 1990. "Expanded Programme on Immunization: Report of the 13th Global Advisory Group Meeting." Dated 14-18 October 1990. pg. 8.

[126] WHA44.4. 1991. "Research and Development in the Field of Children's Vaccines." Dated 13 May 1991.

[127] Muraskin generally faults the WHO for its failure to embrace the new initiative and cites its reluctance in explaining many of the challenges and failures the CVI faced early on. However, when considering the fragile footing the EPI itself was on, especially with regards to funding (see Chapter 4), this reluctance seems much more understandable.

for 1990 that year, defining "universal childhood immunization" as 80% global vaccination coverage.[128] The target was ambitious but achievable (unlike truly universal coverage). However, this achievability came at a price, as the 1989 EPI Progress Report reveals. In a section entitled "Reaching 1990," the report details the challenges remaining and the prospects for overcoming them. It declares:

> The low levels of immunization coverage in Africa have been noted. But most unimmunized or partially immunized infants in the developing world are found not in Africa but in the largest countries: half are in India, China, Nigeria, Bangladesh and Indonesia, and a third are in India alone... This is good news, because all of these five countries have a high commitment to universal childhood immunization and three of the five have strong existing health infrastructure which permit high coverage levels to be reached and sustained... There are a limited number of countries in which immunization programmes are still in their initial stages. Bangladesh and Ethiopia have coverage of less than 10% for a third dose of oral poliovirus and DPT vaccines. Despite being considered large, they only have about 6.0% of the newborn infants in developing countries as a whole. Eight of the smaller countries... have similarly low coverage rates (Angola, Chad, Democratic Kampuchea, Democratic Yemen, Equatorial Guinea, Guinea, Mali and Niger). They account for 2.5% of all newborn infants in developing countries. While efforts to accelerate programmes in these countries are urgently needed, they will not be major determinants of coverage rates in the developing world as a whole.[129]

In other words, 80% global vaccination coverage could be achieved by abandoning universal efforts, at least temporarily, and by focusing on large developing countries where rapid increases in coverage could be achieved while temporarily deprioritizing smaller developing countries with weak programs.

The 80% global vaccination coverage target was finally reached in 1992, and the WHA acknowledged this victory with yet another EPI resolution – the last that concerned the EPI program as a whole.[130] The resolution applauded the achievement of 80% global vaccination coverage and endorsed a set of eight EPI goals for the 1990s, formulated by the GAG. These included: (1) maintaining high levels of vaccination coverage (with a goal of increasing global coverage to 90% by 2000); (2) a 95% decrease in measles cases and 90% decrease in measles mortality by 1995; (3) eradication of polio by 2000; (4) elimination of NNT by 1995; (5) achieving 80% vaccination coverage in each district by 1995 and 90% by 2000; (6) complete reporting of all cases of polio, NNT and measles

[128] WHO/EPI/GEN/89.1. 1989. "Report of the Expanded Programme on Immunization Global Advisory Group Meeting, 17-21 October 1988."

[129] A42/10. 1989. "Expanded Programme on Immunization: Progress and evaluation report." Dated 6 March 1989. pg. 12.

[130] WHA45.17. 1992. "Immunization and Vaccine Quality." Dated 13 May 1992. While not titled "Expanded Programme on Immunization," the resolution's content and references make its lineage clear. In addition, the resolution comes from the EPI itself, with review and approval of the GAG and Executive Board, rather than from a WHO member state or other program.

from designated reporting sites by 1992; (7) incorporation of yellow fever vaccine in immunization programs in all countries at risk for yellow fever by 1993; and (8) integration of Hepatitis B vaccine in all immunization programs by 1997.[131]

Yet these goals, too, showed the program's expansion and fragmentation. I've already discussed the Task Force for Child Survival's role in pushing the WHO to adopt polio eradication, measles control and NNT elimination goals. Similar outside influence is evident in the first four goals adopted in the 1992 amendment: their most immediate antecedent was the "joint WHO/UNICEF health goals" endorsed by the World Summit for Children in 1990, a meeting held not at the WHO or UNICEF but at the UN itself. The last four recommendations came from the EPI/GAG, but even these showed important influences from other interested parties. As Muraskin (1995) shows in his history of the International Hepatitis B Task Force, the last goal arose through the concerted efforts of another independent group, which pushed for the introduction of this new, expensive, but much needed vaccine into the EPI.

This resolution and report were the last concerning the full EPI program vetted by the GAG. The group continued meeting in 1992 and 1993 and may have met in 1994,[132] but it was soon replaced by a new group, SAGE, which initially advised both the EPI and the CVI programs and continues to advise the WHO and GAVI today. The EPI itself suffered a similar fate, being absorbed into a new program, the Global Program on Vaccination (GPV)[133] that united the classic EPI goals with new disease control initiatives, new vaccine research programs, efforts to introduce new vaccines and vaccine safety initiatives (made especially important by the developing HIV/AIDS pandemic). However, the 1990s ultimately proved to be a tumultuous decade for the WHO's immunization programs, mainly due to financial constraints, as resources, although increasing significantly over the period, did not keep up with the needs of the many new and old programs, as discussed in Chapter 4. The following section explores how the programs themselves diverged, with a particular focus on policies related to the three traditional EPI diseases chosen for particular attention during this period: measles, polio and NNT and on attempts to integrate new vaccines into the programs.

Breaking Apart and Coming Together Again

The numerous new initiatives inevitably entailed increasing differences in program recommendations. Clearly, recommendations and procedures for vaccine development and those for increasing coverage with existing vaccines would bear little resemblance to each other. Problems encountered adding "new" vaccines, like hepatitis B and yellow fever vaccines, to programs also differed considerably from those facing vaccination with the four traditional EPI vaccines. However, even for related aspects of the program, like disease control efforts aimed at polio, measles and NNT, program

[131] A45/8. 1992. "Expanded Programme on Immunization, and Vaccine Quality: Progress Report by the Director General." Dated 9 April 1992. pg. 8

[132] No report from a 1994 meeting was available, and no summary of the report appeared in the *Weekly Epidemiological Record* in 1995. However, the 1993 meeting did include suggestions for topics to cover in the following year's meeting.

[133] The GPV was replaced by the WHO's Vaccines & Biologics division around 1999, signaling yet another shift in the program's organization. However, program changes inaugurated in the 1990s persisted after this change, with few new efforts added at this point. Instead, the focus was on better organization and coordination of the vast existing programs and on better aid for least-developed countries.

recommendations became increasingly diverse as the program's focus turned to problems of controlling specific diseases and meeting diverse, disease-specific targets.

To show how program recommendations diversified over the 1990s, I analyze GAG and SAGE recommendations related to polio, NNT and measles published in the *Weekly Epidemiological Record* from 1990 to 2000 (summarizing recommendations from 1989 to 1999). Differences were not especially apparent immediately after the WHA endorsed specific disease-control goals for the 1990s, including polio eradication, NNT elimination and measles control, in 1989. For example, recommendations for both polio eradication and NNT elimination emphasized the need to pursue goals "in ways which strengthen the EPI as a whole."[134]

However, even at this point the different programs involved different programmatic emphases. Improving surveillance was a major emphasis for the polio campaign, while improving the measles vaccine to allow vaccination before nine months of age was a major goal of the measles program. For NNT elimination, the focus was on reaching high risk groups and reducing "missed opportunities" to ensure that women of child-bearing age's tetanus vaccinations were up-to-date through, for example, school-based vaccination programs and vaccination of mothers along with their infants at infant vaccination sessions.

As the polio eradication campaign continued, recommendations for this program grew increasingly specific, drawing early on from experiences gained during the successful elimination program in the Americas. By 1991, a three-pronged strategy was well-established and recommendations changed little after that.[135] The first prong of this strategy was based on an "accelerated immunization strategy" first developed in the mid-1980s, National Immunization Days. The second prong emphasized surveillance, and particularly laboratory-based disease surveillance (particularly Acute-Flaccid Paralysis, or AFP, surveillance) and case investigation using a global laboratory network. Finally, the third prong was outbreak response activities including door-to-door immunization in target areas. Throughout the 1990s, these strategies formed the backbone of the polio eradication campaign. The few additions concerned more particular situations, like recommendations concerning greater coordination among neighboring countries, specific tactics for politically isolated or war-torn countries, and discussions about how to ensure high-quality NIDs that helped strengthen routine immunization services.

The NNT elimination effort involved a very different set of recommendations, with the main focus throughout the 1990s being on reaching and identifying hard-to-reach high-risk populations. In addition to this continuous emphasis, program recommendations focused on avoiding "missed opportunities" for immunization by, for example, immunizing women along with their children at infant vaccination sessions, and on establishing school-based tetanus immunization programs to ensure that all women of child-bearing age were vaccinated against tetanus. Other efforts explored how to better evaluate coverage and risk[136] and improve NNT surveillance. Unlike polio efforts, no "accelerated strategies" or mopping-up approaches were ever advocated for NNT.

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[134] 1989. WER 65(2). pgs. 9&10.

[135] See 1992. WER 68 (1-2).

[136] Coverage was typically estimated based on the percent of pregnant women receiving two-doses of tetanus toxoid. However, as many of those women may have already been vaccinated against tetanus in the recent past, this estimate likely under-estimated the true extent of protection.

Of the three efforts, recommendations regarding measles control efforts show the most change. At the beginning of the 1990s, great hope was placed in a new, high-titer measles vaccines, which could potentially be administered prior to nine months of age. Aside from this, the program emphasized the need for high routine coverage, aiming for 90% in each district, and reducing measles mortality through treatment, particularly with vitamin A. In addition, GAG recommendations in 1989 and 1990 warned that countries should expect outbreaks among older children as measles control progressed. Counterintuitively, they recommended against aggressive outbreak responses in these situations. This counter-intuitive recommendation was based on fear that outbreak responses could weaken the higher-priority routine measles immunization program targeting infants. For example, in 1990, the GAG recommended that any such outbreak response should include health education to encourage use of routine immunization services, but noted: "Programmes should be cautious about spending valuable resources on control measures in these situations."[137]

This policy began changing in 1991, when the GAG requested that the EPI begin evaluating alternative measles control strategies, including outbreak response activities and elimination activities.[138] This new emphasis, bringing measles control efforts more in line with the aggressive measures adopted against polio, was based in part on changing regional-level programs: polio-free regions, like the Americas, were turning to measles elimination as the next logical effort for their programs. By 1993 these investigations led to a new recommendation:

> Countries should develop and implement policies for responding to measles outbreaks that include investigation and control measures appropriate for the stage of the immunization programme, becoming more aggressive as programmes mature.[139]

SAGE embraced this new direction, recommending that polio-free areas begin measles elimination efforts and that measles control efforts focus on high-risk populations with strategies including mass immunization activities to improve measles control.

Various policies for measles control, polio eradication and NNT elimination showed persistent differences based on the various goals of the different programs and the particularities of the target diseases. While polio eradication called for aggressive and even exceptional control measures, like door-to-door mopping up activities in response to outbreaks, NNT elimination did not lend itself well to such intensive strategies. They would not help interrupt diseases transmission, as was the case with polio, and the continually changing population-at-risk, pregnant women, was not necessarily best reached by such mass tactics. Measles stood between the two: with efforts initially aimed at control, not eradication, the GAG emphasized improving routine immunization (and developing more effective vaccines). However, as some areas began pursuing measles elimination and as routine efforts continued to be unsuccessful at meeting the measles control goals, tactics changed to adopt some of the same intensive strategies employed so successfully in the polio eradication campaign. In all three cases, emphasis was

[137] 1991. WER 66(3). pg. 9.
[138] 1992. WER 67(4).
[139] 1994. WER 69(5). pg. 34.

increasingly placed on the particular challenges faced by efforts to control a particular disease, rather than on the broader, overarching vision that had initially driven the EPI.

This particularistic focus was even more apparent in new initiatives. For instance, the main challenge facing efforts to introduce new vaccines, beginning with Hepatitis B in 1992 and Hib (*Haemophilius influenza* type b) starting in 1996[140] was not ensuring access to services and breaking transmission cycles, as with polio, measles and NNT, but vaccine costs.[141] While early efforts to include new vaccines focused on which countries should begin such efforts – recommendations based heavily on disease-burden – later discussions focused almost exclusively on how to overcome the financial constraints to vaccine introduction through, for example, efforts to reduce vaccine cost, tiered-pricing systems and aid targeted at the neediest countries.

Vaccine costs had been a challenge for early EPI programs as well, particularly for measles vaccines. However, the program overcame this major constraint in the early 1980s when UNICEF created a standard vaccine package including all EPI vaccines and most major donors fully embraced the idea of vaccine donations for the poorest countries. Nonetheless, both UNICEF and traditional EPI donors proved reluctant to add the new vaccines, and their often prohibitive costs, to their standard aid packages, making vaccine prices the major issue faced for these new vaccines.[142]

As discussed in Chapter 4, both new efforts aimed at controlling specific vaccine-preventable diseases and efforts to introduce additional vaccines to EPI programs demanded significant new resources, and even though donations grew throughout the period, organizers were hard-pressed to find sufficient resources to sustain new efforts. Competition over an insufficient pool of resources could only have a detrimental effect on program coordination, but fragmented program aims and the lack of a unifying vision to unite these disparate elements of the program added to this problem.

Efforts to combat this tendency are clear: in the mid-1990s the EPI and new, semi-independent efforts, like the CVI, were united within the WHO's Global Programme on Vaccination. The disbanding of the GAG, which exclusively advised the EPI, and the creation of SAGE occurred at the same time. SAGE ensured that one expert body would advise all of the WHO's immunization programs. However, ultimately advice and program goals remained largely independent of each other, and discussion of priorities or coordination became increasingly rare as new programs became better established.

Ultimately, greater coordination would not come to these programs until the 21st century with the creation of GAVI (for a thorough history of GAVI's creation and first years, see Muraskin 2005). The advent of a major new donor, the Bill & Melinda Gates

[140] SAGE recommended Hib vaccine's inclusion in national immunization programs where appropriate in 1996. See 1997. WER 37(32). pgs. 240-1.

[141] Of course, vaccine costs were also a challenge early in the EPI – particularly for measles vaccines. But the original four EPI vaccines cost much less than the Hepatitis B vaccine, and their cost was fairly stable. Once UNICEF developed a standard vaccine package and vaccine purchase program for developing countries including all four vaccines, vaccine cost almost disappeared as a financing concern for countries, with other costs, like cold chain and transportation (and particularly fuel) being far more worrisome.

[142] A major breakthrough for this cost issue finally emerged when the Bill & Melinda Gates Foundation helped create GAVI in 2000 and became a major new source of financial support for vaccination programs: one of their many foci was the integration of new vaccines into vaccination programs, and the Global Fund, which they created, included money specifically dedicated to furthering this goal.

Foundation, which supported *all* of the various immunization programs certainly helped bridge the divide as well. The 21st century also saw renewed efforts at coordination between the WHO and UNICEF, with the inauguration of a joint "Global Immunization and Vaccines Strategy" starting in 2005.[143]

Conclusion

The global community began an ongoing effort to ensure children (and mothers) access to life-saving vaccinations in May of 1974, when the WHA inaugurated the EPI. That effort continues to this day, now under the auspices of the GAVI, uniting many global actors, including the WHO, UNICEF and the World Bank. Yet a sustained effort over the past 38 years hides vast and frequent changes in program strategies. Over the decades, the programs transformed first into a cornerstone of the WHO's "Health for All by the Year 2000" campaign and the PHC movement and then into a series of ambitious but loosely related programs for the 1990s, before finally reuniting under the auspices of GAVI in 2000.

This chapter has examined how programs developed and changed over the first quarter century of global childhood and maternal immunization programs. That period saw two major program trends, the adoption and pursuit of Health for All and PHC in the late 1970s and 1980s and the shift toward disease-targeted programs (along with other new endeavors) in the 1990s. Yet programs changed continuously within those two periods as well. From 1974 to 1988, the program shifted from an experimental mindset to a well-defined vision of what a "PHC approach" to childhood immunization entailed to a new emphasis on experimentation and new openness to so-called "accelerated activities." Change was even more radical from 1988 onwards, as the program first fully embraced disease-specific goals, most notably polio eradication, and then added ambitious new activities seeking to integrate new vaccines into the programs and develop new and better vaccines as well.

This persistent commitment to childhood (and maternal) immunization is impressive, and Chapter 1 shows the effects of this persistent effort: vaccination coverage with the four original EPI vaccines has risen significantly since 1980, although global levels have generally remained near the 80% level first reached in 1992. However, one might well ask how these programs have been implemented on the ground and what effect the myriad program changes since 1974 have had there. Part II of this dissertation turns to these questions. It looks at EPI programs in two developing countries, Malawi and Cameroon, from the beginning of their programs until 1990, after which the necessary archival data are no longer available. Malawi has been a notably successful country, quickly raising vaccination coverage and maintaining high coverage to this day. Cameroon has had a rockier history, despite its greater resources. Coverage lagged throughout the 1980s and 1990s: polio coverage still had not crossed the important 80% threshold in 2006.

[143] WHA58.15. 2005. "Global Immunization Strategy." Dated 25 May 2005.

PART I, CHAPTER 4

GLOBAL SOLIDARITY AND IMMUNIZATION

The cholera pandemics that struck Europe in the early 19th century changed the face of the medical sciences. Previously unknown in Europe, investigations into this disease led to some of the biggest breakthroughs in modern medical science. John Snow's study showing that cholera was spread by water is considered one of the foundational studies of modern epidemiology. Similarly, Robert Koch's identification of its causal organism, *Vibrio cholerae*, was a seminal moment for modern biomedicine and the "germ theory of disease."

In addition to inspiring scientific investigations that form the basis of modern medical sciences, the cholera pandemics were the impetus behind the birth of another modern medical order: international cooperation on health issues. In 1851, the European powers organized the first of a series "International Sanitary Conference," wherein they debated both the causes of cholera[1] and joint measures to be taken in response to the outbreak. Ultimately, these conferences led to the first international laws regarding health and the formation of the first universal health IGO, the *Office International d'Hygiène Publique* (OIHP) in 1907.[2] The sanitary conferences and OIHP are generally regarded as the direct predecessors to the WHO (Fidler 2001).

If pandemic disease first inspired the world powers to cooperate on health matters, it also created cooperation with a particular tenor. Brown, Cuerto and Fee define this outlook as "international health", which "focus[es] on the control of epidemics across borders or boundaries between nations" (2006 77). In his discussion of relations between European powers and "the Orient", Peter Baldwin gives a particularly clear example of this. He quotes one French delegate, who frankly declared the need "to preserve Europe from all compromise with the rude and injurious habits of the Oriental populations" when speaking in favor of maintaining quarantines in the East (qtd. in Baldwin 1999 229).

The control of pandemic disease remains a key concern for international cooperation, although the overt racism and disdain for the life of non-Europeans found in these early discussions is generally absent today. However, recent years have also seen a shift in the tenor and focus of cooperation around health issues. Brown et al. define this new perspective as "global health," which "implies the consideration of health needs of the people of the whole planet as an agenda above the concerns of particular nations." (2006 77) In their overview of the history of international health in general and the WHO in particular, Brown et al. cite 1992 as the date when the WHO truly embraced global health (2006 87). However, this new concern with the global can be seen in many world health efforts, from the WHO's end-of-century "Health for All" campaign to the health goals included in the United Nations' (UN) millennium development goals to numerous ongoing global health efforts addressing all aspects of health.

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[1] Snow's study, first published in 1849, remained controversial, and Koch's isolation of *Vibrio cholerae* was still 32 years in the future.

[2] The first health IGO, the Pan-American Sanitary Bureau (now the Pan-American Health Organization) was a regional body formed to aid cooperation around health issues for the states of North and South America.

To illustrate the shift, Brown et al. tabulate PubMed entries containing the term "international*" and "global*"[3] by decade, from 1950 to 2004. However, entries for both terms increased 40-fold over the decades they examine, making it difficult to see any shift from one to the other. To get a clearer picture of the change, I redo their analysis by year for the years 1950 through 2010. Instead of reporting raw counts, I calculate the ratio of "global*" to "international*" entries and the five-year moving average of the same, as seen in Figure 4.1.[4]

[Figure 4.1 about here]

As seen in Figure 4.1, references to "international*" were much more common than those to "global*" at first. In 1950, there was less than one reference to "global*" for every 100 reference to "international*", and references to "international*" outnumbered references to "global*" by more than 20 to one prior to 1975.

However, we see a clear trend beginning in 1975, with ratio of "global*" to "international*" entries increasing steadily. After 2005, the number of references to "global*" even outnumbered those to "international*". This suggests that the shift from international to global began much earlier than the 1992 date cited by Brown et al. It truly began with the beginnings of the EPI program and the move towards primary health care.

It is less clear what this shift in terminology meant for international cooperation on health. Did it entail, as Brown et al. suggest, a shift in focus from the security- and border-centered "international health" to a "global health" with its emphasis global solidarity and the health needs of all people, regardless of nation? And if so, what kind of global solidarity emerged? To answer these questions, we must look at global health programs emerging in this period more closely. How did ideas about global responsibility develop in these programs? In this chapter, I address these linked questions through an examination of the development of norms of global solidarity surrounding the WHO's immunization programs from the beginning of the EPI in 1974 to the present day. These programs began just as the shift from international to global began and continue to the present, allowing me to explore these changes over a long time period, encompassing both the PHC era and the 1990s.

I draw from three sources: progress reports and program statements about WHO immunization programs, debate within the WHA, the supreme decision making body for the WHO that unites representatives of all WHO member states, and details regarding donations to the immunization accounts in the WHO's Voluntary Fund for Health Promotion. The progress reports and program statements express the WHO's view of global solidarity – a position which is meant to express a global consensus. The WHA debates reveal how widely accepted this position is and point to any points of conflict over it. Finally, contributions to the Voluntary Fund show global solidarity in action and reveal which areas receive particular support and the limitations of this support.

My analysis proceeds in two parts. In the first part, I show the clear shift in global perceptions of responsibility for ensuring access to immunization, as expressed both in

[3] They used "international*" and "global*" as search terms in order to identify articles including words such as international, internationalism, global, globalization, etc.

[4] I also calculated the ratio of "international*" to "global*" entries and the five-year moving average of that ratio. These figures are available upon request.

immunization program statements and intergovernmental debate at the annual meetings of the WHA. This analysis reveals the shift in senses of global responsibility for immunization in three main periods. During the first period, from 1974 to the early 1980s, the global community had a very small potential role in immunization: providing aid and expertise to help countries set up national immunization systems, which would then be those countries' sole responsibility to run and maintain. Analysis of debates shows that developing countries contested this limited view of global responsibility for providing access to immunization but that it was also widely accepted by wealthy donor countries, including both the United States and the Soviet Union in this Cold War era.

This limited conception of global responsibility began to change in the late 1970s and early 1980s as the WHO embarked on its "Health for All by 2000" campaign. Pursuing these campaign goals led the organization and member states increasingly to recognize that developing countries needed extensive long-term aid and support to meet the campaign's goals, including universal childhood immunization by the year 1990. This, in turn, led to a new vision of shared responsibility: national governments still had primary financial responsibility for programs, but the global community took on responsibility for a significant portion of funding through a system of voluntary contributions.

Once firmly established, the idea of shared responsibility proved tenacious, remaining unchallenged from the 1980s onwards. However, global solidarity still required negotiation – particularly regarding national and international sources' share of financial responsibility and which countries needed aid. In the 1980s, the newly embraced ideal of shared responsibility emphasized a precise 2:1 ratio, with national governments expected to provide 2/3 of the funds required for immunization programs while international sources provided the rest. As the world began new immunization efforts in the late 1980s and early 1990s, this strict division gradually gave way. With the establishment of GAVI in the year 2000, a new formula based on perceived need for aid emerged.

After showing how global perceptions of responsibility for immunization hasve changed from 1974 to the present, I turn to a second question: if recent years have seen the emergence of a new sense of globally shared responsibility for health, what kind of global solidarity have these new efforts created? To answer this question, I draw on debate at the WHA and budgetary information found in the WHO's proposed program budgets and financial report. I particularly focus on the role of extrabudgetary funding in the WHO's immunization programs.

The new global solidarity that emerged in the late 1970s and early 1980s was built on the fragile foundation of voluntarism. Both developing countries and donor countries were called on to increase their spending on immunization, but no mechanisms existed to force them to do so. Analysis of WHA debates reveals few years in which funding was not a concern for immunization programs. Indeed, once the program expanded to adopt new goals in the late 1980s and early 1990s, funding shortfalls became a persistent feature of and worry for the organization. These funding shortfalls were a significant problem for the organization and for the general development of the WHO's immunization programs in the 1990s.

Global ambitions often exceeded available financing (especially before the Bill and Melinda Gates Foundation became a major donor to immunization programs).

However, examining debate alone can be misleading. It emphasizes financial shortfalls and the failure of both national and global sources to meet the financial needs of programs while ignoring the considerable increase in funding that actually did appear. The last section of this chapter turns to this subject, analyzing actual global contributions to immunization programs.

Unfortunately, unified data about national and even international spending on immunization are not available. However, I partially overcome this limitation by focusing on one immunization fund for which consistent data are available from 1975 to 2000: the immunization accounts in the Voluntary Fund for Health Promotion. The first account was created in 1974, with the creation of the EPI itself. Contributions increase steadily with the expansion of the program and spread to a wide array of immunization programs as new efforts began. My analysis shows that global solidarity, as expressed by these contributions, grew over the period, despite its inability to consistently meet the ambitious targets set for it.

Immunization and the WHO, the WHA and the Voluntary Fund

As discussed in detail in Chapter 3, the EPI began in 1974 when the WHA unanimously adopted a resolution[5] calling for the expansion of childhood immunization against six common childhood diseases: polio, measles, diphtheria, pertussis, tetanus and tuberculosis. From 1974 to 1988, this effort dominated the WHO's activities related to immunizations,[6] but new efforts began in 1988, with the beginning of the polio eradication campaign.[7] This new program was quickly followed by many others, including increased efforts to control measles, a campaign to eliminate neo-natal tetanus, increased focus on adding new vaccines (especially hepatitis B vaccine) to EPI programs, and a new vaccine research initiative, the CVI.[8]

By the year 2000, the immunization program had outgrown the original EPI framework and was replaced by the newly formed GAVI.[9] GAVI combined the original goals of the EPI with new efforts to streamline the introduction of new vaccines into immunization programs worldwide and with vaccine development activities previously pursued by the CVI. Thereafter, the WHO coordinated its overall immunization strategy in close concert with UNICEF in their joint "Global Immunization Strategy", and the various aspects of its immunization program were generally treated separately from one another or as components of still-broader overall health programs, like the UN's Millennium Development Goals or broad programs on women's, newborns' and children's health.[10] After being virtually ignored in its early years, the PEI began to receive increased attention during this period, with the Assembly receiving annual reports from 2003 onwards.

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[5] WHA27.57. 1974. "WHO Expanded Programme on Immunization." Dated 23 May 1974.

[6] One major exception was the final stages of the smallpox eradication effort: the WHO declared smallpox eradicated in 1980.

[7] WHA41.28. 1988. "Global Eradication of Poliomyelitis by the Year 2000." Dated 13 May 1988.

[8] WHA44.4. 1991. "Research and Development in the Field of Children's Vaccines." Dated 13 May 1991.

[9] WHA53.12. 2000. "Global Alliance for Vaccines and Immunization." Dated 20 May 2000.

[10] In reviewing debate on WHO immunization program, I focus on programs primarily concerned with immunization, such as the global immunization strategy, GAVI, the polio eradication effort, etc. Broader programs including immunization activities are excluded from consideration.

Over the years, the WHA discussed some 22 reports updating it on different parts of the WHO's immunization program. These reports offer updates on all aspects of the immunization programs, but I concentrate my analysis on their discussion of funding issues, especially as related to the division of financial responsibility for immunization programs. To this end, my analysis of the reports concentrates on reports from the initial years of the EPI program (1975, 1976, 1977 and 1978), and five additional especially important reports: EPI progress reports from 1982, 1986 and 1992, the foundational GAVI report from 2000, and the Global Immunization Strategy report from 2005. These years involved major changes in the strategies and activities pursued by the WHO's immunization program, and as a result entailed particularly detailed discussion of the division of responsibility for immunization programs.

The WHA debated immunization at 30 of its sessions and passed 18 resolutions regarding the WHO's immunization programs[11] in the years from 1974 to 2010. These debates arose either out of consideration of reports related to immunization programs – often a progress report – or in the context of the Assembly's discussion of the WHO's projected budget and program. In all, 153 different Member States participated in the debates at one time or another, with an average of 29 Member States participating per year of debate. Table 4.1 summarizes these trends, indicating the years in which debate occurred, the number of countries participating in the debates, whether or not resolutions were passed and the context in which debate occurred.

[Table 4.1 about here]

Traditionally, the WHA passes resolutions setting WHO policy through consensus, and resolutions related to the WHO's immunization programs proved no exception, with all resolutions discussed above passing with no objections. In keeping with this tradition, countries never unequivocally criticized programs under discussion. Instead, statements tended to offer either direct or indirect support for programs, with critiques meant to offer useful advice on program priorities or policies, implying support for broader program goals. In addition to discussion of WHO policy, the debates also served as a forum for countries to highlight their own activities related to programs under discussion, to request aid and to offer it.

Debates often addressed financing questions. On the one hand, developing countries often used such statements to thank donors and highlight any further needs for assistance they had. On the other hand, "donor countries" often highlighted their own expertise in the area and either pledged aid or highlighted support already given. In addition, the Assembly served as a forum to debate program financing more broadly. In this context, it served as a forum to discuss the division of financial responsibility for immunization programs between national and global actors. Who was responsible for ensuring children's right to health? I pay particular attention to these aspects of debate, and especially to reactions to the ideas of global solidarity put forth in the reports under discussion.

[11] Excluding resolutions related to influenza and those in which immunization played an important secondary role, such as resolutions related to viral hepatitis, HIV/AIDS or the UN's Millennium Development Goals.

The WHO has relied heavily on extrabudgetary funding since the beginning of its involvement in immunization. Even before the beginning of the EPI, voluntary contributions provided an important source of funds for the WHO's smallpox eradication campaign. The resolution creating the EPI itself also created a special account for voluntary contributions to EPI activities within the WHO's Voluntary Fund for Health Promotion, the Special Account for the Expanded Programme on Immunization. The WHO's *Financial Reports* provide details regarding contributions to this fund and its successors, including information on which states and organizations donated money, how much was donated and the purpose of donations.

Although these donations do not represent all funds made available to immunization programs, in the absence of complete information, they provide a proxy for overall of trends in donations. Furthermore, with detailed information available for donations from 1974 to 2002, they provide consistent, detailed information over a longer period than any other source. Even WHO budgets, which include information on both the regular budget and extrabudgetary funds, do not provide details of funding for immunization programs for this long a period. They only begin reporting on immunization as a separate budget line in 1980 and stop doing so in 1994.

In the following sections, I trace the fortunes of the WHO's immunization programs from the beginning of the EPI in 1974 to the present day. I begin with an overview of reports, concentrating on how norms of global responsibility for immunization change from the beginning of the EPI to the present day. I then review debates about the WHO's immunization programs, concentrating particularly on debates about shared responsibility and discussion of financing problems. In reviewing debates, I consider the four distinct program periods that are highlighted in Chapter 3 separately: the early years of the EPI, 1974-1982; the height of the EPI as part of the "Health for All" campaign, 1982-1990; the period of program expansion from 1988-2000; and, lastly, new efforts to establish a truly global immunization program beginning with the formation of GAVI in 2000. I end by looking at global solidarity in action through an examination of contributions to the Voluntary Fund.

Changing Visions of Global Responsibility at the WHO

The WHA resolution beginning the EPI affirmed the "importance of systematic immunization programmes in all countries" and requested the Director-General to increase the WHO's immunization activities in developing countries in particular.[12] However, this broadly inclusive vision had major financial limits, as revealed by statements in the first EPI progress reports in 1975 and 1976. Both emphasized that it was necessary for newly created programs quickly to become self-sufficient. The 1975 report was particularly clear, opening with the following general principles:

> There are two important principles to be borne in mind:
>
> 1. On the one hand, once a national health service has embarked on a programme of routine childhood immunization it is perforce committed to maintaining it at the required level of coverage without any foreseeable time limit (except for smallpox vaccination, which is a special case).

[12] WHA27.57. 1974. "WHO Expanded Programme on Immunization." Dated 23 May 1974.

> 2. On the other hand, external aid is inevitably time-limited. Its purpose is to accelerate development and not to support for long period routine recurrent expenditures of national health services. ...
>
> It is essential, therefore, in launching a national immunization programme that health authorities make definite plans so as to be able to continue it from their own resources within a defined period of years.[13]

The 1976 report ended on a similar note, declaring:

> It has been stressed in all discussions with national health authorities that their plans must include measures for the acceptance of full financial responsibility by the countries themselves as quickly as possible.[14]

These statements make it clear that imminent self sufficiency was a vital requirement for these nascent programs in the first years of the EPI. However, this policy would quickly change as the WHO embarked on a broader "Health for All" campaign linked to its new focus on "primary health care." 1977 proved a key year for this general change. That year, the EPI progress report set forth a new objective: "to provide immunization against these diseases to every child in the world by 1990."[15] This ambitious goal joined the new program to a broader effort underway in the WHO at that time: the "Health for All by the Year 2000" campaign and its PHC approach.

The PHC movement would reach its apogee a year later, with the international conference on primary health care and the "Declaration of Alma Ata." The declaration affirmed that health was a human right, condemned inequalities in health, and called on "governments, international organizations and the whole world community" to push for "the attainment by all peoples of the world by the year 2000 of a level of health that will permit them to lead a socially and economically productive life."[16] Immunization was included in a list of basic health services considered fundamental to primary health care,[17] and the goal of providing immunization to every child by 1990 formed part of the broader "Health for All" campaign.

This new orientation, premised on the idea of health as a human right and aiming to provide immunization to all the world's children by 1990, was clearly at odds with any criterion requiring countries' immunization programs to be self-sufficient programs. Further, such exclusionary policies would make it impossible to meet the universal childhood immunization goal adopted by the "Health for All" campaign.

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[13] A28/WP/5. 1975. "Detailed Review of the Programme Budget for the Financial Years 1976 and 1977." Dated 21 April 1975.

[14] A29/16. 1976. "Expanded Programme on Immunization: Progress Report by the Director-General." Dated 24 March 1976. pg. 6.

[15] A30/12. 1977. "Expanded Programme on Immunization: Progress Report by the Director-General." Dated 19 April 1977. pg. 2.

[16] 1978. "Declaration of Alma-Ata." Dated 6-12 September 1978. Accessed at: http://www.who.int/hpr/NPH/docs/declaration_almaata.pdf. Access date 14 March 2011.

[17] The full list of minimum measures reads: "education concerning prevailing health problems and the methods of preventing and controlling them; promotion of food supply and proper nutrition; an adequate supply of safe water and basic sanitation; maternal and child health care, including family planning; immunization against the major infectious diseases; prevention and control of locally endemic diseases; appropriate treatment of common diseases and injuries; and provision of essential drugs."

Reflecting these changes, the 1977 EPI progress report abandoned its emphasis on countries' need to accept full financial responsibility for their programs in order to ensure their continuity. Instead, the report identified "social and technical desiderata" for countries receiving aid, including:

- the allocation of a national budget to the programme;
- the long-term costing of permanent programmes and the assessment of their financial feasibility from both internal and external sources;
- the attraction of external funds, as necessary, through the presentation of national plans;[18]

Notably, long-term plans for funding programs entirely from internal resources were *not* among the desiderata identified in the report. Indeed, the report contained no reference to the desirability of immunization programs being self-sufficient at all. Instead, the WHO urged countries to draw on both external and internal resources to meet long-term funding needs.

Thus, 1977 inaugurated new understandings of the nature of aid and of the nature of immunization services. The idea that aid was inevitably a short-term investment, which underpinned earlier exclusionary policies, was replaced by a new emphasis on the need and desirability of long-term aid for immunization programs. This change reflected the new idea that access to immunization was a "human right". Immunization services changed from an optional service governments could provide their citizens if they thought it warranted to one of the essential services all governments must provide as a human right. Furthermore, this obligation was not seen as the sole responsibility of national governments. It was also a global responsibility as part of the "Health for All" campaign.

This vision proved durable: all future discussions of immunization were premised on the idea of shared global and national responsibility to provide immunization services as part of governments' basic duty to protect the health of their citizens. However, agreement on this principle did not automatically lead to agreement about how to enact it. A new progress report, in 1982, brought clarity on this point. Financing was among the key issues addressed in the report, which called for national governments and the global community to:

> Invest adequate financial resources in EPI: For the programme to expand to reach its targets, current levels of investment in EPI, estimated now at US$72 million per year, must be doubled by 1983 and doubled again by 1990 when a total of some US$300 million (at 1980 value) will be required annually. Over two-thirds of these amounts must come from within the developing countries themselves, the remaining one-third from the international community.[19]

[18] A30/13. 1977. "Expanded Programme on Immunization: Progress Report by the Director-General." Dated 19 April 1977. pgs. 7-8.

[19] A35/9. 1982. "Expanded Programme on Immunization: Progress and evaluation report by the Director-General." Dated 19 November 1981. EB69/25. Presented to WHA 25 March 1982. pg. 7.

With this point, the plan clarified the financial implications of shared responsibility. Nation states were responsible for two-thirds of costs, with the global community responsible for the remainder.

A new progress report in 1986 reported initial success implementing this vision of shared responsibility.[20] Reviewing progress related to point three in the five-point plan, it notes:

> Support for immunization programmes, both from within national programmes and from external resources, has markedly increased. ... At present, no committed countries with a realistic EPI plan of operations needs to be constrained by a lack of vaccines, cold-chain equipment or supplies.

Nevertheless, shared responsibility still caused some worries, especially combined with pressure to increase coverage quickly in pursuit of the goal of universal child immunization by 1990. A discussion towards the end of the report is especially revealing here. It notes:

> In the least developing countries and in many other developing countries it does not at the present time appear likely that before 1990 the national budgets will be sufficient to support the local coasts required for full vaccination coverage on a sustained basis... *In these countries, meeting the 1990 goal is likely to imply providing external funds to meet costs which have in the past been considered a national responsibility*... In such countries, the external support may become dominant, posing a potential threat to national autonomy and perhaps to national development.
>
> Should the Programme's recommendation be to back away from the 1990 target date in a number of developing countries, restricting external support for immunization to a traditional 20% or so of the total cost? Or to press forward, working to avoid continual dependence on external resources, yet recognizing that few successful examples of such an approach are known to date? (emphasis added)

The discussion reveals a problem not addressed by the consensus established in 1982: what if continuous but subordinate global support was not enough to ensure immunization for all children? In moving from total national responsibility to shared responsibility, the global consensus still emphasized the nation state's primary responsibility, both financially and managerially, for ensuring immunization services. Yet, as seen above, this principle, as with the principle of total national responsibility, was not necessarily compatible with the ambitious global goals of the "Health for All" campaign. That year, the WHA reaffirmed its support of the 1990 universal immunization goal,[21] implicitly breaking with the 2:1 ratio agreed upon in 1982.

[20] Although, as will be clear in the discussion of program debates below, fund raising initially faced severe difficulties.

[21] WHA39.30. 1986. "Expanded Programme on Immunization." Dated 16 May 1986.

Despite improvements in program financing, the EPI still had difficulty achieving its ambitious goal of universal immunization by 1990. As late as the end of 1988, worldwide coverage with measles vaccine was only 50% and rates barely exceeded 60% for the other vaccines included in the program.[22] Despite these relatively low levels, the 1989 EPI Progress report was optimistic about the possibility of achieving the 1990 goal. In discussing the prospects of meeting the 1990 goal, the report declared:

> The figures for coverage in 1987 at first seem daunting. How, by the end of this decade, can immunization levels which took almost 15 years to raise to the 50% mark be boosted to 80% of more? And the issue is not only 1990 and not only immunization. For immunization services must be sustained for the foreseeable future and they must be established in ways which strengthen other elements of primary health care.
>
> The prospects are, in fact, encouraging. The coverage now being achieved rests on a health infrastructure which has been developed since the beginning of EPI. It was never envisaged that coverage would increase by equal stages each year. Rather, it was expected to remain at low levels for several years to be followed by rapid growth. This is in fact what has happened. ...
>
> Only since the mid-1980s had the majority of developing countries had a core immunization infrastructure in place which would permit national vaccination coverage to be rapidly increased in a sustained manner. Now global emphasis is on acceleration of national programmes. ...
>
> [W]ith vigorous efforts, a coverage of some 75% may be obtained by the end of 1990. Projections are always a risk. There are those who will consider them too optimistic while others will expect even greater performance. In any case 80% coverage targets should be attempted, as it sets the stage for the reduction, elimination and eradication proposed for the next decade.[23]

This optimism, which seems extraordinary given the short amount of time remaining before 1990, was justified through a slight of hand redefining universal childhood immunization as 80% vaccination coverage worldwide. This new definition allowed efforts to ignore whole swaths of the developing world where the infant population was not sufficiently large to threaten global averages.

A detailed plan for how to achieve at least 75% (and hopefully 80%) coverage worldwide accompanied this optimistic assessment.[24] It called for a particular focus for the largest developing countries, stressing the excellent prospects for large increases in vaccination coverage in three of the five largest developing countries (India, China and Indonesia). It also went to great lengths to note areas where low coverage rates did not seriously threaten world averages. For example, the plan declared: "The low levels of vaccination coverage in Africa have been noted. But most unimmunized or partially

[22] A42/10. 1989. "Expanded Programme on Immunization: Progress and evaluation report." Dated 6 March 1989. pg. 2.
[23] Ibid. pg. 11-12.
[24] All quotes and figures in this paragraph are drawn from Ibid. pgs. 11-12.

immunized infants in the developing world are found not in Africa." It further noted that Bangladesh and Ethiopia "despite being considered large," only had "about 6.0% of the newborn infants in developing countries as a whole." Angola, Chad, Democratic Kumpuchea, Democratic Yemen, Equatorial Guinea, Guinea, Mali and Niger, all countries with exceptionally low immunization levels, also had too few newborns ("2.5% of all newborn infants in the developing countries") to seriously threaten global coverage figures.

The redefined goal of achieving 80% vaccination coverage worldwide was achieved with little fanfare by 1992,[25] but by then the WHO was embarking on new projects and pursuing new goals, including the eradication of poliomyelitis, the elimination of neo-natal tetanus and the radical reduction of worldwide cases of measles. It also embarked on new initiatives related to vaccine research and efforts to add new vaccines, particularly hepatitis B, to the EPI program. New programs brought new funding needs, and the 1992 debate brought a greater focus on this dimension of WHO programming. That year marked the last true year of debate about the EPI,[26] with the WHA receiving its last progress report focusing exclusively on that program.

The lengthy report on the EPI program included broad program goals and targets for the 1990s, which became official WHO policy when the WHA adopted the new EPI resolution, entitled "Immunization and Vaccine Quality,"[27] which, despite its specific name, broadly endorsed the new policy recommendations and targets outlined in that years progress report. The new program adopted four major objectives:

1. maintenance of a high level of vaccination coverage (at least 90% of children under one year of age by the year 2000) against diphtheria, pertussis, tetanus, measles, poliomyelitis, tuberculosis and against tetanus for women of childbearing age;
2. by 1995, reduction by 95% of measles deaths and reduction by 90% of measles cases compared to pre-immunization levels as a major step towards the global eradication of measles in the longer run;
3. elimination of neonatal tetanus by 1995; and
4. global eradication of poliomyelitis by the year 2000.[28]

It added three further targets meant "to ensure the equitable distribution of immunization services," to improve surveillance and "to specify new vaccines and a mechanism for their introduction into immunization programmes in the countries in greatest need." These included:

1. **Vaccination coverage:** Coverage against diphtheria, pertussis, tetanus, poliomyelitis, and tuberculosis for children under one year of

[25] See "Expanded Programme on Immunization, and Vaccine Quality: Progress Report by the Director-General." Dated 9 April 1992. A45/8.
[26] Renewed discussion of the WHO's overall immunization program would re-emerge in the next millennium, with the formation of GAVI in 2000 and with debates about the WHO's "global immunization strategy" in 2005 and 2008.
[27] WHA45.17. 1992. "Immunization and Vaccine Quality." Dated 12 May 1992.
[28] A45/8. 1992. "Expanded Programme on Immunization, and Vaccine Quality: Progress report by the Director-General." Dated 9 April 1992. pg. 8.

age should reach at least 80% in all districts by 1995 and 90% by the year 2000. Measles vaccination coverage should reach at least 90% in all districts by 1995. Meeting the goals of measles reduction, neonatal tetanus elimination and poliomyelitis eradication will require even higher coverage in certain high-risk areas. In all districts at high risk of neonatal tetanus, all births should be protected by the immunization of women of childbearing age with tetanus toxoid by 1995. If risk is unknown, it should be assumed to be high.

2. **Surveillance:** All countries should ensure complete and timely reporting of paralytic poliomyelitis, neonatal tetanus and measles (including reports of zero cases) on at least a monthly basis from all designated reporting sites by the end of 1992.
3. **New vaccines incorporated into EPI: Yellow fever vaccine** should be routinely administered to children under one year of age in all countries at risk for yellow fever by 1993.
   Hepatitis B vaccine should be integrated into national immunization programmes in all countries with a hepatitis B carrier prevalence (HBsAg) of 8% or greater by 1995 and in all countries by 1997. Target groups and strategies may vary with the local epidemiology. When carrier prevalence is 2% or greater, the most effective strategy is incorporation into the routine infant immunization schedules. Countries with lower prevalence may consider immunization of all adolescents as an addition or alternative to infant immunization.[29]

Ambitious new program goals brought with them increased funding needs, and a large part of the report's exegesis dealt with funding problems and the balance of global and local roles and responsibilities in the EPI program. Discussion of these issues occurred in four sub-sections of the report: (1) Resources, (2) Planning and Coordination, (3) Sustainability and (4) Roles and Responsibilities. Meeting new goals required "significantly more resources, including more vaccine",[30] and the system in place for meeting those funding needs remained entirely voluntaristic, heightening the threat of funding shortfalls on both the national and international levels.

The report offered a particular vision of how to overcome this problem: better communication and a broader base of support. The former was meant to elicit the latter. Several types of information would help elicit support. First, "public awareness of the benefits of immunization" in both developing countries and "industrialized donor countries" would bring funding dividends by increasing interest in supporting immunization programs.[31] Second, better communication and coordination between donors and other partners in immunization programs would help assure donors that their funds were needed and would be well used. This second strategy was to take place in new coordinating bodies called "interagency coordinating committees" (ICCs) which were meant to help coordinate funding issues on all levels, global, regional and national, of the program. Speaking of national bodies, the report notes:

[29] Ibid. pgs. 8-9.
[30] Ibid. pg. 10.
[31] Ibid. pg. 10.

> This coordination benefits both recipients and donor agencies by promoting effective use of available resources and by providing individual donors with the accountability and visibility needed for continuing support.[32]

The logic of donor support revealed here differs dramatically from that found in early years of the program. According to earlier accounts, donors' main demand in funding programs was the ability to quickly cease funding them. They were willing to put forth funds, but only if countries could quickly take over. Here, donor support is contingent on completely different factors: they need proof that funds are well used (accountability), and they need acknowledgement of their contributions (visibility).

The discussion of roles and responsibilities is even more revealing of the vast changes that had taken place over the preceding 18 years. That section discusses the specific roles and responsibilities of nine different organizations or types of organizations involved immunization efforts: national governments, the WHA and WHO Regional Committees,[33] UNICEF, other UN agencies,[34] the Task Force for Child Survival and Development,[35] bilateral development agencies, disease control agencies and laboratories in developed countries, and non-governmental organizations (both local and international). Although national governments maintained primary responsibility for "coordinating and implementing immunization programmes in their countries," the report acknowledged:

> In developing countries, and *especially in the least developed countries*, donor partners will continue to be needed for the foreseeable future to support governments in achieving universal mother and child immunization and the goals of measles reduction, neonatal tetanus elimination and poliomyelitis eradication.[36] (emphasis added)

The WHA and regional committees, on the other hand, were responsible for setting the goals national governments ought to strive to meet. The many other organizations listed in the report had various duties designed to ensure the availability of any needed support to meet those goals. The necessary tasks included:

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[32] Ibid. pgs. 10-11.

[33] The WHO is divided into six regional bodies: AFRO (African Region), AMRO/PAHO (American Region), EURO (European Region), EMRO (Eastern-Mediterranean Region), SEARO (South-East Asian Region) and WPRO (Western Pacific Region). Each is governed by its "Regional Committee," made up of representatives from Member States in that region.

[34] The report specifically names the United Nations Development Programme (UNDP), the World Bank and the United Nations Population Fund (UNFPA).

[35] Now known as the Task Force for Global Health, the Task Force for Child Survival was founded in 1984 to serve as a coordinating body for a consortium of global health organizations, including UNICEF, WHO, The Rockefeller Foundation, The United Nations Development Programme, and the World Bank. The Task Force was meant to facilitate the collaboration of these organizations in pursuit of specific health goals, including those of the EPI and successor immunization programs.

[36] Ibid. pg. 15.

- Help planning and evaluating programs, technical advice and training (WHO, UNICEF and disease control agencies and laboratories in the developed world);
- Provision of financial and material resources (UNICEF, bilateral development agencies, other UN agencies, and NGOs);
- Aid in carrying out immunization programs themselves (NGOs, UNICEF);
- Coordination of all the various organizations involved to ensure that resources were distributed efficiently and effectively (Task Force for Child Survival and Development, but also the new ICCs, which were meant to help coordinate efforts on the national level);
- Mobilization of resources and general advocacy (WHO and UNICEF).[37]

The list reveals a global coalition uniting actors of many different kinds working at many different levels – a coalition which was unthinkable less than 20 years earlier, when the WHO offered periodic advice, UNICEF may have offered aid, and any available development aid would only serve as a short-term impetus to new health programs. However, the extraordinary growth in interest in immunization also caused problems, as analysis of WHA debates makes clear. New sources of funding could not keep pace with the resource demands brought on by new programs, and independent or semi-independent programs often competed with each other for the limited funds available. The 21st century brought a new solution to these coordination problems: GAVI.

GAVI brought renewed focus and resources to the original goal of the EPI: protecting children from vaccine-preventable disease. The report introducing the project to the WHA made this clear, noting:

> The Alliance has been set up to fulfil the right of every child to be protected against vaccine-preventable diseases of public health concern. Its mission is to save children's lives and to protect people's health through the widespread use of safe vaccines, with a particular focus on the needs of developing countries.[38]

However, GAVI extended beyond the WHO itself, including "representatives from the WHO, UNICEF, the World Bank, industrialized and developing countries, technical agencies, research and development agencies, the Rockefeller Foundation and the Bill and Melinda Gates Foundation."[39] Governing mechanisms were especially designed to neutralize conflict between UNICEF and the WHO, a key problem faced by one of its predecessors, the CVI.[40] The two organizations took turns sharing the governing board, and each led one of the organization's key task forces (along with the World Bank, which led a third). Further, the organization's coordinating secretariat, although housed at

[37] Ibid. pg. 15.
[38] EB105/43. 2000. "Global Alliance for Vaccines and Immunization: Report by the Secretariat." Dated 25 January 2000. pg. 1. The WHA considered the same report, originally prepared for the Executive Board, when debating GAVI at their meeting in 2000.
[39] Ibid. pg. 2.
[40] For a full account of the rise and fall of the Children's Vaccine Initiative, see Muraskin, William. 1998. *The Politics of International Health: The Children's Vaccine Initiative and the Struggle to Develop Vaccines for the Third World*. New York: State University of New York Press.

UNICEF, was at that organization's Geneva office, near the headquarters of the WHO, rather than in the global headquarters in New York.

GAVI's initial strategic objectives were not new, having frequently been discussed and advocated in the years prior to that organizations creation. They included objectives:

> (i) to improve access to sustainable immunization services; (ii) to expand the use of all existing cost-effective vaccines; (iii) to accelerate the development and introduction of new vaccines; (iv) to accelerate research and development efforts for vaccines and related products specifically needed by developing countries; and (v) to make vaccination coverage an integral part of the design and assessment of health systems and international development efforts.[41]

While the objectives themselves were not new, GAVI united them under one broad framework, which had not previously been the case.

GAVI also put particular emphasis on developing countries – an emphasis it shared with previous programs, including the EPI. However, unlike the EPI, GAVI included a new fund, the Global Fund for Children's Vaccines, which offered particular support to the poorest developing countries. Although not the only source of funding available under the GAVI framework, this important new source of funding was available only to countries with per capita GNP under $1,000 per year, making some 74 countries worldwide eligible for the funding when the Fund was created in 2000.[42] While previous efforts had targeted developing countries, no previous effort had put as much focus on aiding the poorest among them or restricted aid to the poorest countries. Indeed, aid criteria first emphasizing imminent self sufficiency and later emphasizing nation states' primary financial responsibility for programs, which characterized the 1970s and 1980s, instead targeted the wealthiest developing countries, which were most likely to have the resources needed to assume their share of responsibility for immunization programs.

GAVI continues to provide the basis for most of the WHO's immunization program, although some efforts, including polio eradication, operate semi-independently from this broader program. Within this frame, the WHO and UNICEF prepared a joint "Global Immunization Strategy," which was presented to and approved by the WHA in 2005 and is meant to govern the WHO's immunization activities until 2015. The new plan again placed emphasis on the needs of the poorest developing countries.

As part of this, it highlighted a long recognized problem faced by such countries: planning and funding difficulties arising from such reliance on external donations. In discussing financing, it noted:

> In low-income countries, especially in sub-Saharan Africa, overall health services are desperately under-financed. In some countries, basic health services receive less than US$ 10 a year per capita - against a requirement of US$ 30-40 a year per capita. Although immunization financing should

[41] EB105/43. 2000. "Global Alliance for Vaccines and Immunization: Report by the Secretariat." Dated 25 January 2000. pg. 1.
[42] "Global Alliance for Vaccines and Immunization (GAVI)." Fact Sheet N°169. Revised March 2001.

> be primarily a national public responsibility, many low-income countries rely heavily on international assistance for this. As a result, financing can be volatile and vulnerable to shifts in donor priorities.[43]

The problem was an old one and had haunted efforts to expand access to immunization services from the beginning. How could immunization services, once begun, be sustained? Although the global community had long abandoned the model of complete national self sufficiency, shared responsibility continued to be difficult to implement in practice. Practical solutions remained largely the same as those envisioned in 1992: mobilize more resources, provide long-term support, and coordinate activities from all partners through ICCs.[44]

In sum, over 36 years of immunization programming, global visions of responsibility changed dramatically. When the EPI program began, immunization was not seen as a "right," and neither states nor the global community had a responsibility to provide it. This changed when the WHO embarked on its "Health for All" campaign, with its emphasis on health, and particularly primary health care (including immunization) as a human right. This framework made immunization the joint responsibility of nation states and the global community.

By the early 1980s, the meaning of shared responsibility became increasingly precise. According to this vision, nation states held primary financial and managerial responsibility for immunization, but the global community also played a significant role. However, pursuit of the WHO's ambitious "Health for All" goals pushed for a new interpretation of shared responsibility, one emphasizing the global community's particular responsibility towards "least developed countries." Although this vision would only fully emerge in the 21st century, with the creation of GAVI and the Global Fund, its foundational principle, that the global community was primarily responsible for ensuring access to immunization if nation states were unable to do so, was first obliquely acknowledge in 1989, and this new emphasis continued throughout the 1990s, albeit in an amorphous way.

By the 21st century, primary national responsibility also began to give way. The new global framework, GAVI, placed special emphasis on aiding least-developed countries, even if they were not able to exert primary financial responsibility for immunization programs. Shared responsibility brought with it a new challenge: coordination and sustainability. These challenges would haunt all future global immunization programs and led to the creation of new coordinating mechanisms, including ICCs at the national level and the new global partnership, GAVI, globally.

These changes did not go unnoticed by WHO member states. The following section looks at member states' participation in debates about the EPI and subsequent immunization programs. It begins with a broad overview of patterns in participation before turning to a closer examination of how themes in the debates changed over time, particularly those relating to questions of responsibility and financing.

Debating Immunization at the WHA

[43] A58/12. 2005. "Draft Global Immunization Vision and Strategy." Dated 16 May 2005. Add. 1. pg. 5.
[44] Ibid. pg. 39.

The WHO's immunization program can be divided into several periods. The first, from 1974 to 1988, concerned the original EPI, which focused on raising vaccination coverage with four vaccines to combat six vaccine-preventable diseases. After 1988, the program began expanding considerably. The initial period of expansion, from 1988 to 2000, was relatively uncoordinated, with multiple vaccination programs running in competition with one another. GAVI, which formed in 2000, was meant to help re-establish the unity-of-purpose found in the original EPI while maintaining and adding to the expanded aims established during the 1990s.

These changes in the WHO's immunization programs brought with them changes in countries' participation in debates. Between 1974 and 1987, delegates from 105 member states contributed to debate at least one time. For 1988-1999, the number was only 97, whereas the period between 2000 and 2009 saw increased participation, with delegates from 117 countries participating in debates. More interesting are changes in how many and which countries participate frequently in debate, which I define as participating in at least half of the debates held in the period. The number of frequent participants increases consistently in all three periods, from 14 in 1974-1987 to 18 in 1988-1999 and 32 in 2000-2009.

Table 4.2 lists countries participating frequently in debates during each period and indicates how many debates (as a percentage of total) they participated in.

[Table 4.2 about here]

As can be seen in Table 4.2, participation changes quite a bit between the periods. Only five countries (India, USSR/Russia, USA, Nigeria and Thailand) appear on all three lists. The last period sees an especially marked increase in participation from developing countries. There are also more specific changes in which countries participate in debates. For instance, the Netherlands drops from 100% participation in 1974-1987 to 50% in 1988-1999 and off of the list in 2000-2009.[45] Significant changes also occur in the other direction, with certain countries radically increasing their participation in debates. China, the most active participant in debate after 1988, is particularly notable here. It increases its participation rate from a mere 8% of debates in 1974-1987 to 87.5% in 1988-1999 and 100% after 2000. Other countries, including Australia and South Korea, only begin participating in debates after 1988. Many more, including Oman, Brazil, Japan, Bangladesh, Botswana, Swaziland, Turkey, Zambia and Greece more than double their participation.

Initial Debates, 1974-1987

The EPI began when a coalition of member states, including Ethiopia, India, the Netherlands, Poland, Qatar, Somalia, the USA and Venezuela, introduced a draft resolution for debate during the WHA's discussion of the WHO's communicable disease control and prevention program and budget. The resolution called for all countries to develop immunization services targeting six common vaccine preventable diseases. In addition, it called on the WHO to assume new duties to ensure the quality of vaccines and help countries set up programs, including "study[ing] the possibilities of providing from international sources and agencies increased supplies of vaccines, equipment and

[45] The Netherlands participated in three of the eight debates held between 2000 and 2009.

transport, *for countries that indicate that they can shortly become self-sufficient in these requirements*."[46]

This last clause provoked considerable debate, with numerous developing countries, including Ethiopia, Ecuador, Ghana, Cameroon, Ivory Coast, Iraq and Malawi, emphasizing developing countries' need for sustained aid in developing immunization programs. Four countries (Ivory Coast, Cameroon, Iraq and Ethiopia) called for the clause to be stricken. The delegate from the Ivory Coast succinctly summarized the objection:

> He was disturbed at operative paragraph 1(3)(i), which mentioned the supply of vaccines, equipment, and transport to countries that indicated that they could shortly become self-sufficient in those requirements. That provision seemed to exclude a certain number of the economically least favoured developing countries, and it was precisely those countries that needed long-term assistance. Therefore, although he fully agreed with the sponsors of the draft resolution, he urged that countries without the necessary logistic means should not be systematically excluded.[47]

The delegate from Malawi raised a further concern: that any country excluded from WHO aid would also be excluded from receiving such assistance from other sources, and particularly from UNICEF, which cooperated closely with the WHO on health issues, and relied on technical advice from that organization. The Director-General emphatically denied that this would be the case, and in the process shed some light on why the clause was included to begin with:

> In the past donor agencies had insisted that countries commit themselves to taking over within a certain period the responsibility for continuing routine vaccination. There had been a constant exchange of views between WHO, UNICEF and bilateral and multilateral assistance agencies in which WHO had fought to convince other agencies that countries needed a long time to become self-sufficient in that respect. Very often the fight had been bitter, and sometimes the WHO had lost.[48]

While obviously trying to portray the WHO itself in a positive light, the Director-General's statement revealed an ongoing debate about the role of aid. Was it necessarily a short-term investment? Or was long-term aid possible and even desirable?

In the end, the Assembly adopted a more broadly worded resolution after lengthy debate. The exclusionary clause was removed in the final resolution, and a new clause was added to the preamble emphasizing the need for all countries to have "systematic immunization programmes."[49]

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[46] A27/A/Conf. Doc. No. 19. 1974. "WHO Expanded Programme on Immunization." Dated 18 May 1974. pg. 1. emphasis added.
[47] A27/A/SR/10. 1974. "Committee A: Provisional Summary Record of the Tenth Meeting." pg. 9.
[48] A27/A/SR/11. 1974. "Committee A: Provisional Summary Record of the Eleventh Meeting." pgs. 5-6.
[49] WHA27.57. 1974. "WHO Expanded Programme on Immunization." Dated 23 May 1974.

However, this amendment did not end the ongoing debate over aid. While not officially endorsed in the resolution, the idea that only countries that could quickly run self-sufficient immunization programs ought to receive aid persisted, as seen in the discussion of WHO reports, above. Over the next four years, the WHA would debate the nascent EPI program annually. These initial years of debate also saw large changes in ideas about aid and responsibility for immunization programs.

Even though it had been removed from the EPI resolution, the principle of imminent national self sufficiency re-emerged in the 1st EPI progress report, forming one of the guiding principles for the early program. Despite the vocal objections in 1974, no one objected to the exclusionary principles laid forth in the 1975 progress report. Some delegates even spoke up in favor of it, as seen in the Dutch delegate's statement:

> Time-limited external aid could be used to accelerate the development of national immunization programmes where needed, and national health services could then maintain them.[50]

In 1976, the delegates from both the USA and the USSR spoke up in defense of the same principle, with the US delegate declaring:

> [T]he expanded programme was not a time-limited programme, and the same dramatic success as had been achieved in smallpox eradication should not be expected. The programme must continue, for if it was interrupted the diseases would recur and the programme would be discredited. For that reason his delegation was pleased to see on page 6 of the report that it had been stressed in all discussions with national health authorities that their plans must include measures for the acceptance of full financial responsibility by the countries themselves as quickly as possible.[51]

The USSR echoed this point, noting:

> [C]ountries would have to accept responsibility for the implementation of the programme, and in that connexion he agreed with the remarks made by several delegates, including the delegate of the United States of America.[52]

However, 1976 also saw some hints of change, with delegates from Canada, Norway, the Philippines, Sweden and Switzerland introducing a new resolution urging:

> all governments and agencies that are in a position to do so to contribute funds or their equivalent in equipment and supplies, to the Voluntary Fund for Health Promotion (Special Account for the Expanded Programme on

[50] A28/A/SR/5. 1975. "Committee A: Provisional Summary Record of the Fifth Meeting." Dated 20 May 1975. pg. 2.
[51] A29/A/SR/15. 1975. "Committee A: Provisional Summary Record of the Fifteenth Meeting." Dated 17 May 1976. pg. 7. Emphasis added.
[52] Ibid. pg. 8.

> Immunization), or to make sufficient long-term contributions on a bilateral basis.[53]

The call for contributions was routine, but the end of the clause with its emphasis on the desirability of *long-term* aid marked a change from the initial years of the program. During debate, 12 other countries[54] voiced their support of this call for generosity, and the resolution passed unanimously, despite the open misgivings about long-term aid expressed by delegates from the US and the USSR.

The shift to shared responsibility accelerated in 1977, when the WHA unanimously endorsed the broad program changes involved in making the EPI part of the WHO's "Health for All" campaign, including adopting the ambitious goal of universal immunization by 1990. This broad change became official policy when the WHA passed a new EPI resolution.[55] However, the ambitious new goal and the expanded global responsibility it implied did not pass without reservation. While some questioned the feasibility of the ambitious 1990 goal,[56] others returned to the theme of self sufficiency. The British delegate was clearest in his emphasis on the need for nations to ultimately assume full financial responsibility for their programs, noting: "Countries in need should be supported but should also be moved towards self-reliance as quickly as possible."[57] Others, including the USSR and Bulgaria, emphasized Member States' leading role, both logistically and financially, in any EPI programs.

Little changed in this formulation during 1978, the final year of initial debate. The assembly passed yet another EPI resolution, which, among other things, formally linked the program with Primary Health Care. However, the tentative consensus about aid and responsibility reached in 1977 remained unchanged aside from one detail. In deference to concerns raised the previous year, the progress report identified a new long-term program objective: to "promote countries' self-reliance in the delivery of immunization services within the context of comprehensive health services."[58] Nevertheless, the new consensus remained: immunization was a right, and the global community shared with nation states some responsibility for ensuring that this right was met.

Four years later, in 1982, the Assembly considered a new program plan, devised by the Global Advisory Group, which included a new standard of shared responsibility: the 2:1 ratio of national to international funding. That year the WHA reaffirmed its commitment to the goal of universal child immunization by 1990 and endorsed this plan with a new EPI resolution.[59] The Assembly followed its usual pattern in strongly

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[53] A29/A/Conf. paper No. 15. 1976. "Expanded Programme on Immunization." Dated 15 May 1976.

[54] Chile, the Netherlands, Thailand, Mozambique, the USSR, Zambia, Sierra Leone, Egypt, Czechoslovakia, Yugoslavia, Tanzania and Turkey.

[55] WHA30.53. 1977. "Expanded Programme on Immunization." Dated 19 May 1977. The Director-General recommended a draft of this resolution, which was adopted with little amendment, for consideration by the WHA in the Progress-Report.

[56] See especially the comments from the delegate from Yugoslavia. A30/B/SR/17. 1977. "Committee B: Provisional Summary Record from the Seventeenth Meeting." Dated 18 May 1977. pg. 3.

[57] Ibid. pg. 9.

[58] A31/21. 1978. "Expanded Programme on Immunization: Progress Report by the Director-General." Dated 31 March 1978. pg. 1.

[59] WHA35.31. 1982. "Expanded Programme on Immunization." Dated 14 May 1982.

supporting the program and the resolution,[60] but neither WHA support nor the resolution guaranteed that funding was available. Neither developing countries nor the global community were compelled to provide their share of the funds needed. This lack of guarantees made some cautious in their support of the program, as seen in the following statement from the delegate from Denmark, speaking on behalf of the Nordic countries:[61]

> Finance was also a serious problem, now that economic growth had virtually stopped. By carefully documenting of costs, the case for financing could be strengthened. The Nordic countries had supported WHO both with extrabudgetary resources and bilaterally; and would probably continue to do so.[62]

The delegate from the Netherlands, while strongly supporting the program in general, offered an even more pessimistic view of the situation, calling the 1990 goal into question:

> It was estimated that financial resources would have to be four times as great as they had been in 1981 if full vaccination coverage by 1990 was to be achieved. His delegation wondered whether that could be effected without major shifts in health priorities. Even without taking financial restraints into account, it was perhaps unrealistic to cling to the aim of full immunization of children by 1990. The figures in Table 1 of the annex to the report were not encouraging. It could be bad for morale to insist on a target which might not be attainable.[63]

Some delegates from developing countries expressed skepticism about their ability to provide the necessary funding as well. Echoing concerns about the world economic situation raised by delegate from Denmark, the delegate from Indonesia noted:

> Point (3) of the action programme stated that investment in the Expanded Programme must be doubled by 1983. Though all Member States would try to increase their spending in the area, the world economic situation would make that difficult for developing countries, and international resources must be mobilized to assist them. Indonesia would do what it could.[64]

The delegate from Bangladesh also raised concerns, pointing to the special financial needs of least developed countries:

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[60] A35/A/SR/11. 1982. "Committee A: Provisional Summary Record of the Eleventh Meeting." 30 countries spoke in favor of the program, with 22 specifically citing support for either the five-point action plan or the resolution, including: Nigeria, Denmark, Finland, Iceland, Norway, Sweden, Tunisia, Greece, Indonesia, the Netherlands, Ghana, Peru, East Germany, Central African Republic, Chile, Israel, Mongolia, India, USSR, Uruguay, USA, Iran and Senegal.
[61] Denmark, Finland, Iceland, Sweden and Norway.
[62] Ibid. pg. 14.
[63] Ibid. pg. 15.
[64] Ibid. pg. 15.

> The primary responsibility for implementing the strategy of health for all lay with governments. But treating sick people and immunizing them in order to control and prevent disease, as well as providing safe drinking-water, and health education and ensuring the welfare of mother and child, comprised a heavy task, especially in the least developed countries like Bangladesh, where the per capita income was the equivalent of about US$ 100; 80% of the population, 72 million people, lived below the poverty line, and lacked food, clothing, shelter and health care in Bangladesh. If they were to have them and to be included in the health for all programme, emphasis should be placed on material assistance to the developing countries. In most organizations of the United Nations system there were special programmes for assisting the least developed countries. In the strategy of health for all and the Seventh General Programme of Work, as in other programme, WHO should take special action to ensure that the least developed countris were able to develop basic health infrastructures.[65]

Responding to the concerns, EPI Director Ralph Henderson threw responsibility back to Member States. He noted:

> Several questions had been raised concerning the ability of EPI to meet its resource goals during the next two years and to meet its coverage goal by 1990. He was less concerned by the immediate future than by the latter half of the decade. In many developing countries, costing studies and programme reviews had revealed major inefficiencies in the way existing health staff were investing their time. He believed that the target of 50% coverage by 1984 could be reached with some new resources and with better use of existing resources. But during the remainder of the decade, when an attempt was being made to extend the coverage of immunization and other health services to populations which currently had little or no access to such services, a real test would be faced. Would the Organization be able to meet the challenge? It was for delegations to answer, for it was their commitment and determination which were required. The answer was important, for, unless that simple step with respect to immunization could be accomplished, aspirations for the year 2000 must be open to question.[66]

This challenge ended program debate for that year. The Assembly passed the resolution, formally committing itself to the program goals, including its ambitious financing requirements. However, only future events would show whether the new standard of shared responsibility was practicable.

If 1982 marked a new consensus about the division of responsibility for financing immunization programs, it also marked the beginning of serious concerns about the feasibility of achieving the ambitious goal set by the EPI. Delegates from many countries

[65] Ibid. pg. 15.
[66] A35/A/SR/12. 1982. "Provisional Summary Record of the Twelfth Meeting." Dated 14 May 1982. pg. 5.

highlighted their concerns when discussing the EPI program as part of budget reviews in 1983 and 1985. Some, like the delegate from Chile, simply asked whether the goal was attainable:

> [T]he year for the attainment of the current goal was 1990 and yet, so far, in the Region of the Americas only five countries, including his own, had achieved and were maintaining 80% vaccination coverage. He would like to know what was the situation in other regions - as the target date was so rapidly approaching an intensification of effort would probably be required - and whether WHO had any reservations about the possibility of attaining the goal.[67]

Others were more pointed in their critique, pointing to slow progress, as in this statement from the delegate from Iran:

> [E]stimated vaccination coverage in children up to the age of 12 months had not yet reached one-third of the target. ...It was accordingly hard to see how the goal for 1990 could be achieved on a worldwide scale.[68]

With the program's ability to meet its ambitious goal of universal childhood immunization by 1990 increasingly in question, debate also hinged on *why* vaccination coverage remained low. The EPI program statement in the *Proposed Programme and Budget for the Financial Period 1986-1987*, addressed this point, placing blame primarily on national governments:

> This slow improvement in immunization may be attributed to two underlying factors: insufficient national political will to mobilize resources, and lack of managerial skills to translate resources into results.[69]

In the face of this growing pessimism, 1986 brought a reaffirmation of the 1990 universal immunization goal, with the passage of a new resolution in support of the EPI program[70]. The resolution reaffirmed the Assembly's support of the 1990 goal and called for accelerated efforts to increase vaccination coverage, including new tactics, like National Immunization Days and efforts to reduce the "drop out rate" (the drop in coverage between the first and third dose of vaccination series for polio and DPT). However, it also recast the goal to focus more on ensuring *access* to immunization services and to focus more on immunization's measurable *effects* on vaccine-preventable diseases (particularly neo-natal tetanus, measles and polio) than on vaccination coverage itself.

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[67] A36/A/SR/10. 1983. "Committee A: Provisional Summary Record of the Ninth Meeting." Dated 11 May 1983. pg. 14.
[68] A38/A/SR/12. 1985. "Committee A: Provisional Summary Record of the Twelfth Meeting." Dated 16 May 1985. pg. 7.
[69] PB/86-87. 1984. *Proposed Programme Budget for the Financial Period 1986-1987*. pg. 201.
[70] WHA39.30. 1986. "Expanded Programme on Immunization." Dated 16 May 1986.

Seemingly in response to the critique of developing countries put forth in the 1985-1986 budget, many developing countries spoke about the specific efforts their governments were undertaking to increase vaccination coverage within their borders. Only three[71] of the 21 developing countries whose representatives spoke regarding the program failed to highlight measures being taken to improve program performance within their borders. Several European countries also highlighted their own efforts as part of a newly adopted European-region immunization initiative.

For their part, donor countries also signaled their continued support for the program. Some, including the US and the Netherlands, tied their continued support to recognition of the need for ongoing, long-term international assistance. As the delegate from the Netherlands stated:

> It was not enough to reinforce existing health services; acceleration was essential even though it might in many cases entail sustained use of external financial and operational assistance for decades rather than years.[72]

Similarly, the US delegate recognized the need for long-term financial support while pledging new and ongoing American aid for the program:

> It was recognized that the sustaining of programme efforts in many countries would depend on the availability of external resources to meet recurring costs. The Agency for International Development was committed to long-term financial support for EPI and its country programmes.[73]

This renewed commitment outlasted the year, as the *Proposed Programme Budget for the Financial Period 1988-1989* makes clear. In stark contrast to the 1986-1987 budget, this one declares:

> Support for immunization programmes and commitment to reaching the 1990 goal, both from national programmes and from external resources, has markedly increased and has encouraged national programme managers to explore innovative ways of rapidly increasing vaccination coverage. Support from the many organizations that have long been associated with the Expanded Programme is growing and the number of collaborators is increasing. At the present time, therefore, no committed country that has a realistic plan of operations for immunization need be constrained in its implementation by a lack of vaccine, cold chain equipment, or other supplies.[74]

[71] Argentina, North Korea and Burkina Faso did not mention their programs when speaking.
[72] A39/B/SR/11. 1986. "Committee B: Provisional Summary Record of the Eleventh Meeting." pg. 10.
[73] Ibid. pg. 14.
[74] PB88-89. 1986. "Proposed Programme Budget for the Financial Period 1988-1989." pg. 197.

Two years later, the situation analysis gave no mention of the financial needs at all, simply noting:

> International support has been essential for the Programme's success. It has come from organizations and bodies of the United Nations system, multilateral and bilateral development agencies, nongovernmental organizations, and public and private voluntary groups.[75]

The solid financial situation continued in 1989, as shown by an EPI progress report submitted to the WHA for consideration that year. After providing extensive cost estimates for meeting various possible program goals, the report notes:

> Optimism can be expressed about the continuing availability of outside support for EPI. At the first Bellagio meeting, in 1984, the international development agencies gave the assurance that, if developing countries placed immunization high on their own national agendas, outside funds would not be lacking.
>
> External funding for EPI has up to now largely kept pace with the needs.[76]

Expanding Programs, 1988-1999

Thus, by the end of the 1980s, the tentative new model of shared responsibility based on voluntary commitment from both national governments and international donors appeared relatively stable. Despite early difficulties eliciting sufficient commitment from both groups, by mid-decade a new equilibrium had developed, and the EPI's financial future looked relatively stable. However, this stability did not take into account the new program activities begun during the same period. 1988 marked a turning point for the EPI, with policy moving firmly away from the program's holistic focus on increasing vaccination coverage broadly to focus more firmly on efforts to control specific diseases using immunization.

These changes posed two linked challenges. First, new activities increased the overall need for resources, both national and global, dedicated to immunization. Second, by diversifying the program they posed new challenges to global unity, provoking considerable debate about program priorities and worries that certain aspects of the immunization program, including its original focus on broadly increasing access to immunization services worldwide, would be neglected.

Divisions and disagreements about program priorities emerged as early as 1988 and 1989, during debates about the new polio eradication program. In 1988, the Assembly considered a report on collaboration within the UN system, including discussion of the recent "Declaration of Talloires." The Declaration, issued by the Task Force for Child Survival (a group uniting concerned UN organizations, including the WHO, and major multilateral and bilateral aid organizations), urged the global community to pursue several new goals, including eradication of poliomyelitis,

[75] PB90-91. 1988. "Proposed Programme Budget for the Financial Period 1990-1991." pg. 267.
[76] A42/10. 1989. "Expanded Programme on Immunization: Progress and evaluation report." Dated 6 March 1989. pg. 15, paragraph 5.21-5.22.

elimination of neo-natal tetanus, a vast reduction in the global incidence of measles and in deaths due to childhood diarrhoea, and reductions in mortality associated with acute respiratory infections and in infant, under-five and maternal mortality rates more generally.

The Assembly specifically debated the first of these propositions when a group of 17 member states, including Brazil, Canada, China, Cyprus, France, Hungary, Indonesia, Italy, New Zealand, Pakistan, Sri Lanka, Sweden, Thailand, USSR, USA, Zaire and Zimbabwe, introduced a resolution calling for the global eradication of poliomyelitis by 2000[77]. Debate was brief and enthusiastic, with 15 more countries[78] quickly speaking up in favor of the program and suggesting minor amendments. During the debate, eight more countries[79] joined as sponsors of the resolution.

Although the level of participation was high (only three previous years had seen higher levels), there were some telling silences. The Netherlands was notably absent from vocal supporters of the amendment. A strong and vocal supporter of the EPI, the Netherlands had never failed to speak in favor of the program during debate or to support a resolution concerning the program. Most of the other Member States who had frequently interested themselves in the EPI program in the past spoke out in favor of the new program.[80]

The Netherlands' initial reaction to the new polio eradication initiative became clearer in 1989, when the Assembly reviewed a new EPI progress report[81] and debated what would be the final EPI resolution,[82] which brought EPI policy in line with the recommendations contained in the "Declaration of Talloires." Debate was brief, but it allowed the Netherlands to break their silence from the brief year. Although they consented to the new resolution, as they had in 1988 when the polio eradication initiative was passed, they expressed significant misgivings about the overall development of the EPI. Discussing the progress report, the delegate noted:

> That report was pervaded by a mixture of euphoria and realism, with euphoria perhaps too predominant. The situation with regard to measles and neonatal tetanus justified concern; in several countries coverage was still below 10%, which might not augur well for the global eradication of poliomyelitis by the year 2000.... It seemed to his delegation that the effort to eradicate poliomyelitis might even draw human and financial resources away from other equally important health problems. That had been implicitly recognized by the Director-General in paragraph 36 of the programme statement, which read: 'additional extrabudgetary resources

[77] The resolution was the first immunization resolution to be introduced by Member States since 1977.
[78] They included: Cuba, UK, Chile, East Germany, India, Switzerland, West Germany, Saudi Arabia, Nicaragua, Mongolia, Zambia, Czechoslovakia, Botswana, Colombia and Iraq.
[79] UK, Switzerland, West Germany, Saudi Arabia, Nicaragua, Mongolia, Zambia and Iraq.
[80] In addition to the Netherlands, Ghana, Egypt, Tanzania and Nigeria also did not participate in this debate. While these four countries were hardly as ardent supporters of the EPI as the Dutch, they had participated in half of the previous debates related to that program, and, of them, only Tanzania had failed to speak in favor of an EPI resolution in the past.
[81] A42/10. 1989. "Expanded Programme on Immunization: Progress and evaluation report." Dated 6 March 1989.
[82] Passed as WHA42.32. 1989. "Expanded Programme on Immunization." Dated 19 May 1989.

> will be needed if long-established support of activities for reducing morbidity and mortality from the other target diseases of the programme is to be maintained'. If those additional resources were not forthcoming, the question of priorities would thus be raised.[83]

The Netherlands, although a strong supporter of the EPI as a whole, had long expressed concerns about the feasibility of the ambitious goals set by the program. It was among the first to question the feasibility of the 1990 goal, and frequently questioned whether it was achievable in subsequent debates. As this excerpt reveals, the new focus on disease eradication only exacerbated their ongoing concerns.

Assistant Director-General Bektimirov responded to the Netherlands' concerns in his response to the overall debate. His comments reveal a great deal about the Secretariat's view of the purpose of setting ambitious program targets and of the new targets in particular:

> Turning to the question by the delegate of the Netherlands about the future of the Expanded Programme on Immunization if extra resources were not forthcoming, he said that core programme activities would be preserved, first priority being given to increasing and sustaining coverage. But he was not optimistic that the excellent momentum generated by the Programme in the past decade could be maintained without switching the major focus from coverage to disease eradication and control and without adding new activities relating to the introduction of additional vaccines. To make such activities effective, further resources were required. The total external cost of poliomyelitis eradication over the coming decade was estimated to be less than that of the Expanded Programme on Immunization as a whole for one year.[84]

Notably, the Assistant Director-General did not comment on whether polio eradication was feasible (although the Secretariat had long suppressed pushes for eradication in the absence of sustained efforts on the regional level and of demonstrations that the target disease *could be* eliminated from countries). Instead, his comments focused on the need to maintain *momentum*. In a global program that relied on extrabudgetary funds and on a country's willingness to dedicate substantial national resources, the need to maintain momentum, and with it national and international interest and funding, was paramount. But momentum could be a double-edged sword. If new programs helped maintain interest, they also threatened to divert funding from the EPI's original goals.

While generally praising the program's achievements,[85] countries also expressed considerable worries about its sustainability. Several developing countries, including Lesotho, Barbados, Swaziland, Malawi and Guinea, highlighted how difficult economic

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[83] A42/A/SR/11. 1989. "Committee A: Provisional Summary Record of the Eleventh Meeting." Dated 17 May 1989. pg. 7. The Netherlands shifted its position on polio eradication following a national polio outbreak among members of a religious group that refused immunization on religious grounds in 1992-93. It was one of the programs major donors by 2000.

[84] Ibid. pg. 12.

[85] France proved a notable exception. The French delegate questioned the accuracy of the data presented in the progress report.

situations and waning donor interest had or could negatively impact their national programs. Comments from the delegate from Swaziland are particularly interesting:

> In her country, certain multilateral and bilateral partners and nongovernmental organizations, which had supported the Programmes since the 1980s, had indicated that they might not be in a position to continue to do so. One of the reasons given had been that financial and technical support would now be directed toward countries that had a coverage of less than 80%; however, all countries had to achieve 90% coverage.
>
> Swaziland had attained 83% coverage in 1989. No case of poliomyelitis had been reported in the previous 10 years. The EPI targets for 1995 in Swaziland were: elimination of neonatal tetanus and poliomyelitis; reduction of the number of cases of measles by 90%; and maintenance of zero morbidity from diphtheria. In order to meet those targets, her country would need continued support from its international partners and from WHO.[86]

Several other developing countries, including Iran, Cuba, Senegal, Algeria and Tunisia, also highlighted the economic challenges facing the program, warning of dire consequences if "donor fatigue" undermined international financial support for the programs. Donor countries had less to say on the question of resources, mainly focusing on program policy in their comments. However, the delegate from France provided another perspective on international aid and economic constraints, noting: "Economic difficulties had led some countries to cut the resources they allocated to the Programme, which hampered support from the international community."[87] In addition, delegates from the Netherlands and the UK expressed concern about the optimal coordination of international aid, particularly through the establishment of a new interagency coordinating committee.

Finances remained a central concern the following year (1993), when the Assembly reviewed the EPI's program budget for 1994-1995 and considered the first progress report on the PEI. A key theme of the debate was the need for greater international support for the polio eradication program, especially in the face of rising vaccine costs and a related vaccine supply crisis that was facing the entire EPI program, but was especially acute for polio eradication efforts. Delegates from eighteen countries[88] lamented the delays and setbacks facing both the EPI and the PEI due to vaccine shortages associated with a lack of financial support for the program. Three of them, those from China, Vietnam and Zambia, detailed how the crisis was negatively affecting their own efforts to eliminate polio. The Regional Director for the Eastern Mediterranean highlighted similar problems in Pakistan.

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[86] A45/A/SR/7. 1992. "Committee A: Provisional Summary Record of the Seventh Meeting." Dated 11 May 1992. pgs. 6-7.

[87] Ibid. pgs. 8-9.

[88] Finland, the Netherlands, Australia, the Russian Federation, Swaziland, China, Philippines, Japan, Vietnam, USA, Zimbabwe, Mozambique, Tunisia, France, Iran, Guatemala, Bangladesh and Zambia.

Debate in 1995, although brief, made it clear that polio vaccine supply continued to pose a challenge, as did the second PEI program review in 1999, which highlighted a large funding shortfall. In reviewing the program, the representative from the Executive Board noted:

> The Organization estimated that a total of US$1250 million of extrabudgetary resources was needed to bring the initiative to a successful conclusion, the current shortfall being US$500 million). US$ 700 million would be required over the next three years, the shortfall for that period amount to US$370 million.[89]

Despite polio eradication's ongoing financial difficulties during the 1990s, delegates continued to express concern that new programs, and especially polio eradication, distracted attention and resources from the broader EPI program. For instance, during debate about polio eradication in 1993 the Swiss delegate questioned the focus on the program, calling, instead, for a greater focus on the broader goals of the EPI:

> Switzerland, although in no way disputing the relevance of poliomyelitis eradication, questioned the need to accelerate action on that front in view of three recent developments; the fact that although the Expanded Programme as a whole had attained its objective for the previous decade, programmes in the least developed countries had not; the world recession had eaten into donor countries' resources; and there were other important diseases where attention to immunization or primary health care ought to be enhanced.[90]

Although less critical of the eradication program, the Bangladeshi delegate issued a similar call for prioritizing more general immunization programs four years later:

> [H]e expressed concern at the transfer of funding from programme 5.2 [communicable disease control] to programme 5.1 [eradication or elimination of specific communicable diseases]. ...Priority attention should continue to be given to national programmes for vaccination against preventable diseases and for immunization and disease surveillance programmes.[91]

The Bangladeshi and Dutch delegates concerns were not misplaced. A closer look at the content of delegates' statements during WHA debates focusing on the entire immunization program does reveal a slight shift in interest away from general immunization programs. When delegates discussed the WHO's immunization programs in 1989, all delegates who spoke mentioned broad immunization services. As seen in

[89] A52/A/SR/7. 1999. "Provisional Summary Record of the Seventh Meeting." Dated 22 May 1999. pg. 23.
[90] A46/A/SR/9. 1993. "Committee A: Provisional Summary Record of the Ninth Meeting." Dated 11 May 1993. pg. 3.
[91] A50/A/SR/4. 1997. "Committee A: Provisional Summary Record of the Fourth Meeting." Dated 8 May 1997. pg. 14.

Table 4.3, that percentage dropped steadily in subsequent debates, until only 65% of delegates mentioned broad immunization services during the debate in 1997. [92]

[Table 4.3 about here]

However, it is clear that this shift did not entirely arise due to interest in polio eradication. Although interest in polio eradication increased from 36% to 76% over the period, the shift in interest came late, with only a third of debate participants mentioning polio in any debate prior to 1997. Instead, the earlier decline in interest in general immunization programs arose from countries' desire to highlight new program developments in their territories or regions. Three of the five countries whose delegates did not mention broad immunization services in 1992 instead focused on such developments. For instance, the Gambian delegate highlighted Gambia's unique status as the only country in Africa to have fully integrated hepatitis B vaccine into its vaccination services.

Interest in polio eradication only intensified as the 2000 deadline for polio eradication approached, just as concern about the 1990 universal childhood immunization deadline had increased in the late 1980s. In 1997, all 12 delegates who did not mention broad immunization services did discuss polio eradication. Yet, even this shift did not necessarily signal a shift in interest away from the original EPI program; none of these 12 countries had expressed great interest in the original EPI program.[93]

These trends suggests that polio eradication and other new programs may have served more to increase overall interest in immunization than to deflect international attention away from routine immunization. I return to this question in the final section, when I look at funding trends for the WHO's Voluntary Fund for Health Promotion.

Renewed Unity, 2000-2009

Disagreements about broad program priorities dissipated by the year 2000, when the advent of GAVI brought greater coordination of the various parts of the immunization program. Polio eradication became fully independent of this broader program and received broad support in many WHA meetings as the Assembly followed the series of challenges arising during the long, final push for polio eradication[94] with extreme interest, debating the program annually from 2003 through 2009.

Despite less conflict about broad program priorities, these years continued to see the funding challenges present in the 1990s. Funding pressures were particularly severe for the polio program, which faced enormous pressure to finish eradicating polio without delay. With large funding needs, the program consistently found itself with similarly large budget shortfalls – a particularly severe problem in 2003, but a continuous one throughout the rest of the decade.

GAVI and the WHO's Global Immunization Strategy faced less severe budget pressures than polio eradication (despite similar difficulties meeting program targets,

[92] Table 2 only included analysis of debate in 1989, 1992, 1995 and 1997. Other years' debates only focused on part of the WHO's immunization program and cannot serve as indicators of general interest in different aspects of that program.
[93] None had participated in more than three debates held prior to 1988.
[94] The polio eradication effort continues to this day.

particularly for neo-natal tetanus), although budget shortfalls were occasionally a concern for these programs as well. However, Member States were far more interested in another funding issue associated with the program: the re-emergence of funding exclusions. GAVI's creation coincided with the advent of a new source of international funding for immunization, the Global Fund for Children's Vaccines. As mentioned in the previous section, aid from this fund was made available only to the poorest developing countries (those with per capita GNP under $1000 per year).

During the original WHA debate about GAVI in 2000, these new criteria provoked objections from delegates from some wealthier developing countries with strong immunization programs, including Swaziland and Botswana. The delegate from Swaziland noted:

> Her delegation was concerned at the eligibility criteria for funding from the Alliance, specifically as regards gross national product and vaccination coverage rate. It appeared that Swaziland's success in achieving high vaccination coverage would disqualify it from funding, whereas it was still facing major challenges... She therefore urged reconsideration of the criteria for funding by the Alliance, since it seemed that Member States which had achieved reasonable success were being penalized.[95]

This concern was not new – the Swazi delegate issued a very similar critique in her comments in 1992. However, Swaziland's difficulties raising funds in 1992 did not arise from a general principle of need-targeted aid, whereas their inability to seek Global Fund funding did.

Despite objections, the Global Fund's need-based aid principle remained. Indeed, the WHA had no power to amend it. Although the WHO was a key member of GAVI, the Global Fund itself was "a financially independent mechanism," initially created by a US$750 million grant from the Bill & Melinda Gates Foundation (another key partner in GAVI)[96]. While the WHA could debate whether or not the WHO should participate in GAVI and could even refuse to endorse the WHO's participation in the new organization, it could not directly change the eligibility criteria established by the Global Fund.

When the Assembly next debated GAVI policy, in its discussion of the "Global Immunization Strategy" in 2005, financial concerns remained high on the agenda. Twenty-two of the countries that spoke mentioned concerns about program funding or vaccine costs (including two speaking on behalf of large groups of countries),[97] representing over half of all speakers participating in the debate. Of these, Mexico, Sudan and the Bahamas, who spoke on behalf of the 14 member countries of the Caribbean Community, joined Swaziland in expressing concern about the exclusions build into the Global Fund. The delegate from Mexico specifically cited "the principle of health equity" when raising his objections:

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[95] A53/B/SR/5. 2000. "Provisional Summary Record of the Fifth Meeting." Dated 19 May 2000. pg. 4.

[96] 2001. "Global Alliance for Vaccines and Immunization (GAVI)." Fact Sheet N°169, revised March 2001.

[97] They included: Zambia, Kuwait, Canada, Palau, Ivory Coast, El Salvador, Gabon (on behalf of the African Group), Tunisia, Burkina Faso, Poland, Pakistan, France, Venezuela, Oman, Timor-Leste, South Africa, Thailand, Mexico, the Bahamas (on behalf of the 14 Member Countries of the Caribbean Community), Swaziland and Sudan.

> The draft strategy included a welcome reference to immunization against other diseases such as hepatitis B and Haemophilus influenza type b infection, but new inclusions could be expensive. Therefore, the strategy should incorporate support for countries at an intermediate level of development and those with emerging economies, which were currently exempt from the benefits available to the poorest countries from such sources as the Global Alliance for Vaccines and Immunization. Otherwise, the principle of health equity could be compromised.[98]

However, financial concerns were broader than this specific concern, and included concerns about a projected funding shortfall and more serious concerns about the high cost of vaccines. Vaccine costs had been a persistent concern of the program since initial efforts to include hepatitis B vaccine, beginning in 1992.

Concerns regarding vaccine procurement seemed less serious in 2008, when the Assembly received a progress report on the Global Immunization Strategy.[99] Several Member States credited a new strategy, "advance market commitments," with helping resolve some of these problems. However, vaccine costs, and especially the cost of new vaccines, continued to be a concern.

The delegate from Mozambique introduced several amendments related to new vaccines and their cost to a resolution supporting the program. The Thai delegate addressed the problem from the supply-side, introducing an amendment urging an increase in the number of vaccine manufacturers worldwide, with the hope that increased production capacity and competition would help decrease costs. Both proposals sparked significant debate, with countries disagreeing about targets for the introduction of newly developed vaccine, how binding resolution language ought to be, and whether the overall number of manufacturers or the overall production capacity made the most difference for vaccine prices.

Funding Trends

As seen in the discussions above, the debate about responsibility for immunization inevitably entailed a debate about sources of funding for immunization programmes. The WHO's budget was in no way sufficient to meet the resource requirements of the program. Indeed, even many activities on the international or regional level drew on extrabudgetary funds and voluntary contributions for their financing. Instead, the EPI relied on a system based on voluntary commitments from both international donors and nation states. This broad system remained unchanged from the late 1970s onward, although new efforts to coordinate donor funding and to influence vaccine prices and manufacturers would begin in the 1990s and intensify after the year 2000.

Unfortunately, no systematic source exists showing total amounts and sources of funding in the system, due to the diverse funding sources and mechanisms used in the

[98] WHA58/2005/REC/3. 2005. "Committee A: Seventh Meeting." In *58th World Health Assembly: Summary Record of Committees*; *Report of Committees*. pg. 116.
[99] A61/10. 2008. "Global Immunization Strategy: Report by the Secretariat." Dated 3 April 2008.

program. Funding came from many sources, including national budgets, international development assistance, global NGOs, charitable organizations and philanthropies, individual donations and various UN bodies (most notably UNICEF and the WHO). Further, much of this funding involved direct bilateral agreements between donors and receiving states, while some bypassed any state involvement at all.

However, the Special Account for the EPI in the Voluntary Fund for Health Promotion gives some sense of funding trends. This fund was created when the EPI began in 1974, and the WHO's *Financial Reports* included detailed information about contributions to immunization accounts within the Voluntary Fund from 1974 to 2003, after which changes in reporting procedures make it impossible to distinguish contributions for immunization programs from other contributions.

I draw on these data to create a database of contributions by contributor from 1974 to 2001. Even though data are available for the post-2000 era, the creation of the Global Vaccine Fund seems to have had a major impact on Voluntary Fund donations, which drop significantly after 2001.[100] In addition, I broadly distinguish the purpose of funding and identify whether contributions were "specified" or "unspecified." Specified contributions included restrictions on how funds could be used, whereas programs could exercise discretion in their use of unspecified contributions. For this reason, the WHO prefers unspecified contributions.

Figure 4.2 shows total contributions to the immunization accounts of the special fund and distinguishes between specified and unspecified contributions. Contributions are reported by biennium, following the publication pattern in the *Financial Reports* for the period 1974-2001. All amounts are adjusted for inflations to 2011 US$.

[Figure 4.2 about here]

As seen in Figure 4.2, contributions have increased exponentially. They increased fairly steadily from 1974 to 1983. Contributions in 1982-1983 totaled some US$ 13.7 million,[101] over 10 times the amount contributed in 1974-1975. After 1983, contributions briefly stagnated before beginning to increase again in the 1986-1987 biennium. By the 1988-1989 biennium, they had almost doubled from the 1982-1983 level. The early 1990s saw a new period of stagnation, but contributions quickly began to rise again, experiencing unprecedented growth between 1992 and 2001. Contributions in the 2000-2001 biennium were 23 times higher than ten years earlier, and over 400 times larger than contributions made in 1974-1975.

The ratio of specified to unspecified contributions shows some interesting changes. Although specified contributions formed the majority of contributions in the early years of the program, unspecified contributions were generally more significant for a long period from 1982 through 1995. However, after 1995, specified contributions grew much more rapidly than unspecified. The largest gap between the two is found in 1998-1999, when specified contributions were 11 times greater than unspecified ones.

The periods of stagnant growth in the contributions correspond to periods of crisis for the program. However, the explosive growth in contributions since the early 1990s

[100] The Financial Reports were issued annually until 1979 and biennial thereafter. For consistency, I report funds by biennium, including the 2000-2001 biennium but excluding the 2002-2003 biennium.
[101] In 2011 US$. In 1983, US$ the amount was slightly over six million.

gives the lie to the persistent complaints in both WHO reports and WHA debates about funding shortfalls throughout the 1990s and 2000s. Funding shortfalls certainly did exist during this period, but they did not arise due to shortfall in donations. Two other possibilities exist. Perhaps shortfalls were concentrated in specific areas, such as routine immunization, as increased funds went instead to newer and "sexier" programs, like polio eradication. Alternatively, shortfalls may have arisen everywhere as program growth (and funding needs) outpaced growth in donations.

To determine which of these two possibilities predominated, we must examine not only overall levels of funding but also which program areas received donations. Data on contributions to the Voluntary Fund in the *Financial Reports* are divided by account and sub-account. Over the years, the WHO employed numerous different headings for various sub-accounts, changing categorization systems frequently with the reorganization of the immunization program or with more general organizational restructuring. I identified 14 categories[102] under which contributions to immunization programs were made, which I code into three distinct types of program activities: routine immunization services (RIS), vaccine research and development (VRD), and polio eradication (PEI).[103]

Figure 4.3, below, shows funding trends for these three broad program areas.

[Figure 4.3 about here]

As can be seen in Figure 5.3, overall contributions increased dramatically over the period, beginning to increase exponentially after 1993. Polio eradication clearly accounts for most of the growth in contributions to the Voluntary Fund over this period. However, contributions for routine immunization services also increased, if less dramatically. In contrast to contributions for these two areas, vaccine research and development funds, after an initial rise, stagnated and dropped toward the end of the period.[104]

The exponential growth in donations for polio eradication makes it difficult to clearly see trends in donations for routine immunization and vaccine research and development. To better show trends for donations to these two areas, Figure 4.4 shows only donations levels for them.

[Figure 4.4 about here]

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[102] In some cases, various accounts included regional sub-accounts, such as an EPI account for the Africa region, or regional sub-accounts for polio eradication. Contributions to these sub-accounts are included within the relevant broader account heading.

[103] Contributions for routine immunization services, including contributions related to vaccine quality and production, were made to nine different accounts, including account for: EPI, GAVI, the Global Programme on Vaccines, Vaccines and Biologics, Quality Control, Quality Assurance and Safety, Vaccine Supply and Quality, Vaccine Assessment and Monitoring, and Access to Technology. Contributions for vaccine research and development were made to four different accounts: Vaccine Development, Rotavirus Meeting, Immunization and Vaccine Development, and the CVI. Contributions for polio eradication only appear in one account, the PEI account.

[104] Unsurprisingly, the fate of donations to this account follows the fate of the CVI itself, which struggled to find its footing before ultimately being replaced by GAVI. For more on the origins and development of the CVI, see Muraskin, William. 1998. *The Politics of International Health: The Children's Vaccine Initiative and the Struggle to Develop Vaccines for the Third World*. New York: State University of New York Press.

As can be seen in Figure 4.4, the advent of the polio eradication program did correspond with a period of slightly diminishing donations for routine services from 1988 to 1993. However, polio donations were also relatively small in that period (ranging from US$2.6 million in 1988-1989 to US$8.1 million in 1992-1993, with a small drop in 1990-1991), and overall donations did not grow (US$26 million in 1988-1989, US$24 million in 1990-1991 and US$28 million in 1992-1993).

So, did competition between programs account for funding shortfalls in the 1990s? Ultimately, donation patterns do not seem to support this conclusion. Contributions to routine immunization services increased after 1993, as did overall program contributions and contributions to polio, so competition between these two programs clearly did not negatively affect funding trends. Donations for vaccine research and development show a different pattern. A major new vaccine research program, the CVI, began in 1991, and the Voluntary Fund reports begin reporting donations for this area for the 1994-1995 biennium. There is a major peak in donations at that time, but afterwards contributions stagnated before declining markedly by the end of the period. However, the CVI was the last of the three major immunization programs examined here to be initiated, so it is difficult to argue that it suffered program competition. Instead, donations likely lagged due to the program's difficulties defining itself and getting off the ground. These struggles ultimately led to the end of the CVI in 2000, when it was replaced by and absorbed into the broader GAVI initiative (Muraskin 1998; Muraskin 2005).[105]

Instead, shortfalls seem to have arisen primarily from the extensive expansion in program activities over this period. The exponential increase in funding for both polio eradication and routine immunization services simply could not keep up with the increased need for resources experienced by both of these programs. Polio eradication's needs were particularly acute, given the time-limited nature of the goal and the nearness of the original polio eradication deadline. But routine immunization services also had vastly increased needs as that program sought to increase routine coverage with all EPI antigens and achieve major disease control objectives for measles and NNT. These needs only increased after 1992, when the program endorsed hepatitis B vaccination, and 1996, when it endorsed use of another expensive new vaccine, the Hib vaccine.

Conclusion

This chapter began by asking how ideas about responsibility for immunization have changed since the beginning of the EPI in 1974. Analysis of program statements, debate and contributions to the Voluntary Fund all clearly show a major change, as the global community came to accept increasing responsibility for ensuring access to

[105] In his book on the CVI program, Muraskin cites many factors in explaining the CVI's difficulties, not least of which was the WHO's reluctance to embrace the program (which was originally independent of WHO and ultimately semi-independent of it). Muraskin argues that WHO saw the creation of the CVI as a critique of its own immunization efforts and a potential threat to the EPI. However, he acknowledges that difficulties defining the CVI's objective and mission drift also undermined its efforts. See Ibid. Muraskin is less critical of WHO in his subsequent book on the origins and first years of GAVI, acknowledging that the CVI's difficulties securing new funding sources were a key source of its ultimate demise. See Muraskin, William. 2005. *Crusade to Immunize the World's Children*. Los Angeles: Global BioBusiness Books.

immunization worldwide. This newly assumed responsibility brought with it a responsibility to aid developing countries in setting up and maintaining immunization programs. This ethic of shared responsibility, in which the global community and developing countries were both seen as responsible for ensuring access to immunization, emerged in the late 1970s and remained unquestioned thereafter.

However, while the idea that responsibility for ensuring access to immunization in the developing world is shared between global and national sources persists from the late 1970s onward, ideas about how this responsibility is shared underwent their own subtle transformation. The early 1980s saw the emergence of an ideal ratio of responsibility, with national sources assuring two-thirds of total funding and international sources responsible for the remaining one-third. While actual shares varied, the principle of primary national responsibility remained. However, persistent challenges meeting global targets gradually brought about a change in this formulation.

By the time GAVI was established in 2000, need became the new criterion of responsibility. With the Global Fund, GAVI set up a system in which the global community assumed responsibility for meeting the funding needs of countries that were too poor to assume these needs themselves. Although national governments continued to play an important role in funding these programs, the new formulation was not based on the principle of national primacy. Instead, new targets emphasized the percent of national budgets that ought to be dedicated to health, and global responsibility focused more specifically on the poorest countries.

With little assured funding to draw on, the new global solidarity that emerged in the late 1970s and early 1980s was built on the principle of voluntarism. International donors were supposed to make voluntary contributions, either in the form of contributions to various funds and programs, like the Voluntary Fund for Health Promotion, or in the form of bilateral aid to developing countries, while developing countries were supposed to dedicate national budgetary resources to immunization programs. Neither source of funding was guaranteed, nor was there any guarantee that either source would provide sufficient levels of funding to reach program goals.

While making new immunization programs politically possible, this voluntary system carried with it an inherent risk of funding shortfalls. Indeed, sufficient resources prove the exception rather than the rule, appearing only briefly during the mid-1980s, when commitment to the EPI reached new heights, but before program expansion created new shortfalls. However, as analysis of contributions to the Voluntary Fund reveals, shortfalls did not arise from a loss of interest in immunization or even from a loss of interest in routine immunization. Instead, shortfalls re-emerged in the 1990s and continued throughout the 2000s because the resource needs arising from program expansion increased more quickly than program contributions.

Analysis of WHA debates reveals few years in which funding was not a concern for immunization programs. Indeed, once the program expanded to adopt new goals in the late 1980s and early 1990s, funding shortfalls became a persistent worry for the organization. However, the debates are misleading. An analysis of contributions to the Voluntary Fund shows that contributions began to increase steadily with the expansion of the program, and that these increases were spread across a wide array of immunization programs. Global solidarity, as expressed by these contributions, grew over the period,

despite the inability to consistently meet the ambitious programs' equally large funding needs.

Analysis of the program statements, debates and contributions reveals the complex psychology of interest emerging along with this voluntary system. In the late 1980s, the WHO expanded its vaccination programs both in order to build on its achievements and because not doing so would have seriously undermined global interest in immunization – an interest that was as necessary for sustaining achievements already made as for meeting newly adopted goals. New goals helped drive expanding interest in and commitments to immunization in the 1990s and 2000s.

New goals were not the only driver of interest: risk of failure seems to play an equally important role in maintaining or re-igniting donor commitments. We see this in the mid-1980s, when international response to budget shortfalls, which threatened to derail the EPI program, brought a new era of sufficient funding. We see it again with polio eradication in the late 1990s. While the new program was virtually ignored in debate and its voluntary fund received very few contributions initially, contributions to this program grew exponentially as the original target date for eradication, 2000, approached.

The complex relationship between goals, failure and contributions creates an inherently instability in financing and assumptions of global responsibility for immunization. The need to maintain donor interest leads to the adoption of motivational program goals, and the threat of failing to meet these targets helps drive increased contributions. However, consistent failure to meet goals may have the opposite effect. Polio eradication may prove a test here. With 13 years now passed since the original target date for polio eradication, we may well ask how long donor commitments will last in the face of consistent failure to reach targets.

PART II, CHAPTER 5

THE CASES: CAMEROON AND MALAWI

In Part I, I focused on international aspects of the WHO's immunization programs from the beginning of the EPI in 1974 to the present day. The EPI and other immunization programs helped vastly increase vaccination coverage and decrease burdens of vaccine-preventable disease worldwide. But what happened on the ground in countries implementing these programs? How did this global call for mass immunization programs and the evolving policies it gave rise to translate to action on the ground? To get a fuller picture of the impact of these global efforts, we need to shift our focus from the global dynamics examined in Part I to a look at what happened in countries adopting these programs.

In particular, Part II focuses on the question: Why did global efforts to increase vaccination coverage and to eradicate polio have more success in some countries than in others? The analysis presented in Chapter 2 begins to answer this question. It shows the centrality of IGO ties in promoting increases in vaccination coverage, as well as a number of domestic conditions affecting the progress of campaigns, including infant mortality rate, state durability and the presence of armed conflict. However, this analysis cannot show *how* these factors work to influence vaccination coverage. How do IGO ties help promote immunization? Nor can it assess the role played by the many relevant factors for which no good cross-national data are available. Too many seemingly relevant variables, like spending, simply are not available – or are not available for a long-enough span of time.

To better understand how these international programs helped increase vaccination coverage and decrease the incidence of vaccine-preventable disease, I must switch my focus from the global to the local level and abandon statistical analysis in favor of comparative-historical methods. To this end, Part II provides a detailed comparison of immunization programs and polio eradication efforts in two countries in sub-Saharan Africa: Malawi and Cameroon. Drawing on sources available at the WHO Archives, I look at the progression of immunization activities in these two countries from the beginning of the Expanded Programme on Immunization (EPI) in 1974 to 1990. Unfortunately, archival materials less than 20 years old are not available for public consultation, making it impossible to extend my analysis to the present day.

Part II builds on the analysis found in Part I in two ways. First, I employ a new mixed-methods research technique, nested case analysis, in selecting cases. Nested case analysis combines large-N quantitative methods and small-N qualitative methods, using residual analysis of quantitative studies to inform case selection. Second, I draw on my analysis of global-level program developments in examining local developments, asking how these global-level changes affected global advisors' perceptions of local programs and how local-level personnel reacted to these changes.

Chapter 5 focuses on this first point. In it, I first review the contemporary debate in political science on mixed-method research techniques like nested case analysis, arguing that such methods usefully inform sociological research. I then discuss how I chose my cases, Malawi and Cameroon. Finally, I end with an overview of these two cases, focusing particularly on their modern history, post-colonial political developments and the history of public health in both countries.

Chapter 6 focuses on the second point. It draws on my analysis of the evolution of the WHO's immunization policies, discussed in Chapter 3, to show how these global-level policy changes played out on the ground in both Malawi and Cameroon, to the benefit of Malawi's program and to the detriment of Malawi's. It argues that colonial legacies interacted with the WHO's evolving immunization policies to either promote or impede new expanded immunization programs in Malawi and Cameroon.

Nested Case Analysis and New "Pluralistic" Research Methods

In 2005, Evan Lieberman proposed a new model for mixed methods research called "nested analysis." Nested analysis is meant to bring together the benefits of qualitative and quantitative research methods by carrying out two phases of research: one large-N (quantitative) and one small-N (generally qualitative). Cases for the small-N phase are then chosen on the basis of regression residuals, depending on the overall goal of the research, and may in turn aid further specification of models in large-N analysis.

This work arose as part of broad renewed interest in more "pluralistic" approaches to research methods within political science, seen especially in Henry Brady and David Collier's *Rethinking Social Inquiry* (2004). *Rethinking Social Inquiry* urges researchers working with both qualitative and quantitative methods to appreciate the benefits and recognize the limitations of either approach and strongly urges use of mixed methods techniques. The book set off a lively methodological debate within political science, with many responding favorably and reflecting more seriously on how to best combine qualitative and quantitative methods. Lieberman's nested analysis approach answers this call, as do other methods for combining large-N and small-N studies discussed in John Gerring's recent book, *Case Study Research* (2007).

Although sociology shares a qualitative/quantitative methodological divide with political science, these methodological reflections have found only a small audience within sociology. This neglect is surprising given the close ties between the two disciplines and the similarity in research questions and goals in certain subfields. In sociology, we are also often faced with the task of choosing between the greater scope and generalizability of quantitative studies and the greater analytic depth and precision coming from small-N case studies. Any area of sociological inquiry looking at organizations, polities, or other communities offering opportunities for both quantitative and qualitative research in their various forms, could easily adapt these methods. These new approaches have sparked considerable debate among political scientists about the potential benefits and disadvantages of such methods. Below, I review this debate before reflecting on the applicability of such approaches to my own research on global immunization programs.

The Debate about Pluralistic Methods

Nested analysis is a mixed-method approach meant to allow researchers to better draw on the strengths of both quantitative and qualitative methods. In using the approach, researchers first carry out a large-N study, in which they specify the best possible model for the phenomenon under investigation, given the current state of the literature and available data. They select cases for the small-N analysis on the basis of regression residuals, depending on how satisfactory the quantitative model proves to be. Where models are robust and the main goal is elucidating mechanisms, researchers use a "model-testing" approach. When, on the other hand, the models

are not robust and the main goal is developing new theories, they using a "model-building" approach.

For model-testing purposes, researchers choose a case with very small residuals – in other words, cases that come closest to meeting the predictions of the analysis. A closer, qualitative assessment of this case (or these cases) then serves to illustrate the causal mechanisms at work more clearly. In the model-building approach, on the other hand, researchers use residuals to identify outliers, or cases that are not well explained by the existing model. Closer examination of these cases ideally leads to the discovery of new influences on the phenomena under investigation, which may be included in future quantitative models for broader confirmation.

Ingo Rohlfing's "What You See is What You Get: Pitfalls and Principles of Nested Analysis in Comparative Research" (2008) contains the most pointed critique of nested analysis found in the current debate on mixed methods research in political science. He is especially critical of the model-building approach, tersely noting: "It seems paradoxical to use the residuals for case selection when the model fit is considered unsatisfactory." (1497) While not completely denying the potential value of Lieberman's method, he points to two serious problems that may derive from its use, especially in the "model-testing" variant. First, he warns that following Lieberman's case-selection criteria may not lead to the choice of a truly illustrative case, if the model is misspecified. Second, he warns that researchers may incorrectly exclude variables from consideration during the qualitative phase of research based on the results found during the quantitative phase.

Neither Rohlfing's dismissal of the model-building method nor his concern about unrecognized model misspecification stand up to scrutiny. Both derive from Rohlfing's inordinate concern with constructing the "true" model[1] and with selecting a truly typical case. He fears that, if the model is incorrectly specified, using Lieberman's case selection criteria may lead to the selection of the wrong case for tracing the causal processes at work, leading to false inferences. Obviously, this fear is amplified when starting with a model that is already deemed unsatisfactory, as in the model-building approach. Furthermore, even if correctly specified, he fears that the best case, as chosen from regression residuals, may not be the truly typical case useful for illustrating the models.

These concerns for identifying the "true model" and for the consequences of misidentification are misplaced. As is widely acknowledged, social-scientific knowledge can never be perfect and theories can always be improved. Rather than seeking a "true model" we ought to seek to construct the best model, given contemporary knowledge and data. Furthermore, rather than seeing the results of any study as definitive, we must recognize that they can always be called into question in light of new findings.

Similarly, Rohlfing's concern with identifying the truly typical case ignores both the nature of ideal types and of the logic of causal regression modeling. As Weber reminds us, the ideal type never exists in pure form in the real world, being instead a heuristic construct. Further, regression models look for *average* effects across large number of cases, and thus those effects, if present, ought to be observable in numerous cases, which will fit the ideal type represented by the regression model more or less well.

Considering the provisional nature of scientific knowledge and the nature of ideal types and causal logics of regression modeling, choosing cases for model-building analysis on the basis of unsatisfactory regression models is much less problematic. Obviously such models do

[1] He uses the phrase "true model" eight times in the 24 page paper, and the adjective "true" in reference to regression coefficients, causal model, etc. a further five times.

not account for all or even most of the observed variance, but they likely capture some of it correctly, and researchers may want to take known effects into account when choosing cases for further analysis. Indeed, Lieberman's model-building approach is simply a variant of deviant case analysis, one of seven broad types of case selection methods Gerring identifies (2007 89-90).

Similarly, two considerations contravene Rohlfing's concern with case selection for the model-testing approach. Given the logic of causality in regression models, there ought not be only one case that reveals the causal mechanisms through which relationships identified in the regression model operate. Thus, on-line cases are more likely to aptly illustrate the mechanisms at work than Rohlfing suggests. However, Rohlfing is right to warn that researchers may misidentify a process that is unique to their chosen case as the general causal mechanism at work. One simple way to guard against this possibility is to use a paired or multiple comparison, which simultaneously allows the analytic depth that is the main strength of qualitative analysis and limits the possibilities of overgeneralization (Tarrow 2010).

If Rohlfing's first two critiques are largely overstated, his third merits further attention. He warns that, by focusing too closely on variables included in the regression model, researchers may ignore other important factors influencing the phenomenon they investigate. In other words, in carrying out their qualitative analyses, researchers may rely too much on the logic of quantitative regression modeling, to the detriment of their qualitative research.

Many social scientists using historical methods have pointed out that the logic behind and findings from historical-comparative work often contradict basic assumptions underpinning most regression models (see for example Abbot 2001; Pierson 2004; Sewell 2005). Even the most formalized historical methods, like Charles Ragin's fuzzy-set analysis (2008) construct models that operate on fundamentally different causal logics than found in regression analyses (Mahoney and Goertz 2006). The contrasting logics and assumptions broadly underpinning (qualitative) historical methods and regression analyses (or "cultures" to follow Mahoney & Goertz's terminology) increase the challenge researchers face in successfully mixing approaches.

However, there is broad agreement among all supporters of mixed methods research (including Lieberman himself) that such approaches are best when they are complementary, drawing on the unique strengths of both quantitative and qualitative methods. If, as Rohlfing warns, nested analysis makes it particularly difficult to draw on these different logics and successfully communicate across them, then that would pose a serious challenge to the method.

Others share Rohlfing's view that nested analysis is dominated by a quantitative logic. In his review of recent developments in qualitative research, which includes a discussion of nested analysis and other methods for combining large-N and small-N studies, Mahoney states that Lieberman employs "a statistically oriented approach to social science," which "will be especially appealing to scholars whose basic orientation is large N but who wish to use case studies for supplementary purposes." (2010 140) However, Mahoney sees more possibility for this combination to be fruitful and complementary, rather than subsuming qualitative research to quantitative logic, than Rohlfing. His cautious optimism is shared by Frieder Wolf (2010), who sees a possibility for "enlightened eclecticism" which successfully triangulates the various challenges and contradictions involved in combining large-N and small-N analyses, but also notes the numerous ways scholars attempting to do so may fall short.

In sum, while seeing much promise from mixed methods techniques like nested analysis, theorists warn about the significant difficulties involved. In particular, they note the challenge of truly drawing on the complementary strengths of both approaches, rather than constructing an

analysis dominated by the logic and assumptions underpinning only one of them. For nested analysis, there is particular concern that quantitative "general linear" logics will dominate, undermining the value of the qualitative research phase.

Reflections on my Experience

Critics of nested analysis suggest that quantitative methods remain dominant in this particular mixed methods technique. Contrary to the expectations of critics, I did not find that use of nested analysis restricted my to a single quantitative or "general linear" logic. Instead, as discussed in detail below, residual analysis led me to focus on explanatory variables that I would have ignored had I strictly followed that logic. However, my experience also highlights how important it is for researchers using this method to fully embrace the complementary benefits of drawing on the arguably incommensurable logics of quantitative and qualitative research.

Nested analysis provided two main benefits to my qualitative research. First, it helped me identify interesting cases for qualitative examination. Scholars interested in looking at global/local interactions are often faced with the problem of localizing global phenomena. It can be difficult to know where to look at this process when everywhere in the world is a possible case. Nested analysis, and similar techniques for choosing cases on the basis of large-N quantitative data (see Gerring 2007) help address this dilemma by enabling researchers to get a sense of patterns in the entire population of possible cases. This technique can also highlight cases that may have been overlooked using other case selection methods. By neither relying on researchers' prior knowledge of cases nor on general perceptions of the importance of a particular case, it does not bias case selection toward the well known and most accessible. Instead, it may point to quietly interesting or counter-intuitively typical cases that would be missed using other techniques.

A second benefit of nested analysis is residual analysis. Residual analysis aided my research in two ways. First, in selecting cases, close scrutiny of the population of poorly performing states revealed an unexpected grouping of countries with shared colonial heritage.[2] This first turned my attention to the relevance of colonial legacies for the implementation of the EPI in my cases. My qualitative investigation revealed significant legacies, which interacted in complex ways to either impede or advance national EPI's in both cases. Second, closer scrutiny of the pattern of residuals over time within my two cases highlighted new questions to bring to my qualitative inquiry. In particular, I sought to explain the particular problems faced by Cameroon's program in the mid-1980s, when residuals were especially large.

In both of these respects, drawing on quantitative analysis helped highlight historical processes that are often difficult to model or account for using quantitative tools alone. My qualitative analysis highlights path generation processes,[3] complex conjunctures and eventfulness. In it, we see how two trajectories – a local trajectory influenced heavily by colonial legacies and a global trajectory influenced more by ongoing debates among public health

[2] Case selection based on overall vaccination coverage rather than regression residuals would have masked the over-representation of francophone African countries with low-performing programs. Although African countries are also over-represented among countries with low overall vaccination coverage, the countries of French Equatorial and French West Africa are not particularly over-represented.

[3] I follow Djelic and Quack (2007) in using this term instead of the more usual "path dependence" to highlight the complex, evolutionary nature of path development, which tends to contrast from the general "punctuated equilibrium" model of path dependence.

professionals – interact in complex ways in the implementation of EPI programs in Malawi and Cameroon. This story is not one that is easily modeled using standard regression techniques.[4]

In sum, my experience highlights how using nested analysis does not force qualitative research to follow the logical presuppositions of regression modeling. Instead, use of these techniques may serve to highlight those mechanisms seen as most out-of-step with these presuppositions. However, it also highlights the potential consequences of failing to draw on multiple logics. Had I blindly carried quantitative logics into my qualitative analysis, I would have assumed that by using fixed-effects models, I had already controlled for colonial legacies, and I would have rejected this factor as a potential explanation for the particularly poor performance found in Cameroon.

In the remainder of this chapter, I discuss how I chose my cases in detail and provide some historical background on these cases.

Case Selection

Selecting cases from the 192 WHO member states presents an obvious challenge. This challenge is amplified by my goal of using these case studies to help illustrate more general dynamics and identify key variables affecting mass immunization campaigns and the polio eradication effort. However, I also want to explore my cases in depth to get a detailed sense of the workings of international health campaigns on the ground and of the global-local dynamics emerging from these efforts. Toward this end, I limit myself to the comparison of two cases (on the benefits of paired comparison, see Tarrow 2010).

I have chosen these cases using results from the regression analysis presented in Chapter 2, using the model-building variant of Evan Lieberman's nested case method. In particular, I ask: What are the key differences between countries with higher vaccination coverage than expected and those with lower vaccination coverage than expected? In other words, why do immunization programs perform better in some countries than in others? This question employs a variant of what John Stuart Mill calls the "logic of difference" (Mill 1950 (1881)), most famously used by Theda Skocpol in her work *States and Social Revolutions* (Skocpol 1979). The logic of difference calls for comparative-historical researchers to choose cases that are as similar to one another as possible, and yet differ on the key variable(s) of interest. For example, in exploring revolutions, one case would experience a revolution and the other would not, but the cases would otherwise be very similar.

The logic of difference is difficult to employ in cross-national research due to vast differences between countries, which make it almost impossible to find countries similar enough to compare. The nested case method helps overcome this problem; the quantitative analysis controls for the broad differences between countries. In this case, the inclusion of year and country fixed-effects means that the quantitative analysis controls not only for the variables explicitly included in the model, but also for those arising from overall, constant differences by country or year. Given the innumerable differences between any two countries chosen for comparison, this level of analytic leverage is a huge advantage. I can say with a fair degree of

[4] Modeling these complex interactions would require me to code countries' colonial legacies in a detailed way, with particular attention to the specific public health institutions established by late colonial powers. Coding on the basis of colonizer or time period alone would not be sufficient to capture these effects. I would also have to introduce interactions terms by colonial legacy and year, as a colonial legacy's impact on immunization depends on developments in immunization policy on the global-level.

certainty that variables already identified in my analysis do not account for the *differences* seen in my cases, even though they do influence overall levels of vaccination coverage, at least, in as much as their effects are consistent across countries or years. Furthermore, I use a close examination of residuals by year to identify moments of particular interest for my analysis. For example, years when one of my cases performs particularly better or worse than expected, and where factors at play may be especially important.

As I use regression residuals to pick my cases, it is important to carefully design my model in doing so. Both the EPI and the PEI campaigns primarily target developing countries, and I am particularly interested in global-local dynamics in this sort of development project. As a result, I exclude high-income countries from the model used to select cases. This choice is doubly justified by the evidence, discussed in Chapter 2, that international dynamics work differently in middle and low-income countries than they do in high-income countries. In addition, I exclude countries with populations under one million from consideration due to their small size.

After making these exclusions, 114 countries remain in my analysis. For this group, I calculate residuals from five different models, using polio coverage, measles coverage, DPT coverage, BCG coverage and an index variable including coverage with all four vaccines as my dependent variables. I adjust my analysis to include only variables that influenced vaccination coverage, according to the results presented in Part I, Chapter 2. This gave me a country and year fixed-effects regression of vaccination coverage including a lagged dependent variable, IGO and INGO ties, infant mortality rate, GDP per capita, population, a measure of state durability, the autocracy index and an armed conflict measure.[5]

On the basis of these regressions, I calculated regression residuals and then the average residuals by country. I then created lists of the ten countries with the most positive and most negative residuals for each regression. Countries with large positive residuals have higher vaccination coverage, on average, than predicted by my models. Countries with large negative residuals, on the other hand, have lower vaccination coverage than predicted. Table 5.1 lists the countries with large negative residuals for each model.

[Table 5.1 about here]

As can be seen in Table 5.1, African countries are generally overrepresented on lists of poor-performing countries. No fewer than seven African countries appear on each list, with nine appearing in the lists from the analysis of BCG coverage of the coverage index.

Given the large over-representation of African countries among countries with lower-than-expected vaccination coverage, I will focus my case studies particularly on experiences with immunization programs on this continent. Fifteen African countries appear on at least one list, ten of which appear on multiple lists and three of which appear on all five.[6] These last three are Chad, Cameroon and Gabon. Notably, these three countries are all former French colonies in Equatorial Africa. From the three countries found on all lists, I focus on Cameroon as my "negative case."

Table 5.2 shows those countries with higher than expected vaccination coverage.

[5] I also ran models including all variables used in Chapter 2 and using all countries and variables. Lists derived from these regressions are available on request.

[6] Only two non-African countries (Laos and Haiti) appear on multiple lists, with Laos on two and Haiti on three.

[Table 5.2 about here]

As can be seen from Table 5.2, these countries are much more geographically diverse than those in Table 5.1. Six African states are included in at least one list: Malawi, Mozambique, Angola, Rwanda, Sierra Leone and the Gambia. Of these, only Malawi appears on all five lists. Thus, Malawi is my "positive case."

Of the best-performing countries, Malawi is most similar to Cameroon in terms of geography and colonial heritage. Like Cameroon, it is a sub-Saharan African country, colonized during the "Scramble for Africa" in the late 19th century, a heritage that many argue had negative effects on economic development and governance in the postcolonial era (Acemoglu et al. 2001; Mamdani 1996). Both gained independence during the major wave of decolonization in the early 1960s, and both developed one-party, authoritarian states soon after. In each, the first President lost power in the early 1990s, leading to a democratic transition in Malawi and a softening of authoritarian rule in Cameroon.

However, these similarities are accompanied by numerous differences. Although both countries are in sub-Saharan Africa, they are not in the same region, with Cameroon located in Equatorial West Africa and Malawi in South-East Africa. Given recent focus on the particular governmental problems of large African States (Clapham et al. 2006), it is also notable that Cameroon is almost four times the size of Malawi, being "slightly larger than California" compared to Malawi's "slightly smaller than Pennsylvania." (CIA 2009) However, Cameroon is still much smaller than any of the "Big States" discussed in Clapham et al.'s recent analysis. The smallest of those states, Nigeria, is over twice the size of Cameroon, and the largest, Sudan, is over five times as large.

Colonial histories also differ. Although both were colonized in the late 19th centuries, colonial powers differ between the two. The British colonized Malawi, whereas Cameroon was first colonized by the Germans before being taken over by France and Britain during World War I, with the French governing the vast majority of the present territory. In addition, although both countries score highly on measures of ethnic fractionalization, Cameroon is more ethnically diverse than Malawi, rating among ten most fractionalized African countries according to the Ethno-Linguistic Fractionalization measure developed by Easterly and Devine (1997) and Posner's more recent PREG (politically relevant ethnic group) measure (2004).

Table 5.3, below, shows the mean and standard deviation for key variables included in my quantitative analysis for Cameroon and Malawi for the years 1980 to 1990. For reference, it also shows means and between-country standard deviations for all countries included in my case-selection regression and for all African countries for the same years.

[Table 5.3 about here]

For IGO membership and INGO participation, we see that Malawi generally has lower levels of connections than Cameroon and that Malawi's levels of connections to world society are slightly below the African average, while Cameroon's are higher. Other key differences include the infant mortality rate, which is much higher in Malawi, population density, which is four times higher in Malawi than in Cameroon, and GDP per capita, which is six times higher in Cameroon than in Malawi – although both are relatively poor compared to other possible cases, even if GDP per capita is about average in Cameroon, by African standards. Similarities are found in many political variables, including state durability (continuous since independence in both

cases), autocracy, democracy and armed conflict. Malawi and Cameroon also have generally similar population size – Cameroon is larger, 1.14 million people on average over the period considered here, but both are relatively close to the African average and well within one standard deviation of each other. Youth populations are even more similar, being close to the African average (45%) in both cases.

In theory, none of the above differences ought to explain the differing fates of immunization programs in Malawi and Cameroon. The country fixed effects ought to control for any influence of size, ethnic fractionalization and colonial heritage, none of which are time variant,[7] and other major differences, like level of wealth or infant mortality rate, are already controlled for in the quantitative analysis. However, as discussed above, mixed-methods approaches like nested case analysis ought not prematurely exclude factors from consideration on the basis of quantitative logics. Doing so risks prematurely rejecting important factors and undermines the key advantage of this method: fully combining the explanatory benefits of both quantitative and qualitative methods. Comparative-historical researchers have developed sophisticated theories of temporality, which often question the theoretical assumptions embedded in regression analysis. Only by fully embracing such approaches can I truly benefit from their insights. As a result, I did not exclude any of the above factors from consideration when examining the archival materials available to me, instead proceeding holistically to get as detailed an understanding of the programs and of their development over time as possible. This holistic approach allows for a full consideration of possible explanations for the different experiences of the immunization programs in Malawi and Cameroon, without prematurely rejecting factors that may be important explanations of the differences seen. As can be seen in Chapter 6, this holistic approach proved important in highlighting the key (and temporally variable) role colonial legacies played in the development of these programs.

Figures 5.1 and 5.2 show Malawi's and Cameroon's respective predicted vaccination coverage with 95% confidence intervals and actual vaccination coverage for the years 1980 through 1990.

[Figures 5.1 and 5.2 about here]

As can be seen from Figure 5.1, Malawi's vaccination coverage is generally higher than expected, although occasionally dropping near the prediction line. In Cameroon, on the other hand, coverage is consistently lower than expected but shows a marked periodicity, generally rising closer to expectations from 1981 through 1983 before peaking in 1984 and falling sharply from 1985 to 1988 before beginning to rise again.

The remainder of this chapter provides a brief overview of these two cases, focusing particularly on their colonial and post-colonial histories and the development of public health institutions in both countries.

Modern History of Malawi and Cameroon

[7] Ethnic fractionalization is the most time-variant of these three, but all existing measures are not time variant, and it is presumably fairly constant over short time periods in the absence of any major upheavals, which is the case for both Cameroon and Malawi between 1974 and 1990. Geographic size also can and does vary occasionally, but did not do so for Cameroon and Malawi over the time period included in my analysis.

Malawi's and Cameroon's modern histories are fairly similar. Both had early contact with European powers, first having contact with the Portuguese starting in the late 15th century for Cameroon and the 16th century in Malawi. This contact was especially important in Cameroon, which lay on the "Slave Coast," at the heart of the trans-Atlantic slave trade. Its trade ties were thus more diverse, including a wide variety of European powers, including the Portuguese, the Spanish, the Dutch, the English, the Swedish, the French and the Germans.

Despite early contact, neither Malawi nor Cameroon was formally colonized until the "scramble for Africa" in the late 19th century. During that period, competing Portuguese and British interests in inland trade in southern and eastern Africa eventually led to the formation of the British Protectorate of Nyasaland in present-day Malawi in 1891. Competing imperial interests also mark the colonization of Cameroon, where a mix of French, German and British forces were active in the late-19th century, with Germany being the first to colonize Cameroon, forming the German colony of Kamerun in 1884. During WWI, German Kamerun fell to British and French forces in 1914. After the war, Cameroon became a League of Nations Mandate, with the British and French administering their portions separately on behalf of the League. The French controlled the majority of present-day Cameroon, which they administered separately from the French Equatorial possessions, although along similar lines. The British Cameroons were administered as part of Nigeria.

In both countries, the post-WWII period saw a large surge in African political organization and increased pressure for independence. In Malawi, this change expressed itself through a series of changes in political representation. In 1944 and 1945, Africans were first given some political representation with the formation of provincial councils. In 1949, Malawi adopted a new constitution that broadened African (and Indian) representation, and over the next 15 years a series of new constitutions continued to broadened African (and Indian) political representation in the country, ultimately paving the way to independence in 1964 (Pachai 1973 236-244). In Cameroon, increased African political organization also accompanied a push for independence. However, the United Nations was a key actor in negotiations between Africans and the colonial powers there: the January 1, 1960 date for independence arose from such UN-brokered negotiations. Similarly, reunification followed a UN-led vote in the British Cameroons to assess the wishes of British Cameroonians. Ultimately, the southern part of the British Cameroons chose reunification and is part of contemporary Cameroon, while the northern part chose to join Nigeria.

Following independence, both Cameroon and Malawi developed highly autocratic governments marked by a single, large political personality. This was especially true in Malawi, which became a one-party state (Malawi Congress Party) a year after independence. With this decision, the President, Dr. Banda, became the effective ruler of Malawi. In 1994 the Banda regime fell and a new, democratic government was formed under president Bakili Muluzi. In turn, Dr. Bingu wa Mutharika replaced him in 2004. While Malawi is no longer considered "autocratic," democracy is not yet firmly established. In Cameroon, President Ahmadou Ahjibo gradually consolidated power after independence, making Cameroon into a one-party state by 1966. Ahjibo's rule ended in 1982, when he resigned and named Paul Biya as his successor. Facing increasing pressure to democratize, Biya instituted new, multi-party elections in 1992, partially democratizing the country. But Biya remains in power, and Cameroon is still considered an autocratic state.

Public Health and Immunization in Malawi and Cameroon

Cameroon and Malawi were among the first countries to begin a WHO-advised EPI. An experimental expanded immunization program began in Cameroon's capital city, Yaoundé, in 1975, and Cameroon began its national WHO-advised EPI program in 1977. Malawi began its WHO-coordinated EPI program in 1978. Both countries had pre-existing immunization services, upon which these WHO-advised programs built. However, these pre-existing services were organized along distinctly different lines, with important consequences for the success of the new program. Below, I briefly review the history of public health in Malawi and Cameroon. I concentrate on the late-colonial era, from 1918 to independence, and the early post-colonial era, from independence to the beginning of each country's expanded immunization program (1975 for Cameroon and 1978 for Malawi).

The Colonial Era

Health care in colonial Africa was long marked by a general neglect of the health of indigenous African populations. Instead, colonial medical services focused on maintaining the health of European colonizers. This administrative neglect was generally overcome for one of two reasons: if Africans' health problems posed a threat to the health of Europeans, as with most epidemic diseases, or if Africans' health problems seriously disrupted colonial economies' need for labor (for an especially good illustration, see Farley 1988). Prior to World War I, most broad efforts to intervene in African health targeted specific infectious diseases, such as sleeping sickness[8] (Lyons 1988), or were directed towards occupational groups, such as mineworkers (Packard 1989). Otherwise, European authorities were content to ignore African health problems, or, if that proved impossible, with segregating African from European populations in an attempt to prevent "African" diseases from spreading to Europeans.

However, while colonial *governments* largely ignored African health prior to 1918, another colonial institution was more concerned about African health: missions. Medicine and missionary activity have gone together since the days of David Livingston, who combined his explorations in central Africa with missionary and medical activities. Unlike their governmental counterparts, missionaries were interested in African health, seeing Western medicine and the cures it offered (admittedly few, especially in early periods) as a useful tool in their efforts to convert Africans to Christianity: by curing Africans' ills, they hoped to convince them of the superiority of another Western innovation: Christianity (Vaughan 1991).

After World War I, most colonial governments began taking a more active interest in Africans' health. However, nascent health services developed on very different lines in different colonies. These differences are apparent when we compare colonial health services in French Cameroon to those in Malawi. In Malawi, the government cooperated with the missions in an attempt to make health services more widely available to Africans. In Cameroon, health services developed along bifurcated lines, with preventive and curative services separated into two

[8] Many parts of African experienced severe sleeping sickness epidemics in the late 19th and early 20th century: contemporary observers feared that whole populations of Africans could be wiped out by these epidemics, and the general level of alarm at that time was comparable to that accompanying the AIDS pandemic today. Although the exact cause of these epidemics remains unknown, most historians point to disruptions in traditional cattle-management practices and housing patterns as key causes. Major movements of animals and people, incited by colonial authorities seeking tax revenue or labor, brought new populations into tsetse fly infected areas, spreading the deadly disease to vast new populations.

different departments. Preventive services, including immunization, were built on the legacy of mass campaigns against epidemic diseases with the *grandes endémies* teams.

Although missionaries were active in both Cameroon and Malawi, the extent of their activities differed markedly. The famed medical missionary, David Livingstone, first explored Lake Malawi and the surrounding region. Missionaries founded the first European settlements in what would become Malawi and played a key role in encouraging British colonization there. Although conflict between missionaries and the colonial government was not unknown, right from the beginning of the colonial period, missionaries frequently cooperated with government authorities (Good 2004; Hokkanen 2007). When British authorities in East Africa first began actively interesting themselves in African health, they extended and formalized this cooperation, incorporating missionary institutions into the general health services (Beck 1970). Efforts at cooperation did not always proceed smoothly,[9] but by the time colonial regimes waned, cooperation was well established. Further, colonial medical services were established along missionary models, trying to extend dispensaries and fixed, general health services throughout the country. Although Malawi did carry out mass immunization campaigns – particularly against smallpox – these campaigns were seen as exceptional, short-term activities. When Malawi began providing routine immunization services, it offered those services from fixed centers. Government and private (generally Christian and missionary-derived) centers worked together, following a common health policy.

Missionaries played a much less active role in colonial Cameroon and French Equatorial Africa, and such well-institutionalized private-public cooperation did not emerge in Cameroon. From the early 20th century, French authorities created a bifurcated system wherein general health concerns and broad public health (generally preventive) issues received very different treatment. General health services were generally neglected by the colonial authorities and, importantly, received no external funding from France, instead relying entirely on the small, internal colonial budgets. Broad public health issues, and particularly sleeping sickness, received much more attention, and efforts to address them received external financial support from France. In 1917, Dr. Eugène Jamot developed the mobile team approach to address a sleeping sickness epidemic in French Equatorial Africa. He established and directed similar services in Cameroon four years later (Headrick 1994). This approach became the basis for the *grandes endémies* system found in French Equatorial and West Africa. This method was used to address multiple major health concerns, including malaria, leprosy and smallpox (Bado 1996).

Postcolonial Health Systems and Immunization

After independence, both Malawi and Cameroon built on pre-existing, colonial-era health systems. In Cameroon, this meant a continued reliance on the *grandes endémies* system. This system was even strengthened in the build up to and aftermath of independence in francophone West and Equatorial Africa with the creation of two regional health organizations. In 1960, the newly-independent countries of French West Africa created the *Organisation de coordination et de coopération pour la lutte contre les grandes endémies* (OCCGE), which continued control efforts against the *grandes endémies* there (Bado 1996 374). French Equatorial Africa (including Cameroon) followed suit three years later, founding the *Organisation de Coordination et de Coopération pour la lutte contre les Grandes Endémies en Afrique Centrale*, which changed its

[9] Notably in Kenya – Beck notes that such efforts were much less fraught in Tanganyika and Uganda, an experience that likely resembles that of Malawi more than the Kenyan one.

name to the *Organisation de Coordination pour la lutte contres les Endémies en Afrique Central* (OCEAC) two years later (OCEAC 2010).

In the 1960s the *grandes endémies* teams received further support from the WHO's smallpox eradication campaign. A USAID-funded smallpox eradication and measles vaccination program in West Africa relied on (and provided further external support for) the *grandes endémies* teams in OCEAC and OCCGE countries. The following excerpt from an unpublished manuscript describes how these early immunization programs worked:

> In Yaoundé, as was traditional throughout urban or rural francophone Africa, vaccination services were delivered by a mobile vaccination team of secteur opérationnel épidémiologique n. 1 of the Sous-Direction de la Médecine Préventive et de l'Hygiène Publique which visited the city for 3 months every 2 years and attempted to vaccinate both child and adult populations against measles (6 month – 6 year age group), yellow fever (after 1 year old), smallpox (all ages), and tuberculosis (BCG from 6 months – 20 years).[10]

Thus, in Yaoundé, as in the rest of Cameroon in 1974, the government provided immunization using national vaccination teams that traveled the country in a biannual circuit, providing vaccination against measles, smallpox, tuberculosis and yellow fever. Notably, these teams were not temporary: they grew out of a long-standing tradition of preventive health care in the region that relied on this type of mobile strategy to control endemic diseases and to administer preventive health measures.

Malawi's immunization services differed from Cameroon's in two major ways: the groups (public/private) involved and how services were provided. As in the colonial era, private (Christian/missionary) health care providers cooperated with the government in providing health services to the population. The 1978 EPI plan notes:

> With its 20 hospitals, 14 PHCs and 94 SCs, the Private Hospital Association of Malawi (PHAM) plays an important role in providing curative and preventive services. PHAM is an umbrella organization for most of the mission health units in Malawi.[11]

When we consider that the government ran some 21 hospitals, 29 primary health centers and 432 sub-centers that same year (1977), the extent of missionary health services in Malawi becomes strikingly clear. Private missionary groups ran almost half of Malawi's hospitals, a third of its primary health centers and a fifth of its sub-centers.

Routine immunization services, where available, were provided at these hospitals and health centers or by mobile teams working from them. Rather than targeting particular types of diseases (endemic disease/vaccine-preventable diseases), services in Malawi were geared to

[10] From "A Program of Multiple Antigen Childhood Immunization in Yaoundé, Cameroon." 1977. In I8 370 2CAE(1).

[11] "Expanded Programme on Immunization: Malawi." .1978. In I8 370 2MAL(1). PHAM represented the private, mainly Christian and missionary health services existing in Malawi. The organization still exists today, although it is now known as the "Christian Hospital Association of Malawi" (CHAM), a name that more strongly highlights the organization's missionary roots. PHCs are primary health clinics and SCs are sub-clinics.

specific populations. Thus, as early as 1960[12] preventive care was available at some health centers during "under-five clinics" (geared to children under the age of five). By 1972 20% of the population had access to these clinics. In 1973 the "Miniplan" – a seven-year development plan for maternal and child health – called for the extension of under-five clinics and for an increased emphasis on preventive health, in particular "to increase the coverage of protection amongst children, especially against diseases for which effective antigens are available."[13] By 1977, a year before Malawi began an EPI-program, 50% of the country had access to under-five clinics providing vaccination with BCG (against tuberculosis), DPT (diphtheria, pertussis and tetanus), smallpox and polio vaccines.[14]

The under-five clinics were run out of some of the fixed health centers (the hospitals, PHCs and SCs mentioned above) and by mobile teams working from these centers. But as with the clinics in fixed centers, the mobile team dealt with a variety of health issues facing the target population, not just immunization. Malawi also ran mass immunization campaigns using specialized mobile vaccination teams to vaccinate against smallpox (as part of the global campaign to eradicate smallpox) and tuberculosis, but these efforts were short-term, targeted campaigns, clearly distinguished from "routine immunization" available through the under-five clinics.

In sum, Malawi's and Cameroon's health services and immunization programs were organized very differently prior to the beginning of the EPI. In Cameroon, specialized vaccination teams from the government's Department of Preventive Medicine and Public Hygiene, carried out mass immunization campaigns on a biannual circuit. In Malawi, mass, specialized campaigns were the exception rather than the rule. Instead, under-five clinics provided routine child immunization along with an array of other preventive and curative health services for children. In addition government and missionary health providers cooperated in providing these clinics, which were available at both public and private facilities. These differences became especially important in light of evolving policies and strategies advocated by the global EPI, which I explore in Chapter 6.

[12] It is not clearly exactly what preventive services were available at this early date or if they included any immunization services.

[13] I draw from an unpublished plan: "Expanded Programme on Immunization: Malawi." 1978. In I8 370 2MAL(1) for information on Malawi's immunization programs prior to 1978.

[14] Ibid. and letter dated 10/11/1978. In I8 370 2MAL(1). The letter suggests that the four vaccines mentioned above were originally part of the Miniplan mandate, noting: "The under 5 clinics have *for years* given BCG, Smallpox, DPT and Polio vaccination to attenders." (emphasis added) Measles vaccination does not seem to have been widely available until a pilot project began in some areas in 1974, and the EPI plan called for the first mass-introduction of measles vaccination in the country. It is unclear why measles was not included with the other vaccines in the original Miniplan, as measles was a huge health problem in Malawi, as in most other parts of Africa. Vaccine costs were likely a factor. A letter commenting on the plan dated 8/17/1978 notes the high cost of measles vaccine.

PART II, CHAPTER 6:

COLONIAL LEGACIES AND THE EPI

In 1974, the WHO urged countries to expand their immunization services. The EPI was at the forefront of a wave of new global health programs focusing on expanding access to basic health services in the developing world. Since then, numerous further efforts to promote immunization or fight vaccine-preventable diseases have built on this early effort. From the global campaign to eradicate polio and the neonatal tetanus elimination campaign to immunization's place in the UN's Millennium Development Goals and the formation of GAVI, the decades since the beginning of the EPI have seen considerable international efforts to promote immunization at all levels worldwide.

These efforts have proven very successful in increasing vaccination coverage globally. As can be seen in Figure 6.1, in 1980, estimated vaccination coverage among one-year olds with the four vaccines especially pushed by the EPI hovered around 20% for each vaccine. By 2011, it was over 80%.[1]

[Figure 6.1 about here]

Africa made particular progress, as shown in Figure 6.2. In 1980, coverage on the continent was around 5%, but by 2011 it was above 70% (WHO/UNICEF 2012).

[Figure 6.2 about here]

Vaccination coverage has increased almost everywhere, bringing with it an equally impressive decrease in incidence of vaccine preventable disease, yet these global efforts have not always gone smoothly. While Malawi was able to quickly increase levels of immunization, Cameroon struggled with low and even falling levels for years. Why?

I argue that the interaction of colonial legacies and international visions in part explains why Cameroon's immunization programs struggled to increase vaccination coverage, while those in Malawi had great success, by and large, in meeting this goal. In the early years of the EPI program, the WHO and international health community stressed the importance of developing "primary health care." As the PHC approach developed over the late 1970s and early 1980s, it came to place increasing emphasis on the importance of integrating immunization programs with other mother and child health services. This focus on integration clashed with existing practices in Cameroon (and in most of francophone west and equatorial Africa), where preventive and curative health services were administered separately and where preventive services generally relied on mobile *Grandes Endémies*-style teams. Calls from the WHO to reform the existing health services incited resistance from health personnel on the ground, generally hindering efforts to promote immunization.

In Malawi, in contrast, global visions corresponded very well with existing practices, where integrated health services were already provided by a mixture of public and private

[1] Vaccination coverage levels plateaued between 70 and 80% around 1990 and remained fairly stable at that level until the early 2000's, when they began to rise again slowly. Now coverage remains stable near 85% for all four original EPI vaccines.

(Christian/missionary) health centers. Thus, WHO efforts to help Malawi establish and extend their immunization program met with little resistance from health personnel and necessitated no major change in the organization of health care in the country. This resonance greatly facilitated efforts, leading to a much smoother and more successful process than found in Cameroon.

This chapter is divided into four main parts. The first reviews major changes in the WHO's program policies and orientations, discussed in detail in Chapter 3. I summarize how this vision and EPI policies developed over the initial years of the EPI (1974 to 1990).[2] These years saw major shifts in the WHO's immunization program, as the EPI shifted from its early, experimental phase, to a PHC approach to immunization and then, in turn, began considering new strategies and goals based on disease-reduction targets. The second and third sections look at national EPI programs in Cameroon and Malawi, respectively, paying particular attention to the changing interaction between international advisers and local governments and personnel. Finally, in the conclusion I remark on the general trends, noting how international advisers' common perspective, embedded in global-level discourses, led them to see programs in Malawi and Cameroon very differently, leading to very different sets of advice for each country, with very different implications for the development of their respective immunization programs.

The EPI: An Evolving Programme

When the WHO embarked on its effort to expand the use of immunization worldwide in 1974, there was no generally accepted model for how to provide routine childhood immunization in the developing world. The WHO recognized this, calling for research "on the most effective ways of operating programmes with the vaccines available at present."[3] By the early 1980s, the program had developed an increasingly coherent vision for how routine childhood immunization ought to be delivered in the developing world, which I call the PHC approach to immunization. This vision acknowledged the many shared technical problems faced by developing countries – especially those related to the cold chain[4] and lack of adequately trained health personnel for programs – but generally ignored major differences in the organization of health services in the developing world, such as were found in Malawi and Cameroon. Finally, while the PHC approach remained dominant throughout the 1980s, by the mid-1980s continued problems raising vaccination coverage levels had led to a greater willingness to experiment with new, alternative strategies.

The EPI Experiment

In the early years of the EPI program, the WHO had few specific recommendations about operational strategy. A 1974 conference on immunization in developing countries noted that strategies commonly applied in the developed world were not necessarily applicable in the developing world and urged innovation and experimentation in developing strategies more appropriate for conditions found in the developing world.[5] A 1975 report on the first year of EPI

[2] This summary draws on the analysis found in Chapter 3, which provides a complete overview of changing program orientations and policies from 1974 through 2000.

[3] 1973. "Proposed Programme Budget and Estimates: 1975." Official Records of the World Health Organization No. 212, 142.

[4] The cold chain refers to the network of refrigerators, coolers and freezers needed to ensure that heat-sensitive vaccines are kept sufficiently cool to ensure their continued potency from production to administration in the field.

[5] 1974. "First WHO Seminar on Expansion of Immunization in Developing Countries. Kumasi, Ghana. 12-19 November 1974." WHO Offset Publication #16.

activities similarly had nothing specific to say about ideal operational strategies, although it mentioned WHO involvement in an experimental program in Ghana testing "the efficiency and effectiveness of a coordinated combined strategy using fixed centre personnel and mobile field teams for the vaccination of children."[6]

By 1976 the WHO began to develop a more unified vision of how immunization services ought to be provided in the developing world, with a new emphasis on the importance of the PHC approach, which would continued and consolidate over the next decade. That year's EPI progress report declared:

> WHO encourages the idea that routine childhood immunization should be regarded as part of primary health care, delivered by the basic health services. The need for, and provision of, maternal and child health services to most populations in the developing world appear best served by a holistic approach to the planning and implementation of national programmes, and of WHO's potential contribution to them.[7]

However, what the PHC approach meant for vaccination strategies at the national level remained undefined. The report noted problem with sustaining "the fully mobile team strategy," but also noted problems achieving high immunization coverage and maintaining vaccine efficacy with "static units" in the developing world. Emphasis continued to be on the need for experimentation with "mixed strategies."[8]

By 1977 the WHO had completed the initial planning stages of the EPI and was ready to move on with a fully operational program, yet it still had no specific recommendations for operational strategies at the country level. The discussion that year is even less specific than that found in 1976. The report noted certain "desiderata" for national EPI programs that would receive support from the WHO (both in terms of technical advice and efforts to attract external funding), which included the following:

> ...the definition of the framework for delivering the programme, such as primary health care services (as understood within the country and not according to any preconceived externally imposed definitions, taking account of the fact that an immunization programme can contribute significantly to primary health care), maternal and child health facilities, health centres, or mobile teams in certain areas. Immunization should be an essential feature of their work, and should not be delivered in competition with them.[9]

Thus, the WHO's "desiderata" remained amorphous. The PHC approach was only an example of a kind of "framework for delivering the programme," and beyond the meaning of "primary health care" was left to country's own understanding without "preconceived externally imposed definitions."

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[6] A28/WP/5. 1975. "A Detailed Review of the Programme Budget for Financial Years 1976 and 1977: WHO Expanded Programme on Immunization." pg. 4.
[7] A29/16. 1976. "Expanded Programme on Immunization: Progress Report by the Director General." pg. 2
[8] Ibid. pgs. 2-3.
[9] A30/13. 1977. "Expanded Programme on Immunization: Progress Report of the Director General." pgs. 7-8.

The PHC approach to Immunization

Two key events, both occurring in 1978, moved the EPI to adopt more precise strategic plans. The first was the International Conference on Primary Health Care in Alma Ata. This conference, seen as the defining moment for the primary health care movement, gave new emphasis to the key place of immunization among primary health care services. The Declaration of Alma Ata included immunization among the basic health services that any PHC program should include. It also set the goal of achieving "Health for All by the Year 2000." As part of its efforts to achieve the broader goal of "Health for All by the Year 2000," the WHO set the goal of achieving universal childhood vaccination by 1990.[10]

While the Declaration of Alma Ata reaffirmed the connection between the EPI and primary health care and drove the ambitious goal of universal childhood vaccination by 1990, the creation of the Global Advisory Group for the EPI in 1978 assured that EPI policies and strategies would reflect this connection and work towards both the specific goal of universal vaccination by 1990 and the more amorphous goal of health for all. Among other recommendations, the GAG reaffirmed the connection between immunization and primary health care, coming out strongly in favor of a PHC approach and giving more precise advice about what such an approach entailed in its 1979 report:

> In achieving its own goals, the EPI contributes directly to the broader goals of primary health care. The EPI seeks to establish permanent immunization services which reach a high proportion of newborns and pregnant women as these populations are continuously being replenished. Such services are most cheaply and most sensibly provided as a component of more comprehensive preventive and curative health services, as, for example, maternal and child health services. The addition of immunization services, in turn, strengthens such other services. The EPI is therefore committed to primary health care by intent, as well as necessity, as this approach provides the most rational context for the provision of immunization services.[11]

This statement was the first to define clearly what a PHC approach to immunization entailed. Services had to be permanent and continuous and had to form part of "more comprehensive preventive *and curative* health services" (emphasis added), preferably in the form of integrated maternal and child health services.

This emphasis on the integrated, PHC approach continued throughout the 1980s. The GAG reaffirmed that approach at their 1980 meeting,[12] and it informed recommendations in the first and second medium term programs, covering the periods 1980-1983[13] and 1984-1989[14] respectively. The World Health Assembly officially endorsed the approach in a 1982 resolution about the EPI program, which also reaffirmed the goal of universal childhood immunization by

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[10] 1978. "Proposed Programme Budget for the Financial Period 1980-1981." Official Records of the World Health Organization No. 250, 188.

[11] EPI/GAG/79/REPORT. 1979. "Report of the Expanded Programme on Immunization Global Advisory Group Meeting: 12-16 November 1978, New Delhi, India." pg. 10

[12] EPI/GEN/80/1. 1980. "Report of the Expanded Programme on Immunization Global Advisory Group Meeting, 20-23 October 1980, Geneva."

[13] EPI/GEN/80/2. 1980. "Global Medium Term Programme: Expanded Programme on Immunization."

[14] EPI/GEN/83/1. 1983. "Global Medium Term Programme, 1984-1989: Expanded Programme on Immunization."

1990 as part of the WHO's "Health for All" efforts. That resolution approved a five-point action plan for the EPI based on GAG recommendations, the first point of which was:

> (1) Promote EPI within the context of primary health care:
> - develop mechanisms to enable the community to participate as an active partner in programme planning, implementation and evaluation, providing technical and logistical resources to support these functions; and
> - deliver immunization services with other health services, particularly those directed towards mothers and children, so that they are mutually supportive.[15]

PHC in Question

In the face of continuing problems increasing vaccination coverage in many countries and the increasingly near 1990 deadline for achieving universal childhood vaccination coverage, the program began considering additional strategies by mid-decade. The first hint that alternative strategies might be conceivable arose in the GAG's deliberations at its 1983 meeting. Noting problems that threatened to derail efforts to achieve the goal of universal childhood immunization by 1990, the 1983 report recommends:

> National initiatives in adapting global immunization guidelines to the particular needs of an area are to be encouraged. Experimentation with innovative strategies to increase vaccine delivery may provide bases for significant operational changes provided the following general criteria are met: epidemiological relevance, technical validity, adequate monitoring and proper evaluation.[16]

However, although revealing some openness to experimentation, the same section emphasis that "The Five Point Action Programme adopted... remains a relevant guide for countries and for the WHO as they work to resolve those problems."[17]

By 1984, emphasis on the need to accelerate increases in vaccination coverage began to take precedence over commitment to an integrated PHC approach. The key emphasis was on the need to accelerate programs to meet the 1990 target. To this end, the report suggested using "intensified strategies," noting four different strategies already used in some programs:

> Intensified strategies have been developed in several countries in an effort to raise immunization levels more rapidly than would be achieved through routine programme implementation. These strategies include:
> 1. accelerated implementation of existing plans;
> 2. use of periodic rounds of intensified activity ('pulses' or 'rounds');
> 3. designation of one or more days each year as national immunization days; on these days, all children in the target age group are immunized without regard to their previous immunization status; frequently only one vaccine is

[15] A35/9. 1982. "Expanded Programme on Immunization: Progress and evaluation report by the Director-General." pg. 7. The WHA approved this plan in resolution WHA35.31.
[16] EPI/GEN/83/7. 1983. "Report of the Expanded Programme on Immunization Global Advisory Group Meeting, 31 October – 4 November, 1983, Manila." pg. 4.
[17] Ibid. pg. 5.

used (usually oral polio vaccine) and no attempt is made to complete the child's record;
4. designation of one or more days each year as national immunization days; all vaccines are available and used according to the child's needs; each dose given is entered on the child's record.[18]

Nevertheless, the new emphasis on innovation and alternative strategies did not mark a complete change from past recommendations. The report still emphasized the importance of integration, declaring: "there must be an intensification of coordination between EPI and other primary health care components" to make best use of existing resources and to better attract new resources,[19] and even the discussion of intensified strategies contained the warning: "To have lasting impact these efforts must remain part of, and promote, the general health structure."[20]

By 1985, the GAG was ready to issue a new set of recommendations revising the original five-point plan and its total commitment to the integrated PHC approach. The new plan included three general and four specific actions needed to achieve the 1990 goal. The three general actions included especially spoke to the ongoing tension between the programs' desire to increase coverage to achieve the 1990 goal and their commitment to the integrated PHC approach:

1) Promote the achievement of the 1990 immunization goal at national and international levels through collaboration among ministries, organizations and individuals in both public and private sectors.

Mobilize social action which creates effective consumer demand and which provides the sustained resources and incentives to assure that this demand is met rapidly and effectively.

2) Adopt a mix of complementary strategies for programme acceleration.

In countries where coverage is unsatisfactory or disease transmission persists, use intensified approaches such as national immunization days to strengthen existing services and bring about rapid and sustained increases in immunization coverage. Such approaches should use all EPI antigens whenever possible and should also consider provision of tetanus toxoid to women of childbearing age. A single national immunization could be proclaimed, or a series of single days, or several consecutive days or weeks. The joint WHO/UNICEF statement Planning Principles for Accelerated Immunization Activities is a useful guide.

3) Ensure that rapid increases in coverage can be sustained through mechanisms which strengthen the delivery of other primary health care interventions.

Accelerated efforts often represent extraordinary efforts. A major challenge will be to ensure that the progress is maintained and that all immunization activities

[18] EPI/GEN/85/1. 1985. "Report of the Expanded Programme on Immunization Global Advisory Group Meeting 21-25 October 1984, Alexandria." pg. 3.
[19] Ibid. pg. 4.
[20] Ibid. pg. 3.

> serve to strengthen the development of primary health care. Complete immunization of all newborns on a continuing basis must be ensured.[21]

These new recommendations do not mark a total break with the past. Point 3 reiterates the warning against letting accelerated strategies weaken more continuous routine immunization through the integrated PHC approach. Further, point 1, with its emphasis on community mobilization, builds on a formerly neglected aspect of the PHC philosophy. However, the second point firmly establishes acceleration strategies, like national immunization days, as an aspect of EPI strategy, marking a significant break with the original five-point plan's total emphasis on immunization as part of broader, integrated and continuously available primary health care services. The extent of the change in policy even called for formal endorsement by the World Health Assembly, the WHO's main governing body, which endorsed all points in a resolution adopted during their 1986 meeting.[22]

The official endorsement of "accelerated strategies" was accompanied by a growing focus on disease surveillance and the EPI's effect on incidence rates of vaccine-preventable diseases. The GAG's 1985 report included "Increase priority for the control of measles, poliomyelitis, and neo-natal tetanus" among the four specific actions.[23] As with their general recommendations, the World Health Assembly endorsed this new emphasis on these three diseases in their 1986 meeting. Two year later, they strengthened this new focus, adopting a resolution to eradicate polio by the year 2000,[24] which was followed in 1989 by a resolution calling for the elimination of neo-natal tetanus and the reduction of measles incidence by 90% by the year 1995 as part of the EPI.[25] The 1989 resolution also amended the goal for universal childhood immunization by 1990, replacing the universal target with one aiming for at least 80% coverage by 1990 and for 90% coverage by 2000.

In sum, the early years of the EPI (1974 to 1990) saw three distinct sets of strategic recommendations regarding immunization program operations. During the first period, 1974-1978, the program had few specific recommendations, instead emphasizing the need for experimentation and the importance of adapting programs to local conditions. During the second period, from 1979 to 1985, this fluidity was replaced by a firm commitment to the primary health care approach, and especially to the importance of integrating immunization into comprehensive, continuous maternal and child health services. The final period, from 1985 onward, continued to recognize the importance of primary health care and of generally strengthening health services, but also saw a place for more targeted "accelerated strategies," like national immunization days, particularly in programs having trouble meeting coverage goals through the integrated PHC approach alone.

How did these changing recommendations affect efforts to expand immunization services on the ground in national programs in Malawi, where pre-existing immunization programs already employed what would become the integrated, PHC approach? And how did they affect efforts in Cameroon, where pre-existing programs instead relied on a specialized, mobile-team approach and where curative and preventive health services were separated at the highest levels

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[21] WHO/EPI/GEN/86/2. 1986. "Report of the Expanded Programme on Immunization Global Advisory Group Meeting, 4-8 November 1985, Copenhagen." pg. 3-4.
[22] WHA39.30. 1986. "Expanded Programme on Immunization."
[23] WHO/EPI/GEN/86/2. 1986. "Report of the Expanded Programme on Immunization Global Advisory Group Meeting, 4-8 November 1985, Copenhagen." pg. 5.
[24] WHA41.28. 1988. "Global Eradication of Poliomyelitis by the Year 2000."
[25] WHA42.32. 1989. "Expanded Programme on Immunization."

of government bureaucracy? In the next sections, I answer these questions through an analysis of WHO-archival materials on EPI programs in both countries.

Malawi and Cameroon were both early adopters of the EPI; Cameroon even sponsored the original resolution calling for the program.[26] Malawi began a national program to expand vaccination coverage with some antigens in 1972 and started a WHO-coordinated campaign in 1978. Cameroon began an EPI-like program in its capital, Yaoundé, with cooperation from the CDC and OCEAC in 1975, which became the foundation for a WHO-coordinated EPI starting in 1977. However, these efforts did not progress equally well in both countries. By 1981, when I first have data, Cameroon's performance was already well below what we would expect from a country with its characteristics, with only 5% of one-year olds completely vaccinated against polio. By 1988, 19% of one-year olds were completely vaccinated against polio, a fall from the rate achieved in 1984, 26%. Malawi, on the other hand, begins strong with 28% of one-year olds covered in 1980 and experiences a general upward trend (with some temporary setbacks) throughout the period, reaching a high of 86% coverage in 1986 and maintaining 72% coverage in 1988.

Here, I concentrate on how the WHO's changing ideas about how to provide immunization in the developing world interacted with pre-existing institutions on the ground in Malawi and Cameroon. As the emphasis on the PHC approach intensified, Cameroonian practices seemed increasingly out-of-step with international norms, leading WHO officials to call for major program reform there, particularly criticizing the practices of the mobile vaccination teams. In turn, attempts to restructure the program in line with WHO recommendations incited resistance from health personnel on the ground, leading to much conflict and debate between international, regional and local health officials. With debate focusing overwhelmingly on questions of the relative utility of mobile teams, evaluators at all levels spent little time examining or attempting to resolve other problems faced by the program. No such major reform effort emerged in Malawi, where already-integrated programs met with approval and support from WHO evaluators. Instead, evaluators and health authorities devoted their energies to addressing the other major challenges faced by Malawi's immunization program, including extending the cold chain and addressing the program's vulnerability to fuel shortages.

The EPI in Cameroon: New Paradigms and Persistent Legacies

As discussed in Chapter 5, the EPI program had trouble in Cameroon, generally performing less well than predicted by my regression models. This section examines interactions between WHO advisers and program coordinators in Cameroon, tracing the first 15 years of the program there. It pays particular attention to how changes at the global level affected those interactions and to national or local-level personnel's reactions to those changes. For reference purposes, Figure 6.3 provides a map of Cameroon, including main roads, railroads, airports and major cities and towns.

[Figure 6.3 about here]

[26] A27/A/SR/10. 1974. "Committee A: Provisional Summary Record of the Tenth Meeting." pg. 10.

Urban Experiments: OCEAC and the EPI in Yaoundé 1975 to 1980

In 1975, an expanded immunization program began in Cameroon's capital city, Yaoundé. Run by a team from OCEAC[27] with extensive backing from the CDC and USAID, the program targeted all six of the vaccine-preventable diseases targeted by the WHO's EPI. The Yaoundé program was self-consciously set up as a model and testing ground for the EPI, even if not yet officially connected with the WHO. Program staff kept up active correspondence with Ralph Henderson, director of the EPI, sought to coordinate research efforts with that program, and sent program reviews and results of research to the WHO for publication.[28]

The new program also echoed the EPI's general presentation of itself as breaking with past campaign-style programs to set up continuous, sustainable immunization services in the developing world. Arguing that past efforts using specialized immunization teams who traveled the country in a biannual circuit (see above), although successful in combating smallpox, had failed to successfully control measles, the new program sought to overcome this problem by making immunization services more continuously available and targeting more diseases than past efforts. In addition, the new program focused on a narrower age-range, targeting infants and setting up an immunization schedule calling for infants to be fully vaccinated against the six target diseases in four immunization sessions between two and nine months of age.[29]

This emphasis on a break with the past emerges clearly throughout the description of the Yaoundé program. In the discussion of program strategy, the paper notes:

> While attack phase vaccination programs give dramatic results they have led to a neglect of the maintenance phase of vaccination programs which in the long run are essential for control of diseases like measles. Thus, the Yaoundé program, from inception, is a maintenance program without mass campaign. The program should keep costs low and begin modestly with available materials and staff, and expand gradually.[30]

Two linked themes are key here: the importance of continuous health care programs, as opposed to short-term mass campaigns, and the need for sustainability. The idea is that continuous programs cannot rely on the large mobilization of resources mass campaigns require, but must instead "modestly" make do with "available" resources.

However, the break with past models was not complete. The early Yaoundé program continued to rely on another feature of earlier, mass campaigns: specialized staff. Again, the discussion of strategy highlights this:

> The advantages of both mobile teams and fixed centers are combined in the Yaoundé program:

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[27] "Coordinating organization for the fight against endemic disease in central Africa." OCEAC was founded in 1963 to coordinate health campaigns carried out by *grandes endémies* teams in the countries of former French Equatorial Africa and Cameroon. A similar organization, OCCGE (Organisation de coordination et de coopération pour la lutte contre les grandes endémies), was founded in 1960 by French colonial doctor, Pierre Richet, to continue efforts of the grandes endémies services and departments of preventive medicine set up by French colonial authorities. It coordinated similar efforts in French West Africa.

[28] See documents in I8/370/2CAE (1).

[29] See 1977. "A Program of Multiple Antigen Childhood Immunization in Yaoundé, Cameroon." In. I8/370/2 CAE(1).

[30] Ibid.

> The mobile vaccination team... has many useful qualities which are retained in the program: (a) The team can be trained to be expert vaccination technicians who understand their job, work efficiently, and theoretically handle vaccine properly without wastage. (b) The team can handle large vaccination sessions and make use of the methods of mass vaccination including ped-o-jets, large dose vials of vaccine, and vaccination lines. (c) The publicity techniques of mass campaign can be used.
>
> Fixed centers, on the other hand, provide a site where vaccine can be available on a regular basis and where children can be brought regularly for vaccination at specific ages. Cold chain should present no problem. Center personnel can carry out health education and publicity and provide a link between curative and preventive care. Vaccination and other maternal child health activities can be integrated.
>
> Therefore, in the Yaoundé program, a mobile team circulates to 10 designated dispensaries and PMI's on a fixed calendar schedule... (e.g. each last Wednesday of the month the team will vaccinate at Centre A). These centers are situated throughout the city so that no area is more than about 1 km from a center. Only the trained team members handle vaccine, carry out technical aspects, do triage of vaccinees, etc. The chief of the team directs these activities.[31]

Thus, while the new program made vaccination more continuously available out of fixed health centers, it still used specially trained, mobile personnel to carry out vaccinations. However, instead of traveling the country in biannual drives, this team traveled the city in a continuous circuit to run monthly vaccination sessions at the fixed health centers.

By 1977, the Yaoundé program was well established,[32] and Cameroon was ready to expand the program beyond Yaoundé and make it into a national, WHO-assisted EPI. This first attempt at expansion began when the Ministry of Public Health, with technical support from OCEAC, prepared a national EPI plan for the years 1977-1982,[33] which it submitted to the WHO, requesting its help finding external aid for the program. The plan called for the expansion of immunization services to cover the entire country in ten years time, and 60% by the end of the five-year period under consideration,[34] so that the whole country could "profit from Yaoundé's experience."[35]

The plan built on the Yaoundé program, foreseeing its immediate extension to four new areas: Douala (the largest city in Cameroon), the area around Maroua in the north of Cameroon, and two rural zone: Eséka (situated between Yaoundé and Douala) and Guider (in the north of the country, south of Maroua), along with a more general expansion of immunization services across the country. The expansion of the Yaoundé program, which continued to receive

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[31] Ibid.

[32] An article in *WER* noted that initial success was "encouraging." 1978. "Expanded Programme on Immunization." *WER*. 53(19). 133-5.

[33] 1977. "Proposition et Projet de Budget, Programme de Vaccination Elargi, Republique Unie de Cameroun: Une nouvelle stratégie pour le development des services de vaccinations infantile pendant la période quinquennal 1977-1982." In I8 370 2CAE(1).

[34] They actually met these two goals, despite the many problems faced by this first effort.

[35] Ibid. The plan also called for immunization to be provided in two other ways: through vaccination at primary health centers in urban areas, and through annual visits by *grandes endémies* teams (which would now target infants) in rural areas. However, these latter two parts of the plan appear never to have been implemented.

extensive support from OCEAC, proceeded more-or-less as planned. The Douala program never got off the ground, and this area was dropped from the expansion, but Yaoundé-like programs did begin in Bamenda, Bafoussam, Eséka and Garoua. However, as the WHO and Cameroon both failed in their initial attempts to attract additional external support to the program, the more general expansion failed.[36]

Frustration with the slow progress apparently ran high, as seen not only in inquiries about funding possibilities from the Minister of Foreign Affairs but also in an extract from a paper presented at a SHDS/CDC Regional Conference on Disease Surveillance and Immunization held in Banjul, The Gambia, and attended by personnel active in Cameroon. In it, an international health worker from the CDC laments the slow progress and lack of aid available to Cameroon during this expansion period:

> By the end of the first year of its existence, the Expanded Program of Immunization (EPI) in Cameroon found itself in the perplexing position of having completed all the required assessments and evaluations; completed the training and placement of an EPI team in each of the three selected zones; completed installation of cold chain facilities in the three zones; written and had accepted by the Ministry of Health a five-year plan for the expansion of the EPI to the rest of the country; and of having gained recognition of the EPI as a permanent office of the MOH - all without having received a single ped-o-jet, a single refrigerator, or a single new vehicle for use by the teams in the field.
>
> The entire structure in place rested on a bed of sand, due to the ancient cold chain facility in Yaoundé, the imminent failure of oft-repaired vehicles and ped-o-jets, and the subsequent demoralization of our field personnel.
>
> Ironically, during this same period of time, we had the dubious opportunity to be visited by no less than three (3) teams to evaluate the program. Two of these teams appeared, to this writer, at least, to be hopelessly ill-prepared (one might even say unqualified) to analyse the working of an EPI - let alone make sustantive [sic] recommendations to assist the Government of Cameroon. Time constraints (one team actually made its evaluations in less than 8 hours) and a basic lack of a well-defined picture of the relations between the SHDS program, AID/Yaounde, CDC/Atlanta, AID/W, and WHO/RO and Yaounde offices, seemed to be the major factors in the fundamental inability of these teams to be of practical assistance to the EPI in Cameroon.[37]

Thus, in early 1980 the first expansion attempt seemed, by and large, a failure. Although the Yaoundé program had indeed been extended to three further areas, efforts at getting further funding and of expanding the infrastructure to support a larger program were at an impasse.

[36] See various correspondence. In I8/370/2 CAE(1).

[37] See 1980. Travel Report dated 24-4-80 to 1-5-80 in I8 441.1 2AF(2). Cameroon is the subject of seven out of 11 papers apparently presented at this conference, but sadly the WHO archives only contained the first page, in most cases a cover page.

In the face of this failure, the government submitted a new EPI proposal to the WHO in early 1980. The new report painted a much bleaker picture of vaccination services in Cameroon than found in the 1977 report, noting:

> Current vaccination services in Cameroon are carried out on a sporadic and indefinite basis. The vaccine supply is at best unpredictable and generally aren't always available at all. The cold chain for preserving vaccines is in such a state that at present, it is not possible to say that the vaccine will always be viable and effective at the moment of use on the ground. A large number of medical and paramedical personnel available on the ground are not educated in the basic concepts of childhood vaccinations.[38]

The report provided a similarly bleak picture of immunization in the four (or five if Bamenda and Bafoussam are counted separately) demonstration zones, declaring: "It is clear that these levels [of vaccination coverage] are, for the most part, below the minimum required."[39]

Despite this grim assessment, the new plan continued to rely on vaccination teams, as first used in Yaoundé, for program expansion. This was in keeping with recommendations made during the 1978 WHO/CDC program evaluation, which urged Cameroon to use the Yaoundé team as "the nucleus for training to other health personnel for expansion of vaccination activities in Cameroon."[40] The plan focused, first and foremost, on the three areas with already existing programs: Yaoundé, Bamenda-Bafoussam and Eséka, which would serve as "demonstration zones" for urban, semi-urban and rural vaccination services, respectively. It called for perfecting services in these three zones during the first year – especially in terms of cold chain and personnel, and then using them as centers for training as the program expanded throughout the country. In years two to five, it foresaw a new round of expansion, first to the cities and major towns of Douala, Maroua, Garoua, Ebolowa, Sangmelima, M'Balamayo, Bafia and Bertoua. With that expansion, all provincial capitals except those of South West and Adamaoua provinces would be included in the program and several additional towns in South and Center Provinces would also have services. By year three, all provinces were expected to have a program at least in their capital city, and by year five, the entire country was expected to have access to immunization services.

With an important new source of external funding coming from UNICEF starting in 1981, the new expansion fared much better than earlier efforts. Efforts began in August 1980, and by 1982, 62% of departments had EPI services, increasing to over 80% in 1984 and to 100% by 1986.[41] One of the first priorities was training. Training courses served two important roles in forwarding the campaign. First and foremost, they helped to meet the EPI's enormous personnel needs. Immunization services could not truly begin in any area before personnel there received training in the administration and management of vaccines and in the logistics of running a new

[38] See 1980. *Projet du Programme Elargi de Vaccination du Cameroun* (Cameroon EPI Project). In I8 370 2CAE(1).

[39] Ibid. Coverage surveys found wide variation in coverage, with the best coverage in Bafoussam and Bamenda and the worst in Douala and Eséka. See Appendix 2.2 for Coverage Data.

[40] 1978. "Review of the Expanded Programme on Immunization: Yaoundé, United Republic of Cameroon, 23 November to 2 December, 1978." In I8 441.1 2AF(2)

[41] See 1986. "Prospects for Universal Immunization by 1990 in Cameroon." Dated Jan/Feb 1986. In I8 370 2CAE(2).

type of immunization program that differed radically from anything seen in Cameroon before. Second, the training courses served as an opportunity to establish a "baseline" of vaccination coverage from which program progress could be assessed. Each training session included a field exercise in which participants gathered data on vaccination coverage in the area.

The program started with a two-week EPI training course in Bafoussam in 1980. During this course, personnel from the demonstration zones and senior members of the Ministry of Public Health facilitated training for 21 Cameroonian health workers from across the country, including six of the nine provinces.[42] More courses followed, with at least 14 courses held between 1982 and 1986.[43] 1982 saw three courses, two local ones in Bamenda and Douala, and a third in Garoua, with participants from the three northern provinces of Cameroon: North, Extreme North and Adamawa provinces.[44] There were two per year in 1983 and 1984, first in Bertoua and Limbe[45] and then in Ebolowa and Maroua.[46] There were four courses in 1985, in Ngaoundere, Douala, Garoua and Akonolinga,[47] and three more in 1986, in Sangmelima, Bafia and Kumba.

However, while expansion efforts proceeded relatively smoothly, the program's strategic orientation based on mobile vaccination teams came under increased criticism during this period. As discussed above, the Yaoundé EPI used a "mixed strategy" wherein a mobile vaccination team traveled to a series of pre-chosen health centers on a monthly circuit, bringing vaccine and carrying out immunization sessions. This strategy was built on the mobile *grandes endémies* teams of the past (which continued to operate, especially in rural areas), with their emphasis on specialized personnel, but broke with that approach in setting up a system that allowed teams to provide the continuous services necessary for infants to complete the series of immunizations needed to protect them against the six diseases targeted by the EPI: measles, tuberculosis, diphtheria, pertussis, tetanus and polio.

When the first efforts at expansion began, this strategy was at its heart, and as the EPI moved to new "demonstration zones," it did so by constructing new teams, finding new centers and beginning a new circuit in that area. Initially, this approach met with the approval of new partners at the WHO. A 1978 program evaluation, although noting some problems at vaccination sessions, where large crowds and lengthy triage procedures led to delays or long waits, spoke positively of the team overall. The report had three recommendations to make about this team:

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[42] See letter and report dated 10/3/1980 in I8 370 2CAE(1) and in I8 133 3AF(A). The three provinces not represented in training courses include: Adamawa, South-West Province and North-West Province. However, North-West Province already had some EPI services, as parts of it were included in the Bafoussam-Bamenda demonstration zone.

[43] Most are listed in 1986. "Prospects for Universal Immunization by 1990 in Cameroon." Dated Jan/Feb 1986. In I8 370 2CAE(2). Another is mentioned in 1985. "Rapport de l'Evaluation de la Couverture Vaccinale dans la Ville d'Akonolinga en November 1985." In I8 370 2CAE(2). I do not have the complete record of such courses – it may exist in Cameroonian national archives, or may not exist at all. But this record gives a sense of how widespread the courses were.

[44] See 1986. "Prospects for Universal Immunization by 1990 in Cameroon." Dated Jan/Feb 1986. In I8 370 2CAE(2) for all and 1982. Travel Report dated 3/8/82. In I8 133 3AF(1) for Garoua course information.

[45] See 1983. Project Progress Report RAF/77/041 (ICP/EPI/001). Dated July-December 1983. In I8 370 2AF(6) and 1986. "Prospects for Universal Immunization by 1990 in Cameroon." Dated Jan/Feb 1986. In I8 370 2CAE(2).

[46] See 1986. "Prospects for Universal Immunization by 1990 in Cameroon." Dated Jan/Feb 1986. In I8 370 2CAE(2).

[47] Ibid and 1985. "Rapport de l'Evaluation de la Couverture Vaccinale dans la Ville d'Akonolinga en novembre 1985," In I8 370 2CAE(2).

1) The Yaoundé team should be regarded as the nucleus for training to other health personnel for expansion of vaccination activities in Cameroon.
2) Plans to move the team from its current OCEAC base to the DMPHP [Division de Médecine Preventive et d'Hygiène Publique] of MOH [Ministry of Health] should be implemented as soon as possible.
3) Efforts to increase vaccination coverage in Yaoundé should be made through increased health education and publicity, and through establishing vaccination activities in additional health centers.[48]

In other words, base program expansion on the Yaoundé program, integrate the team into the appropriate government department, and expand its activities to additional health centers. The only "radical" innovation recommended here involved integrating the previously independent, OCEAC-based team into the government's public health program.

The 1980 expansion plan consciously built on these recommendations, setting up the Yaoundé program and the new Yaoundé-like programs recently begun in Eséka, Bamenda and Bafoussam as "demonstration zones," where personnel from other areas of Cameroon would learn the techniques of a "modern vaccination program." The plan's budget also reflected the strategy of establishing new vaccination teams in new areas served by the program: the detailed budget for 1981 lists personnel requirements for each program extension, including the vaccination teams in each demonstration zone.[49]

This strategic consolidation came to an abrupt end in 1981, following a new WHO-led program evaluation carried out that year. In the overview of its findings, the very first difficulty noted is the following:

> The recommendation from the last evaluation concerning the reorientation of the Yaoundé vaccination team into a training team has not been realized. On the contrary, the team continues to carry out vaccinations according to the former mobile strategy system.[50]

Remarkably, this critique at once signaled a massive reorientation in program strategy for the EPI and effaced the fact that it was calling for such a change. A close reading of the 1978 evaluation to which it refers makes it clear that evaluators were not demanding that the Yaoundé vaccination team take on training duties *in the place of* their vaccination activities, as the critique suggests, but rather in addition to them. The team was meant to help in the training of new teams that were meant to begin programs using a "mobile strategy" like theirs. Clearly the government understood the recommendations this way, as their 1980 plan called for just that. Furthermore, the team did engage in training activities in addition to their vaccination duties, as the participation list from the first Bafoussam training session held in 1980 makes clear.

So, what change did this 1981 report envisage? Luckily, the evaluators were more explicit in the body of the report, which devoted a great deal of attention to detailing the problems with the vaccination teams and how they should now be reorganized.

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[48] See 1978. "Review of the Expanded Programme on Immunization: Yaoundé, United Republic of Cameroon." Dated 11/23-12/2/1978. In I8 441 1.1AF(2)

[49] See 1980. "Projet du Programme Elargi de Vaccination du Cameroun." In I8 370 2CAE(1).

[50] See 1981. "Rapport d'une Evaluation du Programme Elargi de Vaccination (P.E.V.): République Unie du Cameroun." In I8 370 2CAE(1).

> 1) The strategy, until now based on mobile teams, ought to consist of fixed centers in existing health services as much as possible from now on. To this end, we must integrate EPI activities into primary health services dispensed by these fixed public and private centers and exercise mobile activities from these centers.
> 2) The mobile EPI teams must be reoriented toward technical supervision and training at fixed centers participating in the program and must cease to carry out vaccinations themselves, except for advanced activities in regions which don't have sanitary facilities.
> 3) The mobile teams' vaccination activities must be progressively suppressed according to a pre-established calendar and following the prior installation of the cold chain. Integration of current activities with primary health care services should begin in already-established urban and rural sanitary zones, so that operations are carried out at the lowest possible cost and with the highest possible change of success.
> 4) Mobile team personnel ought to be re-used in teaching them certain aspects of management techniques, of logistics, and of evaluation and supervisory methods so that they can give fixed center adequate technical support.[51]

In other words, the report envisaged reforming Cameroon's program to be more consonant with the then developing EPI strategies emphasizing the importance of an integrated PHC approach. The specialized mobile teams, even if they provided continuous immunization services to appropriate age groups, were not integrated with other primary health services. The new recommendations sought to bring practices in Cameroon more in line with this new emphasis on integration by having regular health center personnel carry out vaccination activities, while the "vaccination team" focused on training and supervisory activities. The report recognized that this ideal could not be achieved right away. Where the cold chain did not yet exist (most places, in truth), teams were still needed to bring vaccine and carry out vaccination sessions. However, the report called for the gradual abolition of these less-than-ideal practices: extending the cold chain and getting rid of the teams was a top priority.

The evaluation showed remarkably little awareness of the enormity of the change it demanded. In Cameroon, as in all of French West and Equatorial Africa, preventive and curative health activities had long been carried out separately. In this system, immunization was the business of the Department for Preventive Medicine and Public Hygiene, not the Department of Health. Similarly, it was the business of specialized vaccination teams, not of doctors, nurses and other health workers at (curative) health centers. This tradition was still strong in Cameroon and other countries in former French West and Equatorial Africa, as is made clear by a fascinating note appended to an OCEAC travel report. In it, an American from the CDC working with OCEAC comments on the views and mind-set of his French superior in that organization:

> Dr. XXX, as a product of the Service of the Grandes Endemies with over 30 years of professional experience in francophone Africa, as a Medical General in the French Army, and as Secretary General of OCEAC, holds and expresses certain attitudes and viewpoints in common with a number of his French counterparts in public health in Africa...

[51] Ibid.

The thinking of Dr. XXX and his counterparts remains influential in public health in francophone Central Africa (and probably parts of West Africa as well). They are still strategically positioned to shape, change, and occasionally force public health policies and priorities. They represent a strong fraternity whose opinions are heard and at least partially accepted by national public health officials, who frequently do not themselves have technical or even medical experience. Their support from F.A.C.[52] gives them additional authority beyond their own considerable powers of persuasion. Beyond that, the older generation of national public health officials and health professional was strongly influenced by the practices, attitudes and priorities of these Frenchmen. They have been in Africa a long time and show every indication of remaining for the foreseeable future...

With regard to EPI Dr. XXX remains unconvinced that integration and decentralization of immunization activities is either more effective or more efficient than the vertical, autonomous program approach. He, like many of his colleagues, is very concerned about a loss of operational quality as soon as central athority [sic] and supervision is relinquished. He fears an unsupervised and uncontrollable and inadequate performance of vaccinations, records, and management at the peripheral level. He feel that management, in particularly, is not well developed in Africa (nor will it be soon) and that reliance on a strategy which diffuses management responsibilities is asking for trouble.

On a less theoretical level he feels that in the OCEAC countries at least the track record of the WHO-style EPI (particularly in Cameroon) is less impressive than that of the Grandes Endemies style 'EPI's' (Gabon and CAR programs are run directly by expatriates). He is afraid that after the withdrawal of the SHDS project and the CDC expatriate operations officers the EPI programs will have serious difficulties and stagnate.

An additional concern and complaint of Dr. XXX and his colleagues is that with its rigid insistence on a fixed strategy (even if health centers were capable of doing a quality job) the EPI necessarily, and in fact, ignores the rural population, which the Grandes Endemies types claim constitute 80% of the population. The EPI also ignores other vaccine preventable diseases such as yellow fever and meningitis. Not only does the EPI concentrate on the population centers, but in their view it does in reality only a mediocre job of vaccinating there. But by its heightened international image and WHO/UNICEF approval the EPI draw the support of international donor agencies and budgets of the respective Ministries of Health to the detriment of the traditional programs which attempted to serve the rural areas. Thus in their view the EPI, which they consider only partially effective at best an making only slow progress past 'demonstration' areas, has soaked up virtually all the resources and political support which might otherwise have helped the more rural based programs, leave '80%' of the population to its fate. ...

While XXX and colleagues do not present the argument directly, there is another obstacle to overcome in instituting a fixed strategy even where the infrastructure of health centers exists: In the francophone regions at least there is

[52] I'm not sure what this is yet.

> very little tradition of health center personnel being involved in vaccinations (except perhaps some missionary centers). Many rural dispensaries as well as some urban ones are understaffed or perceive themselves as understaffed for the heavy volume of curative medical services they perform. The staff generally do not welcome being additionally burdened with vaccination activities and all the associated tasks of ordering supplies, maintenance, sterilization, extra record keeping, etc. Overcoming the resulting resistance to integration of vaccination activities into these centers must be added to the difficulty of supply and installation of cold chain facilities. Many of the smaller more rural dispensaries, staffed for example only by a 'decisionary' nurse (virtually no formal training) or by an aide-soignant (licensed practical nurse) are probably not realistic candidates at present for becoming fixed vaccination centers.[53]

This lengthy excerpt reveals three major objections to the change of strategy recommended by the WHO's 1981 evaluation of the EPI program. First, Dr. XXX and others like him objected to the integrated approach for theoretical reasons, arguing that specialized teams were "more effective and efficient" than the health personnel in holistic, integrated centers. Second, they objected for empirical reasons, arguing that, at least in francophone Equatorial Africa, the PHC approach had proved less effective at raising levels of vaccination coverage than continuing with the *grandes endémies* tradition. A third objection arose for humanitarian and social justice reasons and argued that the integrated-approach, which called for gradual expansion of services from urban centers, left the majority of the population with no access to services. In addition to these three objections, the above excerpt reveals one further impediment to the PHC approach: staff at fixed centers were both reluctant to take on these new duties and, in some cases, did not have sufficient training to carry them out well.

The above excerpt speaks directly to another problem for the EPI in Cameroon: inter-organizational disagreements. The WHO was a relative latecomer to expanded immunization services in Cameroon. OCEAC (with backing from the CDC and USAID) originally began the Yaoundé program there and remained a core partner in the program after the WHO became involved in Cameroon's EPI in 1977. Yet, as this excerpt reveals, personnel at the very head of OCEAC had many objections to the new strategies so strongly pushed by the WHO starting in 1981. Thus, the note reveals several layers of interorganizational tension within the Cameroon EPI: between OCEAC and WHO and also between French personnel (former colonial doctors) and American personnel (from CDC) within OCEAC.[54] These objections presumably only strengthened further as new international staff, or at least evaluators, became more doctrinaire in their insistence on total integration and began criticizing the newly created joint mobile-fixed strategy for not integrating enough.[55]

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[53] See 1982. "Compte-Rendu du Mission." Dated March 9, 1982. In I8 370 2CAE(1).

[54] The note was actually written by an American from the CDC working in OCEAC to his superior at CDC, advising on difficulties future CDC-personnel working in OCEAC ought to be aware of before beginning their work.

[55] Of course, this push for total integration of immunization services into fixed centers was not without justification. Two main arguments were advanced in favor of it. In theory, immunization from fixed centers would allow even more continuous immunization services than the monthly rotation used by the teams. This, in turn, would presumably raise levels of vaccination coverage, which were stagnant (and low) in many parts of Cameroon. Further, use of fixed centers would lower costs by using health personnel more efficiently and eliminating a large part of the transportation costs for the program. Furthermore, integrated programs did work well in some areas, as my discussion of Malawi below makes clear.

Although hinting at problems between national and international personnel, the note does not directly reveal them. It was written by an American about tensions between approaches advocated by the WHO (and also to an extent CDC) and those favored by most (French) personnel in OCEAC. We must turn to national sources to see whether these objections and impediments were as widespread as suggested in the note, and whether they impeded efforts to improve vaccination coverage in Cameroon. A series of local vaccination coverage evaluations and other studies, written between 1983 and 1985 show that the objections and impediments noted above did indeed extend over a large part of the country, and that reservations about the new integrated approach were widely held by national health personnel within Cameroon. The local evaluations come from three different provinces and from a mix or urban and rural areas. Two are from cities: Bafoussam, the capital of West Province and site of an early EPI "demonstration zone," and Akonolinga, a city in Center Province. Another comes from the department of Noun in West Province, which has a mix of urban, semi-urban and rural areas. Finally, a third entirely rural area is represented by a study from North East Benoué.

Studies from rural areas highlighted the truth behind the social justice/humanitarian critique, never failing to note that mobile vaccination teams were needed to reach rural populations in areas where health centers, even if existing, did not have refrigeration. This challenge was especially clear in the rural outpost, North-East Benoué, which completely lacked cold chain facilities. There, they used a variant of the mobile technique first developed in Yaoundé, with vaccination teams visiting health centers on a monthly rotation and "help[ing] those responsible for the center to carry out vaccinations." The report noted:

> The organization of the EPI in the rural zone that is NEB is *only actually possible thanks to the mobile medical team in place*, a team which will disappear once the development of the zone has been achieved. It therefore would seem desirable for health centers to be supplied with means of conserving the vaccines which would allow them to function in an autonomous manner.[56]

The department of Noun also contained many rural areas without developed cold chains, and the evaluation similarly noted:

> Given the Cameroonian Government's goal of progressively suppressing vaccination activities by mobile team, it is notable that currently there lacks a lot of material to assure the cold chain in all dispensaries… *For the moment the only way to reach most of the population is by mobile team*.[57]

These evaluations show a challenge appreciated by all: fixed centers cannot vaccinate autonomously if they do not have a cold chain (and therefore the means to preserve vaccine until use). Therefore, places like NEB, where the cold chain was non-existent, and Noun, where it was not completely developed, needed to continue using teams, who were in charge of supplying vaccine for vaccination sessions.

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[56] In 1983. "Resultats de l'Enquête Effectuée du 7 au 14 Novembre 1983 pour l'Evaluation de la Couverture Vaccinales dans le Nord-Est Benoué." In I8 370 2CAE(1). Emphasis added.

[57] 1984. "Evaluation de la Couverture Vaccinale dans le department du Noun en juillet 1984." In I8 370 2CAE(2). Emphasis added.

The situation was different in cities, which often did have a cold chain in place. There, they could actually attempt to implement the new fixed strategy. However, evaluations from areas that were able to attempt integration highlight the justice of the practical critique: attempts at integration often provoked problems with (medical, curative) staff at fixed health centers. The Bafoussam evaluation praised the integrated, PHC approach, calling it "the ideal strategy," but quickly noted practical problems with that strategy, notably the limited extent of the cold chain, and called for use of a "mixed strategy" until vaccination from fixed centers is more generally possible.[58] In addition, the evaluation complained:

> [M]edical personnel at hospitals think that the vaccination program is the business of those who work at Preventive Medicine, even though the new vaccination strategy, which involves the integration of vaccination into cares dispensed by health centers, requires the participation of everybody, doctors and nurses, to raise awareness, motivate and vaccinate the population in order to assure the success of this program.[59]

The 1985 coverage evaluation for Akonolinga echoed this complaint, adding "their children [i.e., children vaccinated by medical personnel in fixed centers] are not correctly vaccinated."[60] This evaluation, noting the weak level of vaccination coverage, declared: "It is imperative to consider new work methods in order to ameliorate the immunization status of our population."[61]

In both Akonolinga and Bafoussam, the local department of preventive medicine carried out the evaluations, which may explain their remarkably similar complaints about [curative] medical personnel in health centers. Preventive and curative health workers had little previous experience working together in Cameroon, and the complaints point to tensions between the two groups. Further, as similar complaints appear in both Bafoussam and Akonolinga, we see that these tensions were widespread. In Bafoussam in 1983, a relatively well-established EPI previously run by a mobile vaccination team was transitioning to the new fixed approach. Were Bafoussam (and other demonstration zones) the only areas to experience this difficulty, that would suggest that it arose from problems associated only with this strategic transition. However, in Akonolinga the EPI did not begin until 1985 – well after the new strategy was adopted. That both areas experienced the same difficulties shows that the origin of this problem lay more in the traditional divide between curative and preventive medicine than in the difficulties of strategic transition.

Reports from the department of Noun prove most interesting here. Unlike the Bafoussam and Akonolinga EPI's, the local department of preventive medicine was not the main actor in Noun's EPI. Instead, health workers from Njisse Hospital filled this role. A private religious hospital, Njisse provided both curative and preventive services. However, preventive services still appear to have been administered separately from the hospitals curative activities. The hospital ran two fixed health centers providing vaccination services but also had mobile vaccination teams that traveled to a further 32 centers. As in NEB, most services were provided

[58] 1983. "Evaluation de la Couverture Vaccinale dans la Ville de Bafoussam (Cameroun), Decembre 1983." In I8 370 2CAE(1).
[59] Ibid.
[60] See 1985. "Rapport de l'Evaluation de la Couverture Vaccinale dans la Ville d'Akonolinga en Novembre 1985." In I8 370 2CAE(2).
[61] Ibid.

by mobile team due to the lack of a cold chain (or even permanent health centers) in most areas. As in Akonolinga and Bafoussam, the report remarked on the need for "personnel from medical centers" to "understand that vaccination is the business of all, not just of those working at the PMI[62] or the SDMPR."[63]

As an area combining both fixed and mobile vaccination services, Noun was also in a unique position to address the empirical critique by studying a question unanswered in previous studies: which worked better in Cameroon, the mobile or the fixed approach? And Njisse Hospital did not hesitate to join the fray. The unusually inquisitive administration there carried out several studies of their EPI. In their coverage evaluation, they went far beyond the standard reports to give breakdowns by area and service-providing organization (i.e., state or private). In addition, they carried out an epidemiological study of measles in the department and a cost-effectiveness study of the EPI program comparing costs of fixed versus mobile services.[64]

Both the coverage evaluation and the cost-effectiveness study showed that mobile teams were more efficient than fixed centers. The coverage evaluation examined vaccination coverage both for the entire department and for villages served by different mixes of services: state or EEC (Evangelical Church of Cameroon, which operated Njisse Hospital), and fixed center or mobile team.

[Table 6.1 about here]

Table 6.1 shows that areas served by mobile team generally had higher vaccination coverage than areas with only fixed centers. It also indicates some problems mobilizing in areas where the state and the EEC had to cooperate, as coverage rates were considerably lower there than in areas served by the EEC alone.

The cost-effectiveness study spoke more directly to the debate about fixed and mobile services. It found virtually no difference in cost per vaccination between the two approaches (CFA270 versus CFA275). Furthermore, when calculating cost per fully vaccinated child, it found that the mobile team was much more cost effective, costing CFA5,957 compared to CFA12,354 for the fixed centers.[65] The difference between the two (and between the costs in Noun in 1983/84 and that found in Yaoundé in 1984) arose mainly due to different immunization series completion rates. Simply put, children living near fixed health centers were less likely to complete the vaccination series. To be fully vaccinated, each child had to receive eight vaccinations at appropriate intervals: three doses each of DPT and polio vaccines, one BCG vaccination and one measles vaccination. If every child who began the series finished it, the cost per fully vaccinated child would have been CFA2160 at fixed centers and CFA2200 at mobile centers. However, as can be seen in the above coverage evaluation data, every child did not complete the series. Furthermore, how likely a given child was to finish the series varied, with children served by mobile vaccination teams being significantly more likely to do so than children served by fixed centers. Hence the greater cost of vaccination at fixed centers.

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[62] *Protections Maternelles et Infantines* or Maternal and Child Health Services.

[63] In 1984. "Evaluation de la Couverture Vaccinale dans le Départment du Noun en Juillet 1984." In I8 370 2CAE(2).

[64] They may also have done a study of "missed vaccination opportunities" in their health centers – the type and pagination resembles reports from the department, but sadly the report includes no details to indicate who wrote it or where the study was carried out.

[65] Untitled report I8/370/2 CAE/R 84. In I8 370 2CAE(2).

However, despite findings that clearly showed that the mobile team approach was more efficient than vaccination from fixed center, this study from Noun did not put forth the theoretical critique voiced at OCEAC. Instead, it continued to praise the integrated approach as "ideal," or at least as theoretically more cost-effective. The report notes:

> In general mobile teams are more expensive than fixed centers. Despite this general rule, we note... that for an EPI and in particular ours this isn't always the case. One reason is the under-employment of personnel in our fixed centers. On the other hand, there could be a relation with the weaker DPT3/DPT1 ratio and lower vaccination coverage around our fixed centers compared to our mobile centers. If we were to augment vaccination coverage to 80% around our centers by increasing the number of vaccinations per session, we estimate that the marginal cost for a completely vaccinated child in the fix centers would be CFA2900. On the contrary, for the mobile teams we estimate CFA3700. Therefore, it we could increase vaccination coverage, our fixed centers would be less expensive than the work of mobile teams.
>
> The mobile team doesn't only play a vaccination role but equally supervises our dispensaries and SSP centers, trains personnel in these centers, evacuates the ill, etc. Also, the arrival of a mobile team in an isolated village is a non-negligible factor in mobilizing the population. It would be foolhardy to suppress our mobile team in the long run only on financial criteria. Also, state's policy for the progressive suppression of the EPI mobile teams should be preceded by a cost-effectiveness study that also looks at the role these teams play in training, etc.[66]

These comments began by accepting the general rule that fixed centers were more efficient than mobile teams. In defense of this rule, it even considered when and how it might become the case in Cameroon, even though fixed centers were actually much less cost-effective at that time. However, while not arguing that the mobile-team approach advocated by OCEAC was preferable to the new, integrated method, this study did put forth an argument in favor of continued use of mobile teams, highlighting their role in training, supervision and community mobilization.

This latter point, the importance of community mobilization, is especially significant. Community participation was one of two key features of a PHC approach to immunization, according to the five-point plan developed by the GAG in 1981. However, advice from the GAG and the WHO from the early-1980s generally ignored this aspect of the PHC approach, instead focusing on integration. Here, local health personnel focused attention on this neglected aspect of the PHC philosophy to argue in favor of mobile vaccination teams, an approach previously seen as contradictory to the PHC approach.

In sum, these local evaluations and studies echoed social justice/humanitarian critiques by noting the need for teams in areas without cold chains. They also frequently noted the reluctance of medical personnel to take on new vaccination duties, showing that this indeed was a major impediment to the new strategy in Cameroon. Last, the Noun study both provided justification for the empirical critique (that the integrated PHC approach did not work well in Cameroon) and began developing a new theoretical critique in favor of mobile teams, this time emphasizing their advantages for training, supervision and, most importantly, community

[66] Ibid.

mobilization, as justification for a continuing role for mobile teams in Cameroon's vaccine delivery strategy.

Exploring Alternatives: New Innovations in the Cameroon EPI, 1985-1990

As seen above, the EPI in Cameroon was a troubled program in the mid-1980s. Despite extensive expansion and training, levels of vaccination coverage remained low, especially considering the global goal of universal childhood immunization by 1990. By 1986, the EPI extended to 70% of the country, with 70% of vaccinations carried out at fixed centers and only 30% by mobile team. Use of fixed centers continued to pose a problem for the program, with the 1986-1990 Action Plan listing "a lack of motivation among personnel at fixed centers" and "insufficient awareness raising and health education activities... among medical curative personnel" as two major problems faced by the program.[67]

In the face of these continued problems, the national EPI program began experimenting with alternative strategies in late 1984 and early 1985, carrying out three "special immunization days"[68] between October 1984 and January 1985 in four areas: Yaoundé, Ngaoundere, Sangmelima and Bafia. The initial evaluation showed that almost as many vaccinations were administered over the three special vaccination days as during the entire rest of the year using the normal strategy, leading authorities to recommend that the new strategy be adopted nationally.[69] An evaluation of the efficacy of the special days in Yaoundé showed that they increased coverage by 50%, although coverage levels still remained low in the city (under 35% of one-year olds were found to be fully immunized).[70]

A 1986 review examining "Prospects for Universal Immunization by 1990 in Cameroon," although noting the achievements of the Special Days and the extraordinary level of activity within the program more generally, concluded:

> From this, it is quite recommendable that we should critically review the entire EPI action in Cameroon and radically improve on all aspects of the entire system if Cameroon is to achieve the UN target goal of Universal Immunization by 1990 (that is four years from today 1986).[71]

However, unlike the 1981 review, which similarly called for radical innovation in the EPI, this review had few specific suggestions for how services ought to be reorganized. It stressed the importance of adding the new, special immunization day strategy to the program's repertoire, but also recognized that this addition alone might not be sufficient to bring coverage to the desired level.

A new strategic plan covering the 1986-1990 period called for special immunization days covering the entire national territory in 1986 as part of particularly concentrated efforts that year as part of the "African Immunization Year."[72] However, the strategic emphasis continued to be on the importance of the integrated, PHC approach. While calling for national immunization days in 1986, the first two goals for that year were "the reinforcement of fixed vaccination

[67] See "Plan d'Action, 1986-1990." In I8 370 2CAE(2).
[68] In other words, NIDs.
[69] Lantum, Dan. 1986. "Prospects for Universal Immunization by 1990 in Cameroon. (A Report from UNICEF Office, Yaoundé). In I8 370 2CAE(2).
[70] Ibid.
[71] Ibid.
[72] "Plan d'Action, 1986-1990." In I8 370 2CAE(2).

centers, and the creation of new centers" and "integration of the EPI into primary health care." This emphasis on the integrated PHC approach continued in the official plan for 1987 through 1990. Although no mention of further special days was made for these years, the plan did call for "a particular effort... to integrate the EPI as much as possible into other primary health care activities."[73] However, it is clear from the archival record that Cameroon continued using a mixed approach, using special days in addition to vaccination from fixed centers: a UNICEF document from 1986 refers to the need for funding for special days for the years 1987 to 1990[74] and a document from Rotary International concerning Cameroon's participation in their PolioPlus program refers to Rotarians involvement in vaccination activities as part of those special days as well.[75]

Innovation went beyond the by-then formally recognized strategies of National Immunization Days, as made clear by a quick note written to Director of the EPI, Ralph Henderson, by a WHO staffer in Cameroon on other business. He recounted an experiment he observed in Ngaoundere,[76] capital city of Adamaoua Province:

> ... I spent several days up north in the Ngaoundoure area where I met a dynamic French medecin militaire, Dr. XXX, who has years of African field experience (Gabon, Congo) and who is now working within the MOH structure with responsibilities in the Adamoua province and Vina department. He has been experimenting with a new strategy which he calls the 'Equipe mobile urbain'... i.e. a strategy based on outreach of SMI[77] (including vaccination) teams which go out in vehicles as French style mobile teams like to do... but with the sorties being made to various quartiers in the city (!) of Ngaoundoure. He got the idea after having found in 1987, in his department, vaccine coverage was higher in the rural areas than in the urban center itself. This struck him and other local authorities as a paradox and as an anomaly... hence this new system to try to reach out to the urban populations which do not avail themselves of services which may be quite close in terms of distance but are in another quartier. His project has attracted the interest of the 'Secretaire d'Etat a la Sante', Mme. XXX (number two in the MOH), who has allocated supplementary funds for the experiment. There is already talk about extending the concept to other large urban areas in Cameroun if this proves to be a successful 'urban PHC strategy'.[78]

The "new strategy" described above resembles the original strategy employed by the Yaoundé EPI to an extraordinary degree. Like that program, it is a city-based mobile vaccination team. However, unlike that program, this "innovation" was seen as a supplement to immunization from fixed centers, meant to increase coverage in under-served urban areas rather than serve as the primary source for immunization services in the city. In addition, these teams apparently included a variety of maternal and child health services, not simply vaccinations. Unfortunately, available records do not show the fate of this program. However, the late 1980s

[73] Ibid.
[74] 1986. "Republique du Cameroun: Projet a 'noter' pour un financement supplementaire." In I8 370 2CAE(2).
[75] 1987. "PolioPlus Grant Request for Cameroon." In I8 370 2CAE(2).
[76] The city's name was written "Ngadaoudoure" in the note, but it appears to refer to Ngadaoundéré.
[77] Santé maternelle et infantine (Mother and child health).
[78] "Memo: Re: EPI in Cameroun." Dated 14 April, 1988. In I8 370 2CAE(2).

did see a general increase in vaccination coverage in Cameroon, which continued, if slowly, throughout the 1990s, although levels still remained below expectations and generally low into the 21st century.

The EPI in Malawi

In stark contrast to Cameroon, Malawi's EPI was successful from the start, quickly increasing vaccination coverage in the country, despite occasional setbacks. Coverage in Malawi was generally higher than predicted by my regression analyses. This section analyzes interactions between international advisers and the Malawi EPI. Here, too, I find a stark contrast with Cameroon. Where interactions between international advisers and national program managers in Cameroon were marked by sudden changes in the kinds of advice and recommendations given and by national personnel's reactions to those changes, advice in Malawi was much more uniform. The following shows this relative consistency and examines the reasons for it. For reference, Figure 6.4 provides a map of Malawi with airports, railroads, main roads and major cities and towns.

[Figure 6.4 about here]

As in Cameroon, Malawi began providing immunizations (beyond smallpox) before officially beginning an EPI. However, unlike Cameroon, Malawi's government was heavily involved in this effort from the beginning. Malawi's own experiment with general immunization services began in earnest in 1973, with the introduction of "the Miniplan" – a seven-year development plan for maternal and child health. The Miniplan called for the extension of under-five clinics, which already covered 20% of the population in 1972, and for an increased emphasis on preventive health – especially "to increase the coverage of protection amongst children, especially against diseases for which effective antigens are available."[79]

By 1977, 50% of the country had access to under-five clinics providing vaccination with BCG, DPT, smallpox and polio vaccines.[80] The 1978 EPI plan called for the general strengthening of this program by continuing to expand the under-five clinic system and adding measles vaccine to the list of antigens provided at the clinics. The clinics included immunization among a variety of other child-health services, as described in the 1980 program evaluation:

> Each health unit (district hospital, primary health centre or health centre) is expected to conduct under-five and ante-natal clinics on a weekly or monthly basis depending on the need. On the request of the community or MCH workers, the District Medical Officer and the Co-ordinator will decide to conduct a mobile

[79] See 1978. "Expanded Programme on Immunization: Malawi" in I8 370 2MAL(1)

[80] Ibid. and letter dated 10/11/1978 in I8 370 2MAL(1). The letter suggests that the four vaccines mentioned above were originally part of the Miniplan mandate, noting: "The under 5 clinics have *for years* given BCG, Smallpox, DPT and Polio vaccination to attenders." (emphasis added) Measles vaccination seems to not have been available until a pilot project began in some areas in 1974, and the EPI plan calls for the first mass-introduction of measles vaccination in the country. It is unclear to my why measles was not included with the other vaccines in the original Miniplan, as it is clear that measles was a huge health problem in Malawi as in most other parts of Africa. Vaccine cost may have been a factor. A letter commenting on the plan dated 8/17/1978 notes the high cost of measles vaccine.

> under-five and/or ante-natal clinic. These mobile clinics will go to a health post or villages not easily covered by a static unit.[81]

In addition, as measles vaccination was not generally available in the program before 1977, it also called for a two-year-long mass-measles vaccination campaign with mobile teams (akin to the smallpox eradication campaign). After a polio prevalence survey showed high levels of polio,[82] the EPI started a similar mass polio immunization campaign.

Routine immunization through under-five clinics continued to be the main way Malawi promoted vaccination coverage throughout the period under review here. Relying on this system, Malawi achieved relatively high levels of vaccination coverage. Assessments from 1980-1988[83] found the following:

[Table 6.2 about here]

These reports show the comparatively high level of vaccination coverage in Malawi throughout this time period (Malawi's performance as a whole compares favorably to figures found in the highest-performing areas in Cameroon, for example). The general strength of the program is especially apparent when we consider that Malawi did not vaccinate against measles before 1977.

In their periodicity and the use of mobile, outreach services, these clinics resemble the vaccination sessions carried out by mobile teams in Cameroon. Mobile services made up a large and fairly constant percentage of immunization services available in Malawi, as shown in Table 6.3, below, which extracts data on the number of fixed versus outreach (mobile) under-five clinics from EPI Plans and evaluation reports from 1977 to 1985.

[Table 6.3 about here][84]

Despite this reliance on mobile services, Malawi's program differed markedly from Cameroon's in one important respect: immunization was not the only activity of the under-five clinics. Instead, they are "carried out together with weight and growth monitoring, health/nutrition education, and early treatment at clinics."[85] Unlike Cameroon, Malawi did not rely on specialized vaccination teams to provide immunization services, nor did it separate preventive from curative services.

As I discuss in more detail below, Malawi's reliance on mobile services did not provoke the same reactions from WHO personnel as did the vaccination teams found in Cameroon.

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[81] 1980. "Report on an Evaluation of the Expanded Programme on Immunization in Malawi." In I8 370 2MAL(1).
[82] 1978. "A Survey to Determine the Prevalence of Poliomyelitis in Malawi." In I8 370 2MAL(2).
[83] 1980. "Report on an Evaluation of the Expanded Programme on Immunization in Malawi;" 1982. "Table 1: Results of Coverage Survey"; 1984. "Report of the Joint Programme Review: Maternal and Child Health, Expanded Programme on Immunization and Other Elements of Primary Health Care"; 1985 "Country Summary: Malawi" in I8 370 2MAL(1); 1988. "National Evaluation of the Expanded Programme on Immunization: Report." Dated August 1988. In I8 370 2MAL(3).
[84] See 1977. "Expanded Programme on Immunization for Malawi;" 1980. "Report on an Evaluation of the Expanded Programme on Immunization in Malawi;" 1982. "A Joint Evaluation on the Expanded Programme on Immunization: Malawi, September 20 – October 8, 1982;" 1985. "Malawi Epidemiological Quarterly: Expanded Programme on Immunization No 1:1." Dated January 1985. In I8 370 2MAL(1).
[85] Ibid. It is unclear why the number of fixed centers declined.

However, the reliance on mobile services did pose occasional problems. A crisis in 1985, when the percentage of one-year olds fully vaccinated by the program fell from 55% to 35% in a single year,[86] mainly due to drops in coverage with measles vaccine and with the full course (three doses each) of DPT and polio vaccines, reveals this most clearly.

Early EPI evaluations and reports from Malawi showed a generally strong program with persistent shortcomings in three major areas: cold chain maintenance, surveillance and vaccine delivery. These persistent problems seemed to lessen somewhat, at central levels, as the program progressed, but in 1982 hints at a new problem emerge: "transport and fuel shortages." After remarking on the generally strong services, the report noted:

> Due to serious transport and fuel shortages, there is no doubt that in some areas, immunization services have actually declined, eg in Nkhata Bay, lack of a boat has resulted in cancelled clinics and in several areas, the frequency of mobile clinics has been reduced from 2 a month to one a month. Mobile clinics have been cancelled without warning leading to a loss of faith in the service by the public.
>
> For similar reasons, the level of supervision, previously one of the strongest points in the Malawi programme and outstanding compared with most countries in the world, has also declined seriously.[87]

As the above quote makes clear, Malawi's immunization services were especially sensitive to transportation problems. This sensitivity arose not only from the general needs of supervision and supply delivery, but also from the extent of outreach operations, which required working transportation. In 1982, transportation and fuel posed only a small problem to the EPI (although one that led to a new emphasis on use of bicycles for such programs), but this episode highlights how sensitive Malawi's immunization program was to transportation interruptions.

This sensitivity was revealed even more starkly in 1985, the year of a startling 20% drop in full vaccination coverage. In referring to this drop, notes from a 1985 EPI manager's meeting remarked:

> The transport situation has deteriorated because of high maintenance costs and lack of replacement. This has resulted in a drop of the outreach coverage and therefore affected the total coverage as evidenced by the August 1985 Regional Coverage results.[88]

A CCCD program report that same year provides more detail:

> EPI coverage surveys have shown a decrease in fully vaccinated children from 55% in 1984 to 35% in 1985. Two major reasons for this decrease are:
> - severe shortage of petroleum products during 6 month period in 1984 which required stopping all vehicle dependant outreach activities and transferring all

[86] As the population of one-year olds completely changes each year, such a drop is possible if something significantly disrupts general services.

[87] In 1982. "A Joint Evaluation on the Expanded Programme on Immunization, Malawi." Dated 9/20-10/8/1982. In I8 370 2MAL(1).

[88] From 1985. "Expanded Programme on Immunization – Malawi: Brief Review of EPI Manager's Meeting." dated 12/1985. In I8 370 2MAL(1).

peripheral vaccine stocks to district headquarters which received priority paraffin for refrigerators/freezers.
- vaccination of approximately 18% of children with measles vaccine before the age of 9 months.[89]

It is unclear what caused this "severe shortage of petroleum products," but it is easy to see why such a shortage and its effects would be devastating for vaccination coverage, especially in Malawi.

In 1985, around 35% of children received immunizations from outreach services[90] (although not all of those services would have been stopped due to the crisis, as some used bicycles for transport). Further, a large number of health centers relied on paraffin, kerosene[91] or gas refrigerators, which were also affected by the shortage. Five out of seven district hospitals visited during the 1984 evaluation relied on kerosene, as did seven of eight primary health centers and 19 out of 23 health sub-centers with refrigerators.[92] A shortage that simultaneously cut back on the availability of outreach services and on the availability of immunization services at health centers relying on gas or kerosene refrigerators could easily account for a drop in immunization coverage as severe as that observed in 1985.

As I discuss further below, following the 1985 crisis, international authorities become somewhat less enthusiastic about mobile outreach services. However, ultimately neither the Malawi program nor international recommendations turned away from this option. Ensuring access to immunization and other child health services simply required such mobile strategies in Malawi (at least, in the short term), with its large rural population. Instead, solutions to the transportation problems faced by Malawi's EPI relied on changing ideas about what parts of national health campaigns ought to received support from international donors. With changing international consensuses, and particularly with new openness to allowing donations to be used for fuel and other transportation needs, Malawi was able to reopen clinics and re-establish mobile services. By 1988, vaccination coverage had rebounded to 1985 levels.

WHO Evaluations of the Malawi EPI

Although they frequently noted many challenges faced by Malawi's EPI, including cold chain development, transportation problems (as discussed above) and general management concerns, WHO personnel reviewing Malawi's program never called for radical reforms, as

[89] From 1985. "Country Summary." In I8 370 2MAL(1). The measles vaccination problem, while accounting for less-than-perfect coverage, is not responsible for the *drop* in coverage. Misadministration of measles vaccine was a frequent problem for many immunization programs, including Malawi and Cameroon's. Studies in the 1970s found that measles vaccine was not generally effective if administered before nine months of age due to interference from maternal antibodies, leading the WHO recommend that measles vaccine not be administered before nine months of age. However, the change in policy experienced frequent problems on the national level, with vaccinators often administering the vaccine too early. The 18% misadministration rate found in 1985 was actually an improvement when compared to early misadministration rates. The 1982 program evaluation found that 44.6% of children received the vaccine before nine-months, due in large part to the policy, held by the mass measles campaign, of vaccinating all children over six-months of age. The 1984 program evaluation found that rate was 19% of vaccinated children received measles vaccine too early. Thus, clearly this explanation does not account for the *drop* in coverage.

[90] See 1985. "Evaluation of National Immunization Coverage, Malawi – August 1985." In I8 370 2MAL(1).

[91] Kerosene and paraffin refrigerators appear to be the same thing – some reports say kerosene, others paraffin.

[92] See 1984. "Report of the Joint Programme Review: Maternal and Child Health, Expanded Programme on Immunization and Other Elements of Primary Health Care." Dated August 1984. In I8 370 2MAL(1).

happened in Cameroon. Instead, their comments and advice tended to focus on more mundane technical problems, like cold chain maintenance, rationalizing vaccine delivery, and improving supervision and training of health workers in under-five clinics. In this section, I look at WHO advice on vaccine delivery strategies through an examination of five major program evaluations, carried out in 1980, 1982, 1984, 1985 and 1988, and through an examination of correspondence regarding two major government EPI plans, the first written in 1977 and the second in 1985 (covering the period 1985-1989).

The 1978 EPI Plan developed a two-fold strategy. The primary strategy continued to be under-five clinics, with the plan calling for the continued extension of under-five clinics and the addition of measles vaccine to the list of vaccines offered by the clinics (which already administered the other three vaccines endorsed by the EPI). In addition, the plan called for an intensive, two-year long mass measles vaccination campaign to raise baseline levels of measles vaccine coverage nation-wide. The year before, Malawi had experienced a major measles epidemic, and the plan justified this special program by citing the need to forestall a repeat of this epidemic by generally raising baseline measles vaccine coverage.[93]

EPI personnel at headquarters reviewing the plan initially misunderstood key elements of the measles campaign. In particular, they mistakenly thought that the mobile measles campaign was meant to serve only areas of the country not yet served by under-five clinics and that the campaign would be repeated on a two-year cycle. Based on this mistake, they expressed profound skepticism about the plan, objecting to two aspects of it, as they understood them: the limited number of antigens included and the periodicity of the campaigns. With regard to the first point, a letter from the EPI programme office in Geneva noted:

> As you know, once the investment has been made in establishing mobile teams for the delivery of a vaccine such as measles (which demands that rigorous attention be paid to the cold chain), delivery of other antigens can be done by those teams for very little additional cost. ...It seems a pity not to have the expense and hard work of the programme to assemble mothers and children for vaccination not be repaid by delivering several, rather than simple [sic] one antigen."[94]

It continues to suggest that BCG vaccine, at least, be included in the campaign. With regard to the second point, the letter continued:

> We are certain that the Government of Malawi is aware that vaccination cycles of longer than 6-12 months will not be expected to have an appreciable impact on measles incidence, and wonder whether, if cycles longer than this are planned, there might be risk of loss of public confidence, since the communities are not likely to notice much of a change in their experience with measles in the interval between team visits. Although the demands of communities may not make it possible to concentrate the activities of the teams in higher population density areas which they could reach every six months, one cannot be optimistic concerning the health benefits which will result from the investment of these

[93] See 1978. "Expanded Programme on Immunization: Malawi." In I8 370 2MAL(1).
[94] Letter dated August 17, 1978. In I8 370 2MAL(1).

> human and material resources in the mobile team strategy proposed, at least as we understand it.[95]

Objections from headquarters dwelt less on the choice of approach (mobile) than on the technical shortcomings of the plan, as (mistakenly) understood. Why include only measles vaccine when other antigens could be included at little extra cost? And why invest so much in mobile campaigns when the periodicity will not break transmission of measles virus?[96] The continued references to the cost of mobile services and the "investment" required to carry them out subtly discourage the use of this approach, but it was certainly not a firm stand against it, like that found in the 1980 evaluation of Cameroon's program.

A national-level health officer quickly clarified the plan,[97] which received no further objections from the EPI program office in Geneva, and Malawi proceeded with the mass measles campaign. They also added a second, intensive single-purpose mass vaccination campaign targeting polio in 1980,[98] based on recommendations from a 1978 survey of polio prevalence jointly conducted by a representative from Save the Children, UK and Malawi's Director of Maternal and Child Health.[99] The 1980 program review had little to say about these ongoing campaigns, aside from calling on them to "use all possible opportunities to promote the activities of under-five clinics (UFCs) and involve staff more in mobile programmes."[100] Otherwise the review called on the ministry of health to "make special efforts to promote development and expansion of mobile clinics from static health units (outreach strategy) in order to improve coverage of MCH services and EPI."[101] With mass campaigns continuing, these recommendations highlighted the need to maintain a focus on long-term efforts through routine services in under-five clinics, whether fixed or mobile.

In 1982, evaluators were generally satisfied with the progress of the national EPI, noting that mobile or static clinics covered most areas of the country. However, they did make two recommendations regarding vaccination delivery strategy. The first targeted those few areas of the country still not served by the under-five clinics. The report recommended the development of new "appropriate strategies" for these areas, suggesting, "These services might take the form of a three monthly visit by a well-equipped mobile team."[102] The second recommendation dealt with a practice found in areas already served by routine-health services. Evaluators took exception to a new government policy, apparently begun after the end of the two-year intensive mass measles vaccination campaign. The new policy involved "mini-campaigns" in areas surrounding reported measles cases, apparently with the hopes of containing outbreaks. The report notes:

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[95] Ibid.

[96] As demonstrated by Cameroon's failed attempts to control measles through biennial vaccination campaigns in the 1960s and early 1970s, as discussed above.

[97] See letter dated 11 October 1978. In I8 370 2MAL(1).

[98] See 1980. "Report on the Evaluation of the Expanded Programme on Immunization in Malawi." Dated 30 October 1980. In I8 370 2MAL(1).

[99] "A Survey to Determine the Prevalence of Poliomyelitis in Malawi." Conducted for the Ministry of Health, Republic of Malawi by Dr. Nicholas Ward, Save the Children Fund, London and Dr. G.W.Lungu, Director of Maternity and Child Health, Ministry of Health, Malawi. In I8 370 2MAL(1)

[100] 1980. "Report on the Evaluation of the Expanded Programme on Immunization in Malawi." Dated 30 October 1980. In I8 370 2MAL(1).

[101] Ibid.

[102] "A Joint Evaluation of the Expanded Programme on Immunization, Malawi: September 20-October 8 1982." In I8 370 2MAL(1).

> The present policy of conducting measles vaccine 'mini campaigns' needs to be re-examined. If it is to be epidemiologically acceptable, vaccine needs to be given on a very wide basis, eg in all villages surrounding an infected village, to all children 6 months and over, thereby leading to a need for second doses.
>
> It is possible that this policy could lead to the public expecting and waiting for vaccinators to visit their village rather than attending a clinic.
>
> It is preferable that the energies expended in mini-campaigns be directed instead to improving coverage, routinely, of 9-month old children. In view of some element of disillusion, among clinicians and the public, with the measles mobile mass campaign, it would be justified to mount a major propaganda campaign, through the media, the political and traditional authorities aimed at achieving this high coverage through under-5 clinics.[103]

These two recommendations both dealt with mobile services, if in very different ways. The first, recognizing the practical limits of government health services and seeking to extend services as widely as possible, urged a new use of mobile services to improve access. Unlike the "outreach clinics," already widely used in Malawi, the three monthly visits by mobile team seem primarily designed around the needs of immunization services in particular, rather than infant health services more generally.[104] The second argued against another form of specialized, mobile campaign on two grounds: its inefficacy arising from the limited extent of such campaigns and its possible pernicious effect on use of routine immunization services through under-five clinics.

The 1984 evaluation team jointly evaluated Malawi's EPI program and its broader maternal and child health and primary health care programs. The evaluation team highlighted the comparatively high level of services in Malawi, introducing their recommendations with the following remark:

> In comparison with many other developing countries, the coverage of Maternal and Child Health services is high, and the standard of work is good. Often there is a degree of fidelity to ideals and standards which is truly an inspiration.

Nevertheless, the team saw room for improvement. In comparing vaccination coverage in 1984 to previous evaluations, they noted:

> One is struck with the remarkable similarity between the 1982 and 1984 figures [of vaccine coverage]. ...Both 1982 and 1984 show a marked advance over any of the 1980 surveys in fully immunized children. The coverage has, it seems, reached a plateau and some new approaches will probably be needed before the target of 80 per cent fully vaccinated is reached.

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[103] Ibid.

[104] This periodicity, in which a mobile vaccination team would visit remote areas once every three months, is designed around the needs of an EPI vaccination schedule. Both DPT and polio vaccines needed to be administered three times, with at least a one-month interval between doses, to fully protect infants, and measles vaccine was only 50% effective before nine-months of age due to interference from maternal antibodies. A three-month cycle perfectly deals with these two constraints by providing at least three vaccination sessions spaced at least a month a part over the first year of life with at least one happening after nine-months of age.

Unlike the previous evaluations, the team did not see development of mobile services, whether outreach clinics or mobile campaigns, as the kind of "new approach" needed. The only recommendation concerning mobile services urged that areas receiving them be chosen more carefully, calling for the use of "[c]ensus data and maps showing population density and distribution of health facilities and communications" to help "identify large underserved groups and determine location of outreach clinics and future facilities."[105] Instead, recommendations focused on two key ways of increasing coverage: increasing community participation and making immunization services more continuously available. The review team's first recommendation dealt with the former, declaring:

> [G]reater active participation of the community itself was essential for extending coverage of Maternal and Child Health and related services. The Joint Programme Review team strongly endorses the current approach to Primary Health Care. In this, the role of the village health or similar committees needs strengthening.[106]

With regard to the latter, the team had two recommendations: first, that "every opportunity be taken to immunize children who visit a health facility for whatever reason" and second:

> The integration of MCH/EPI and nutrition (and in future child spacing) should be carried further into practice, beginning with a daily integrated out-patient/Antenatal Care/Under-five Clinic/immunization nutrition service at district hospitals, extending later to Primary Health Centres and, after trial and evaluation, to the health sub-centres.[107]

The 1985 evaluation was less formal than the previous three, looking only at vaccination coverage and reasons for non-participation (i.e., reasons why a child was not vaccinated or had not received all the recommended vaccinations). This evaluation also brought attention to the large drop in vaccination coverage since the previous year (% of fully immunized children fell from 55% to 35%), although the evaluation made no mention of the major fuel crisis responsible for a large part of this drop.

Despite the major changes in coverage from the previous year, the 1985 report's recommendations changed little from those given in 1984. It echoed 1984's call for greater community participation, for more frequent immunization sessions and for immunizing children attending health clinics for other reasons. In addition, evaluators mentioned two new tactics: (1) developing ways of identifying defaulters[108] and encouraging them to complete vaccination series and (2) accelerated strategies. With regard to the latter, it noted:

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[105] 1984. "Report of the Joint Programme Review: Maternal and Child Health, Expanded Programme on Immunization and Other Elements of Primary Health Care." In I8 370 2MAL(2).

[106] Ibid. An entire section of the report deals with the village health committees, which were begun in the 1970s as a means of dealing with a cholera epidemic. In general, the team found the current "village health committee" structure to be weak and disorganized, with most such committees, where they existed at all, in abeyance.

[107] Ibid.

[108] Defaulters are children (or more properly, their guardians) who fail to return for 2nd or 3rd rounds of DPT and polio vaccine, or who do not return at/after nine months for measles vaccination.

> Accelerated strategies at district, region or even national levels should be carefully studied. This may be helpful to boost immunization activities and catch on the back long so far accumulated.[109]

This call for "accelerated strategies," presumably referring to new mobile vaccination campaigns, like NIDs, is notably tentative, recommending only that they should be considered and "carefully studied."

In light of the major transportation and fuel constraints behind the remarkable drop in vaccine coverage in 1985, it is remarkable that the 1985 evaluation made no mention of strategy changes to deal with such crises. Indeed, the report even called for new strategies that, if gaining popularity on the global level, were not necessarily well-suited to the resource constraints faced on the ground in Malawi. However, other WHO personnel proved less sanguine. A letter from the Programme Director for Disease Prevention and Control in the African Regional Office of the WHO expressed more doubts about continued reliance on extensive mobile outreach strategies found in the 1985-1989 EPI Plan:

> Concerning the delivery strategies that have been adopted we have observed that immunization activities at Health Centres are expected to consist of 40% (fixed centre services) and 60% (outreach services).
>
> We have no doubt that demographic as well as other important factors have been taken into consideration in arriving at the strategies and targets.
>
> However considering transportation and other logistics problems it might be worth reviewing the strategy to shift the emphasis from outreach services to fixed centre services.[110]

In any case, there is little indication that Malawi adopted new accelerated strategies immediately after the 1985 program evaluation. No such approach is mentioned in the report from the EPI Manager's Meeting from December 1985[111] or in the 1986 country report,[112] both of which instead emphasized efforts regarding other recommendations, including eliciting greater community participation to follow-up with defaulters and making immunization services available more frequently and to people visiting health centers for other reasons.

The 1988 evaluation[113] reveals both the progress and the ongoing problems faced by Malawi in reaction to many of these at times contradictory recommendations. At that time, official immunization strategies included offering immunization services daily in all fixed centers and vaccinating children who had not completed their immunization series and came into health clinics for other reasons. In addition, the government carried out "periodic visits to inaccessible areas during dry season" and had begun some accelerated strategies, including instituting some "special immunization days/weeks." To increase community participation, they ran "an aggressive Social Mobilization campaign." Reports from the evaluation also suggest that

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[109] 1985. "Evaluation of National Immunization Coverage, Malawi – August 1985." In I8 370 2MAL(1).
[110] Letter dated November 5 1986 in I8 370 2MAL(2).
[111] 1985. "Expanded Programme on Immunization – Malawi: Brief Review for EPI Manager's Meeting, Mbanbane, Swaziland 2-5 December 1985." In I8 370 2MAL(1).
[112] 1986. "E.P.I. Malawi Country Report." In I8 370 2MAL(2).
[113] 1988. "MEPI (Malawi Expanded Programme on Immunization): National Evaluation of the Expanded Programme on Immunization Report." Published jointly by the Ministry of Health, UNICEF, WHO and Rotary International. August 1988. In I8 370 2MAL(3).

Malawi may have shifted emphasis from mobile outreach services to more fixed services. The evaluation reveals that only 23% of children received vaccinations from outreach clinics, compared to 57% receiving them from health centers. Although these figures are not directly comparable to figures from Table 3, which report on the number of immunization clinics held, rather than the percent of children served,[114] it is notable that over two times as many children were receiving vaccination from fixed health centers as from outreach clinics in 1988, whereas in 1985 almost two-thirds of immunization clinics were mobile outreach clinics.

The 1988 evaluation continued to find room for improvement, but immunization strategy recommendations changed little from those found in previous years.[115] The evaluation echoed earlier evaluations' focus on making immunization services continuously available, noting that many health units – 16 out of 27 visited as part of the review – failed to provide immunization services daily and calling for investigations into the reasons for these failures. Additionally, it highlighted the need for a better system for identifying "defaulters" (children who failed to complete the necessary immunization series) as a corollary to other social mobilization activities. Finally, it found little to recommend attempts at "accelerated strategies," noting "the achievements made during such operations [special immunization days/weeks] is assumed to be minimum."[116]

Conclusion

The national EPIs in Cameroon and Malawi involved a double process of translation. First, national authorities in both countries had to translate global policy recommendations into concrete plans for expanded immunization programs on the ground. In doing so, they received help from WHO personnel, who served as technical advisers or otherwise aided national authorities. In this role, WHO personnel engaged in a second process of translation: interpreting

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[114] Outreach clinics likely reach fewer children than fixed health centers, as they are meant to make services available to scattered, rural populations in areas not yet served by fixed health centers.

[115] If strategy recommendations do not see any major changes from earlier evaluation, the 1988 evaluation does introduce one new major area of concern for Malawi's EPI: gauging the impact of immunization on vaccine-preventable disease. The evaluation's discussion of surveillance provides a strikingly different picture of the Malawi program than its discussion of vaccination coverage and services more generally. It notes:

> "The need for monitoring trends and incidence patterns of the six EPI diseases was recognised in the Five Year Implementation Plan 1985-1989. It was to strengthen the existing surveillance through:
>
> - Training staff in early reporting
> - Prompt investigation of all cases at any level of occurrence
> - Rapid containment of any outbreaks
> - Establishing sentinel reporting and monitoring sites for more specific EPI information
> - Graphic presentations of the six EPI diseases at all levels.
>
> "The Evaluation Team has to state however that none of those right suggestions has been successfully implemented. The surveillance system in Malawi therefore, remains still weak."

Evaluators reviewed disease incidence data as available, finding few discernible trends in the data and little discernible relationship between disease incidence trends and vaccination coverage trends. Ultimately, they concluded:

> "[T]he present surveillance system is not sensitive enough to measure the changes in the incidence or mortality of EPI diseases and to monitor sufficiently the immunization coverage."

To correct this problem, they recommended that staff at various levels should receive surveillance train "as soon as possible." Unfortunately, I do not have access to documents published after 1990, making it impossible to know how national personnel reacted to these recommendations and this new focus on disease surveillance.

[116] The fact that the report does not even call for closer examination of the impact of special immunization days shows clearly how little valued this strategy was by the evaluation team.

national-level practices in light of changing global ideas about how immunization services could best be implemented in the developing world.

Despite encountering varied national situations, WHO personnel's advice reflected a global-level discourse that saw "developing countries" as a relatively undifferentiated group where a shared, universalistic set of policy recommendations would serve. WHO personnel actively encouraged the implementation of changing global-level policies in national-level EPI programs, leading to remarkable similarities in the recommendations given to both Malawi and Cameroon by WHO advisers. We see this especially in the early 1980s, when reviews increasingly emphasize the need for integrated services and for more continuously available immunization services at fixed health centers. We see it again in the mid-1980s, when both Cameroon and Malawi receive recommendations regarding "accelerated strategies."

These recommendations are somewhat responsive to the differing situations of immunization programs in Malawi and Cameroon. Calls for integration are much more forceful in Cameroon, where immunization by specialized mobile teams directly contrasted with the developing global consensus on the PHC approach. In contrast, discussion of integration tended more to reinforce already-existing practices, looking for ways to further integrated already-integrated programs in Malawi, with its already-integrated program. Conversely, when "complementary strategies" gained acceptance in the mid-1980s, they were embraced much more enthusiastically in Cameroon than Malawi. Cameroon, with vaccination coverage stagnant or falling, certainly was in need of new strategies, given the global goal of universal childhood immunization by 1990. Further, local health personnel's discontent with the previously dominant PHC approach made them early, enthusiastic advocates of these new strategies, which accorded much better with local institutional legacies.

However, sensitivity to particular national situations appears more in the emphasis given to existing global prescriptions than in the actual advice offered. In general, particular national situations receive little consideration, leading to startling omissions or ill-thought recommendations. This is especially apparent in the abrupt change in WHO personnel's view of the Cameroon EPI program, and particularly their mobile vaccination team strategy, from the 1978 to the 1981 reviews. The 1978 review, happening before global-level policy was firmly committed to the integrated PHC approach to immunization, saw the teams as an acceptable method and a promising base for EPI expansion. In contrast, the 1981 review, carried out when global-level policy held a firmer commitment to PHC approaches, saw the continued existence of the specialized teams as a failure, with the reviewer even misinterpreting earlier WHO recommendations in light of new global-level policies.

The growing disconnect between national level practices and global policies clearly exacerbated many of the problems faced by Cameroon's EPI program. WHO reviewers, interpreting Cameroon's program in light of changing global-level policies and with little appreciation of national particularities and institutional legacies, strongly criticized Cameroon's EPI program in the early 1980s, calling for major reforms in the way immunization was carried out in Cameroon. This call for reform, while in-keeping with the global-level emphasis on an integrated, PHC approach to immunization, ignored long-standing institutional legacies in Cameroon, and efforts to implement it incited widespread resistance from regional and national health personnel.

If this growing disconnect affected vaccination coverage, as I argue, we would expect Cameroon's coverage to increase more quickly and be closer to expectations before 1981, when the disconnect between its practices and the PHC approach endorsed by the EPI became clear.

After 1986 we would expect some amelioration, as international models became more accepting of approaches similar to those previously found in Cameroon. Unfortunately, my data for Cameroon begin in 1981, and predictions begin in 1982. The pattern revealed, as seen in Figure 5, differs slightly from these expectations.

Cameroon's coverage, although lower than expected, is indeed closer to expectations in 1982 than it is later in the decade. However, coverage in general does not begin to drop in 1981, nor does the difference between actual and expected coverage begin growing then. This change does not occur until after 1983, when coverage peaks before beginning to drop and when the lines begin diverging. Further, no immediate amelioration in coverage is seen in 1986. Instead, coverage begins increasing and the gap between actual and predicted vaccination coverage decreasing in 1988.

Two factors help explain these differences. First and most generally, we would expect some lag between policy changes and their effect on performance. As coverage evaluations survey coverage in current one-years olds to assess program performance the previous year, we would expect at least a one-year lag in effects. Given the lag began policy adoption and implementation, this lag could well be larger. Such considerations help explain the two-year gap between adopting the National Immunization Day approach and increasing coverage. Second, although important, the interaction between pre-existing institutional structures and international norms alone does not explain coverage. 1981 also saw a large influx of new funding for the Cameroon program, which began receiving UNICEF aid that year and started expanding availability of services nationally. Given the massive expansion effort and influx of new funds, it would be almost impossible for vaccination coverage not to increase in these years. However, the slowing and then drop in coverage after this initial push shows that money and expansion alone were not enough: resistance and lack of enthusiasm from national health personnel and international staff who supported the former, mobile team model clearly played a role.

Malawi experienced a very different situation. There was no separation of curative and preventive health services in Malawi, nor was there a strong legacy of *grandes endémies*-style specialized team. Instead, Malawi began its official EPI by simply adding it to an already-existing system of pediatric, under-five clinics, which were already immunizing against most EPI diseases. This fit between already-existing services in Malawi and the emerging vision of public health in the late-1970 and early 1980s meant that Malawi faced no calls for major program reform, as found in Cameroon.

The close fit between Malawian practices and evolving international norms also meant that Malawi did not experience the same pressure to fit its services to international ideals found in Cameroon. For instance, Malawi's EPI plan began with a call for a mass campaign to immunize against measles – an antigen not previously included in the immunization schedule. International personnel had no problem with this plan. In fact, when an SCF-led investigation into polio revealed a continued high incidence of that disease, they began a mass campaign against it as well. Furthermore, in Malawi we see international personnel urging *more* mobile services in an effort to expand coverage, rather than speaking of the "gradual suppression" of mobile teams, as in Cameroon.[117] Mobile teams in Malawi were integrated, providing immunization in addition to other child health services. As a result, they were seen as "outreach services" that were necessary to provide health care to areas with no existing fixed health centers or refrigeration, and thus fit the accepted EPI policy in a way that Cameroon's teams did not. In

[117] However, the push for more mobile outreach services ended after 1985, when the gas shortage revealed potential problems with this tactic and led to an emphasis on expanding fixed centers instead.

this case, the fit between the evolving EPI ideal and Malawi's pre-existing institution meant that technical advice from WHO advisers was generally better received by national health personnel. As a result, I expect a consistently positive effect here, and, indeed, Malawi's performance is generally above expectations.

CHAPTER 7

CONCLUSION

The incredible rise in vaccination use worldwide since 1974 has had a major impact on children's health. Yet, as seen in the previous chapters, the increase in childhood vaccination was neither automatic nor easy to achieve. On the global level, it required significant global coordination and major changes in global norms of solidarity. Challenges were, if anything, even greater on the ground, as global and local histories interacted in complicated ways. The preceding chapters explored different facets of the WHO's immunization programs from the EPI, begun in 1974, to the present. In their various ways, they all address my key questions: How has the WHO had the power to change national-level practices? And how has this exercise of power changed over the last several decades?

The question of whether and how IGOs exercise authority is a controversial one in the social sciences. Traditionally, international relations scholars view IGOs as institutions designed to solve collective action problems states face on the international level. Several sociological schools share this view, seeing IOs in general as tools for furthering large global trends, whether they be the rise and spread of rational global norms, as argued by world polity scholars (see Meyer et al. 1997), or the furtherance of global capitalism, as argued by world systems theory (see Wallerstein 1974).

However, other scholars argue that IGOs' potential to act with authority and to exert power over national behavior is much greater than these theories would lead one to believe. This theory is particularly well illustrated by the constructivist school in international relations theory (see Barnett and Duvall 2005; Barnett and Finnemore 2004). In their studies, Michael Barnett and Martha Finnemore draw on Weber's theory of legitimate domination to explain how IGOs can exert power over states. They particularly highlight two factors allowing IGOs to exert power: the legitimacy such organizations have thanks to the expertise of their personnel and the valued social norms they are often meant to uphold. In addition, they point to power deriving from their primary organizational form: bureaucracy.

My study of WHO immunization programs generally supports this perspective. However, I argue that these Weberian sources of power are not the only one available to IGOs. In addition, much insight into IGOs' potential to exert power can be gained from a greater appreciation for Georg Simmel's analysis of the implications of group size and position (Simmel 1950). In short, I argue that IGOs often occupy a particularly powerful position in relation to nation states: that of the mediator or the *tertius gaudens*.[1] This position simultaneously puts them outside of the general ebb and flow of interstate conflict and allows them to exert greater influence over state and global behavior than we would otherwise expect, given the general lack of resources at their disposal.

[1] IGOs could presumably also play the third role assumed by the third member of a group, divide and conquer. However, I found little evidence in support of this possibility in my own studies and thus exclude it from consideration here.

In the remainder of this conclusion, I review major findings from the substantive analyses presented in this dissertation and their implications for this theory of IGO power. I then briefly discuss directions future research could take.

Do IGOs influence state behavior?

Before exploring how IGOs influence state behavior, we must first establish whether they influence state behavior. This is the basic question asked in Chapter 2, which also explores IGOs' influence relative to that of INGOs and for different vaccines. My findings clearly show the IGOs influence vaccination coverage and that this influence is different from that exerted by INGOs. When examining vaccination coverage, IGO influence is much more pronounced than INGO influence. Further, when INGO ties influence vaccination coverage, their influence is *negative*.

I argue that this difference and the difference between my findings about vaccination coverage and findings from previous studies looking at human rights or women's rights arise from the different ways IGOs and INGOs influence state behavior and from differences in the nature of the global norms being advanced. Briefly, I argue that IGOs assemble a "society of states" helping diffuse global norms directly to relevant state actors. In the case of immunization, these would be national public health ministries. In contrast, INGOs represent a global civil society, where global social movements influence civil society actors' behavior, which may exert an influence on state behavior in turn.

These differences mean that IGO ties are particularly likely to influence state behavior in state-dominated domains, like public health, whereas INGO ties are likely to be more influential in areas where civil society is more active, for example, in areas with well-organized global social movements, like women's and human rights. My own findings about INGOs' greater negative influence on vaccination coverage for controversial vaccines, like the DPT vaccine, support this view.

By showing that IGOs do influence state behavior, Chapter 2 provides the first essential support for my argument concerning IGOs' power. However, influence is not synonymous with power, nor can the analyses in Chapter 2 show how IGOs exert power. Analyzing power relations requires a more qualitative, historical-comparative approach, which I employ in the remaining analytic chapters. Chapters 3 and 4 explored the WHO's power on the global level, tracing the development of global immunization policies and of global norms of solidarity respectively. Chapters 5 and 6 turned to the national level, looking at EPI programs in Cameroon and Malawi.

The WHO's Authority and the Evolution of Global Immunization Policies

The Weberian and Simmelian dynamics of IGO power are especially apparent in the analysis of the development of global immunization policies presented in Chapter 3. From a Weberian perspective, the power the WHO gains through its expertise is clearly seen in the influence the GAG and SAGE had over the development of global immunization policy. From a Simmelian perspective, we also see the WHO as *tertius gaudens* here, benefiting from nation states' indecision and disagreements over how to pursue childhood immunization worldwide.

This chapter also gives insight into how power relations between nation states and international organizations have changed over the last several decades, with the rise of

new "supranational" organizations like the Task Force for Child Survival and GAVI. Nitsan Chorev's work (2012) shows how the WHO strategically adapts to global changes like the new economic order or the neoliberal turn. Similarly, William Muraskin's extensive work on global immunization efforts (1995; 1998; 2005) shows that the WHO's involvement in global immunization programs has always been essential. This alone shows the WHO's legitimacy: without its support, global health efforts may be fatally weakened, always open to doubts about their motives and/or potential efficacy. However, the nature of this involvement has changed over the decades in important ways deriving both from internal program developments and from broader changes in global cooperation.

When the EPI began in 1974, the WHO's preeminence among global health organizations was uncontested. The program was launched after the WHA debated, amended and passed a resolution calling for the new program put forth by a coalition of member states. Member states' central role in the beginning of the program provides little support for the argument that the WHO itself is a powerful independent actor. This is exactly the dynamic we would expect if traditional, realist international relations theories are right and IGOs are simply institutions that allow states to overcome their collective action problems.

However, even at this early date it is clear that the WHO's role extended beyond that of a forum for debate on global health problems. Although put forth by member states, the EPI resolution clearly met with the approval of the WHO secretariat and WHO personnel. The resolution cited a line in the proposed program and budget calling for new global immunization efforts. Furthermore, it built on earlier, WHO-sponsored international meetings that examined the possibilities for just such a program. Clearly, the program had active support from the WHO bureaucracy from the beginning.

By the end of the 1970s, the WHO's leadership role in developing global immunization policies and programs became especially clear. The creation of the GAG in 1978 and of SAGE in the early 1990s put WHO-affiliated experts in charge of evaluating program achievements and steering program policies. While initial EPI policy derived from resolutions proposed by coalitions of nation states, after the creation of the GAG most resolutions were proposed by the WHO Secretariat itself, following GAG or SAGE recommendations.

The influence of these two groups on program policy clearly shows two Weberian aspects of IGO power: the bureaucratic power such institutions have to shape global programs through their control over agendas and the content of debate and the legitimacy they derive from their expertise. The creation of the GAG and then of SAGE changed the nature of debates about global immunization policy from debates between states to debates between experts. States still played an essential role approving expert recommendations, but their role actually creating policy virtually disappeared.

The limits of state influence over policy developments can be seen clearly in WHA debates. Generally, such debates responded either to a progress report (often including a recommended resolution) or to the biennial program plan and budget. Recommended resolutions were all adopted with little change. However, states' proposals did not receive the same treatment. During debate, states often posed questions to and made recommendations about the running of the various programs. At the end of each debate, a WHO representative would respond to those questions and recommendations,

explaining the organizations viewpoint. In one notable exchange during debate in 1982, the US delegate called on the WHO to begin a measles eradication program. EPI Director Ralph Henderson was very clear in his response, bluntly stating that the WHO was not ready to begin a new disease eradication program at that time and laying out a series of conditions that would need to be met before the WHO would consider a new eradication program, including successful regional elimination campaigns. The regions responded and six years later the WHA adopted a resolution calling for polio eradication. The incident and its aftermath clearly show that even the most powerful member states could not simply dictate policy to the WHO, and that the WHO could successfully set the terms that needed to be met for new programs to be considered.

Interactions between member states and the WHO regarding the beginning of a new disease eradication campaign also illustrate the Simmelian dimensions of WHO power. While many member states were eager for a new disease eradication campaign from the very beginning of the EPI, others embraced the new focus on promoting routine immunization services. The WHO mediated these disagreements, and in so doing it was able to further its own agenda – a classic *tertius gaudens* position. In the face of disagreement among member states, WHO support was decisive in determining the exact direction immunization programs would take and in determining how and when new projects, like polio eradication or other targeted disease control campaigns, would be embraced.

This diminished state role is evident not only in the development of EPI policies but also in the creation of new programs. The first major post-EPI immunization program, the global Polio Eradication Initiative, arose from a resolution proposed by a coalition of states. However, as discussed, the WHO clearly set the terms that needed to be met for such a new program. Other new programs, including the CVI and the GAVI, were proposed by the WHO Secretariat itself, albeit after intense negotiation with outside parties, as I discuss further below.

The role of WHO expertise in setting global immunization policies can also be seen in broad policy changes. The EPI's early affiliation with the WHO's PHC and Health for All initiatives clearly derives from the GAG's influence. However, the GAG also played a key role in inciting other key program changes, like the shift to targeted disease reduction goals in the 1980s. The analysis in Chapter 3 clearly shows that developing knowledge about disease burdens made this shift possible and that this new knowledge and the new disease surveillance techniques that made it possible, in turn, resulted from research priorities set by the GAG from its creation.

When it prioritized the development of disease surveillance technologies at its initial meetings, the GAG could not have known that this would lead to a specific focus on measles, NNT and polio (the diseases most amenable to surveillance with newly developed methods), enabling global programs aimed at drastically reducing, eliminating or eradicating (respectively) these specific diseases. Yet these developments were not entirely unintended consequences. Long-term program plans clearly foresaw the need to shift from holistic goals focusing on vaccination coverage to disease-focused goals focusing on disease surveillance and control, and research priorities were set accordingly.

However, not all program changes derived from these internal dynamics. Chapter 3 also discusses new programs, like the CVI and GAVI, which were arguably imposed on the WHO from outside. It also shows how GAG recommendations began to play a less

decisive role in influencing major policy changes starting in the late 1980s. Instead, resolutions began citing outside sources, like recommendations made by the Task Force for Child Survival or new initiatives, like the CVI. Since 2000, most WHO immunization efforts have been part of a broader, supranational effort spearheaded by GAVI, a supranational organization to which the WHO belongs but which it does not control.

The increasing influence of supranational organizations like the Task Force for Child Survival, the CVI and now GAVI seems to suggest that the WHO's power is diminishing, and the rise of these organizations more generally seems to suggest the same for other IGOs. However, I argue that it is better to see this development as part of a change in the practice of global power, rather than as a sign of the weakening or strengthening of IGOs in general. We need to go beyond the obvious fact of their increasing influence to ask what kinds of organizations these supranational coalitions are and what implications they have for IGOs' power.

These supranational coalitions are very different from traditional IGOs. Traditional IGOs, including the WHO, have states as members, and states formally direct and control them. This fact alone explains many theorists' reluctance to see IGOs as (semi-)independent, authoritative actors on the international stage. However, supranational coalitions generally include many kinds of international actors, not just states. For instance, the Task Force united state and non-state actors as more-or-less equal partners in a broad global coalition interested in child health. Groups represented included two kinds of state actors (representatives from bilateral and multilateral development agencies and representatives from developing countries), IGOs (including the WHO, UNICEF, the World Bank and UNDP) and representatives of major philanthropic organizations interested in child health (in this case, the Rockefeller Foundation). The CVI and GAVI unite similar coalitions of disparate kinds of global actors.

What implications does the creation of these kinds of coalitions have for IGO power? First, far from suggesting that they are powerless, the inclusion of IGOs in coalitions with other actors, including state representatives, formally recognizes them as independent actors on the global scene on equal standing with states. Were they simple mechanisms of diffusion or tools for coordination, there would be no need to ensure their representation in such organizations. Indeed, the structure of many supranational coalitions actually places IGOs in the position of the "first among equals." For instance, the WHO and UNICEF representatives take turns as the head of GAVI, and that organization is clearly designed to place these two major IGOs on equal footing and to facilitate program coordination between them.

In contrast, nation states have less formal power in supranational organizations than in most traditional IGOs. Rather than each state being an independent member of the organization, as in traditional IGOs, states are divided into different groups (often donor states and aid-receiving states) and are represented as such. They have a voice, but so do other kinds of organizations. Furthermore, by dividing states into abstract categories like "donor" or "aid-receiving" states, supranational organizations break with the myth of nation-state equality that forms the basis of organization in many IGOs.

Thus, in many ways new supranational organizations highlight IGOs' powers in an increasingly interconnected world. However, this very act also breaks with one of the bases of IGOs authority over state behavior: their outsider position as mediator or *tertius*

gaudens. In other words, by formally recognizing IGOs as powerful actors with particular interests, supranational organizations also strip them of some of the power they held through their apparent disinterestedness, the basis of their power as mediators and as *tertius gaudens.*

If Simmelian bases of IGO power are weakened by the increasing influence of supranational organizations over IGO policy, many Weberian bases of IGO power are reinforced by these same developments. They reinforce recognition of IGOs as legitimate authorities on various questions and also reinforce the role of expertise in deciding global policies. The primary role experts play in influencing global immunization efforts can be seen in both the increased influence of international conferences over program policies and by the creation of SAGE, a new expert advisory group in the 1990s. When first created, SAGE served to unify the basis of expert advice for two major immunization programs, the WHO's EPI and the new supranational CVI. In 2000, these two programs were replaced by one supranational alliance, GAVI, and SAGE continued in its role as the primary expert advisor for the new alliance.

Marshalling Material Resources

In tracing the development of global immunization policies from 1974 to the present, Chapter 3 shows how the WHO has played a key, if changing, role in the development of those policies. WHO-affiliated experts were and continue to be a key source for developing policy recommendations and establishing topics for discussion, and WHO approval was and is essential for all major policy changes. Yet this sort of ideational influence is not the only facet of power. Global campaigns also need substantial resources to achieve their goals. Furthermore, while the programs and the WHO may maintain substantial influence over which global policies are established, they have far less power to command the necessary resources to realize these policies.

Some IGOs independently control relatively large amounts of material resources (e.g., the IMF and the World Bank), but the WHO is and always has been a resource-poor organization. Its regular budget is modest and has never been large enough to independently fund major global health campaigns. Early in its history, this fact led the WHO to establish the Voluntary Fund for Health Promotion (VFHP), with accounts dedicated to various of its large health campaigns. Interested parties donate funds to these accounts to support these activities.

While the VFHP has existed almost as long as the WHO itself, recent years have seen a resurgence of this sort of "extrabudgetary" funding. Member states froze the regular budget in the 1980s and regular budget growth since then has been very modest. In the face of limitations to these regular resources, the WHO has come increasingly to rely on extrabudgetary funding, which has grown considerably and now represents well over half of the organizations total resource base. This development has provoked considerable concern and debate over whether it gives funders too much influence over WHO policy. The WHO has less control over these extrabudgetary resources, which are often earmarked towards specific purposes, than it does over its regular budgets.

The analysis in Chapter 4 makes it clear that these concerns are not unfounded. Concern about "maintaining donor interest" has had a clear influence on program development, creating pressure for constant program innovation. Furthermore, the presence or absence of willing funders can play a decisive role in establishing programs.

For example, the polio eradication campaign might not have ever started had Rotary International not been willing to dedicate substantial funds to support it. Similarly, support from the Bill and Melinda Gates Foundation was essential for establishing GAVI in 2000.

It is less clear that either of these cases represents funders dictating global health policies. Rotary International was clearly not the only party interested in beginning a new global disease eradication campaign. Some member states had called for such campaigns (although not necessarily against polio) since the beginning of the EPI, and two regions began polio elimination efforts in the mid-1980s. Although the WHO itself was reluctant to begin a new eradication campaign, it was also able to dictate the terms under which such an effort could be envisioned, key among which were successful regional elimination programs, not simply the willingness of large donors to underwrite such a program.

GAVI's creation is a slightly different case. As a supranational alliance, GAVI is (semi-)independent from the WHO itself. Furthermore, although the WHO holds a very powerful position within the Alliance, joining it also limits the WHO's ability to act independently on global health issues related to vaccines and immunization. It needs to coordinate its activities closely with UNICEF, first of all, and with other members of the Alliance. Nevertheless, closer coordination does not necessarily undermine the WHO's power. Furthermore, GAVI came into being at the end of a particularly difficult decade for the WHO. Hiroshi Nakajima's Director-Generalship from 1988-1998 was an especially controversial one, rocked by accusations of corruption and cronyism and by communication problems. As the analyses in Chapters 4 and 5 reveal, the same years were difficult ones for the WHO's immunization programs, as program proliferation posed substantial coordination and funding problems. Finally, GAVI replaced a previous supranational alliance, the CVI, that seems to have been a much more direct attack on the WHO's position (see Muraskin 1998). In contrast, GAVI seems to have been founded in part to reinforce the WHO's power and help counteract some of its weaknesses (see Muraskin 2005).

In sum, it is clear that outside funders and the search for extrabudgetary funding influence the WHO. However, it is less clear that these financial constraints and attempts to overcome them are insurmountable constraints on the WHO's ability to pursue its own health goals independently. Chapter 4 provides some insight into this question through its analysis of changing global norms of solidarity related to childhood immunization.

The analysis of global norms shows a key shift from the idea that immunization programs were a state concern to one in which immunization was seen as a human right that the global community (headed by the WHO) ought to ensure. These changing norms also created global financial responsibilities that found expression in a system of voluntary donations and support of immunization programs in the developing world. Chapter 4 explores the extent to which global funders responded to these financial responsibilities by analyzing donations to immunization-related accounts in the WHO's VFHP. It shows an exponential increase in funding over the period examined. Furthermore, global funders were not particularly fickle: donations for routine immunization programs continued to grow after the beginning of new programs like the CVI and polio eradication.

The extrabudgetary funding system clearly poses significant challenges to global immunization programs. Funding levels could not keep up with new funding needs in the 1990s, despite substantial increases in extrabudgetary funds available. Furthermore, such a volunteer system is inherently unstable: funders could stop donations at any time. However, given constraints to the WHO's regular budget, it is also clear that these programs could never have happened without such extrabudgetary support. Furthermore, the WHO has proven relatively successful at marshalling the funds it needs to support its various immunization efforts.

The search for funds may be another area where we see Simmelian power dynamics. In seeking funds for all of its various health campaigns, the WHO can benefit from divisions and conflict between its member states to incite states to donate funds to various different programs, both to mark their different global health priorities and to enhance their global prestige. The WHO's legitimacy as a global health actor similarly helps it in its search for funding. Other actors can seek to gain prestige from association with this legitimacy by supporting various WHO efforts, as Rotary has for Polio Eradication and as the Bill & Melinda Gates Foundation has for global vaccine and immunization efforts more generally.

Influencing States: The WHO's Influence over National Immunization Programs

If Chapters 3 and 4 explore power within the WHO and on the global level, Chapters 5 and 6 switch levels of analysis from the global to the local, examining the implementation of EPI programs in Cameroon and Malawi. The WHO's authority is clearest in these direct interactions with nation states. Both Malawi and Cameroon were quick to amend policies and even reorganize government to conform to the recommendations of WHO advisers, even when this advice changed radically or involved significant breaks with past practices. This is not surprising: while IGOs are resource-poor compared to the most powerful nation-states and may have little leverage over high-income countries, dynamics quickly change when we look at low-income countries.

The general consensus that IGOs can and do exert power in developing countries leads to new questions: how is this power experienced? In particular, most studies of IGOs or global-campaign implementation in developing countries look at power dynamics and consequences over time. Although many national case studies highlight IGOs' influence over developing countries, such studies also tend to emphasize the many problems global programs face on the ground (for example, see Farmer 1999; Ferguson 1994; Renne 2010). Such accounts show both IGOs' and global campaigns' power to affect national practices and policies and limitations to this power, many of which arise from a lack of understanding about local institutions or from counterproductive dynamics arising as global programs are translated in the local context.

My analysis of EPI programs in Malawi and Cameroon reaffirms both of these points. It highlights the extraordinary deference local authorities paid to recommendations from WHO advisers, quickly changing national policies and even institutions in line with WHO recommendations. For example, Cameroon completely reorganized its ministry of health and began offering immunization services at health centers that had previously only offered curative services in response to WHO recommendations. This deference to WHO expertise highlights the legitimacy of that organization and the influence it is able to exert because of it. However, the smooth

enactment of legitimate domination is not the only facet of power dynamics explored in these chapters. They also highlight the potential for counterproductive interactions between local and global trajectories as programs were implemented, as seen especially in Cameroon.

Drawing on the analysis of the development of global immunization policies presented in Chapter 3, my analysis shows how global advisors' views of national EPI programs in both Cameroon and Malawi were primarily affected by changes in global-level policies and visions rather than by the situation on the ground. Local-level health professionals, in turn, were less attuned to these rapid global changes. Instead, they continued to view immunization according to local schemas, even while deferring to WHO expertise on most questions. In Malawi, where local legacies accorded very well with the emerging PHC vision of immunization,[2] this posed few problems. However, in Cameroon, where local legacies were instead deeply rooted in more "vertical" mobile team approaches, the WHO's growing emphasis on PHC approaches to immunization created more tension, leading many local health professionals to question the applicability of the new approach to Cameroon or to seek ways of justifying local, mobile approaches based on the new, PHC paradigm.

Unlike most research on attempts to translate global campaigns or policies on the local level, my analysis is doubly dynamic: exploring the implementation of *changing* global policies on the also-changing local level. A doubly dynamic perspective has many advantages over traditional approaches to analyzing global-local interaction, which tend to hold the global level static. First, it is more realistic. Global campaigns and policies are often fast-changing and trend-oriented, as they respond to quickly changing global debates and the need for novelty to hold the global public's (and donors') interest. Second, it allows a richer exploration of global-local interaction. Global campaigns and programs are rarely implemented in a vacuum: they often supersede or build on long-standing, previous programs. Local reactions are shaped by this tangled history. Third, it allows exploration of new questions. Specifically, it allows us to ask what impact *changes* in global level programs have on local-level implementation.

Conclusions and Future Research

The global-level research presented in Part I and the local-level research presented in Part II each explores different facets of the WHO's power. Part I explores the Weberian and Simmelian power dynamics at work on the global level, exploring the WHO's key role in shaping global health policies and norms linked to immunization. In contrast, Part II explores how these global policies and norms are implemented at the national level and particularly the WHO's role in aiding such implementation as an adviser to nation states.

Both parts of my study highlight the WHO's power to influence both global health policies and their enactment at the local level, despite its lack of material and military resources. On the global level, the WHO, as a bureaucratic organization with

[2] This resonance is less surprising when we consider that both the WHO's PHC approach to immunization and Malawi's health services in general had strong connections with missionary medicine and its particular vision of health. On PHC's connection to this perspective, see Litsios, Socrates. 2004. "The Christian Medical Commission and the Development of WHO's Primary Health Care Approach." *American Journal of Public Health* 94:1884-1893.

considerable expertise in global health and legitimacy on the global stage, plays an important role formulating and approving global health goals and in promoting their implementation on the ground. These Weberian dimensions of the WHO's power are seen in how WHO-affiliated experts have played a key role in shaping the development of global immunization policies from 1978 on. They also played an important role in promoting a new sense of global responsibility for immunization, which had a visible impact on the availability of global funds for immunization programs. On the national level, their advice had a profound impact on how national programs were organized, even when it provoked resistance from local health workers.

In addition to leveraging its expertise to increase its influence, the WHO also plays an important role mediating between member states differing opinions about how global health programs should be organized and the kinds of goals they should pursue. The WHO's position also allows it to take advantage of these disagreements to actively shape global health programs around its own priorities as a sort of *tertius gaudens*. As member states often have different ideas about the priorities that should be pursued in global health, gaining WHO support for any program is ultimately essential. The WHO's support often ensures that other member states set aside their reluctance, sometimes ultimately embracing a program which they initially did not support.

My study also highlights dynamic processes at work on both the global and local levels. On the global level, it highlights two different dynamics: an internally driven one and an external one. Within the WHO itself, I show how the organization's priorities and internal processes shaped major program changes. These dynamics are especially apparent in the decision to switch from a holistic emphasis on increasing vaccination coverage to a focus on targeted disease control. They can also be seen in changes in how the idea of immunization as a right expressed itself in funding norms, first gaining precision with the 2:1 local-global funding norm and then with more fluid formulas highlighting the special needs of least-developed countries.

In addition to these internally driven changes, the WHO's immunization programs are also increasingly influenced by supranational organizations. This influence was first seen coming from the Task Force for Child Survival, followed by the CVI and, currently, GAVI. The WHO holds an important place in these new supranational organizations, so their increasing influence does not necessarily mean that the WHO's influence over global health policy is decreasing. However, they do signal a major change in the dynamics of power by changing the WHO's position. Rather than being a key mediator of relationships between states, a position allowing the WHO to hold the position of *tertius gaudens*, the WHO becomes a recognized independent actor in global health policy, entailing a more formal need to compromise with other recognized actors.

Finally, the national case studies highlighted dynamics between global advisors and national immunization programs in Malawi and Cameroon. My study highlights potential problems that can arise from the different dynamics and trajectories found on the global and local levels. While global advisers are primarily influenced by rapidly changing global-level priorities and paradigms, local health personnel are instead embedded in often long-standing local institutions. In turn, growing resonance or dissonance between these two can have an important impact on national programs.

These two levels of analysis also call for two lines of future research. With regard to the global level, we must ask how the rise of supranational organizations has changed

power dynamics between the various global actors, including nation states, IGOs, INGOs, and others. I note that their rise undercuts IGOs' ability to take advantage of their position as mediator in influencing global policies. However, this change does not necessarily mean that the most traditional powers on the global scene, nation states, gain in influence. On the contrary, nation states hold much less formal power in these new supranational organizations than in traditional IGOs, like the WHO. Clearly, we need a better understanding of the implications these changes have for global politics in general.

On the local level, my case studies of national EPI programs in Malawi and Cameroon left many unanswered questions begging for further exploration. First, the timeframe for these studies was relatively restricted. Due to constraints on access to archival materials, my study focused on the period between 1974 and 1990. Although this period saw one major change in global immunization policies (the rise of the PHC approach to immunization), it only begins to hint at the effects of later changes, including the shift to targeted disease control programs, like the PEI, and the proliferation of program goals seen in the late 1980s and early 1990s. In addition, as my analysis confines itself to an examination of WHO archival materials, exploration of national reactions and perspectives remains rather limited (particularly for Malawi, as locally produced documents were rare in the Malawi file in the WHO archives). A fuller understanding of the dynamic interaction of global and local requires field study in both Malawi and Cameroon over a longer period.

Second, my study explores the impact of only one dimension of global-level changes on national immunization programs: policy changes. It leaves the impact of changing global norms of solidarity unexplored. Documents available in the WHO archives suggested that these changes also had an important influence on programs. The Cameroon files were especially interesting here. Cameroon's EPI proposals clearly responded to then-current norms demanding that national programs quickly become financially self-sufficient to qualify for external funding. Furthermore, many of the oldest letters and documents in that file address Cameroon's search for external funding for its EPI program. The WHO played a role as an intermediary in this search, recommending Cameroon's program to various funding organizations.[3] Unfortunately these data alone do not allow a robust analysis of that impact. Here too, fuller analysis would require a more thorough examination of national programs themselves and particularly of their funding.

Study of global-local interactions often shows us the self-imposed limits global actors face when carrying out projects on the local level – limits shown in my discussion of Cameroon in Chapter 6, but also well established in the literature (see, for example, Ferguson 1994; Ferguson 2006; Scott 1998), including some studies of global immunization programs (see Renne 2010). However, these limits are only the beginning of the story. Global-local interactions take place over a long period, and both global and local actors must respond to the various problems faced on the ground. Examining global-local interactions over the long term can help us understand not only the limits of global programs but also how they can overcome these limits over time.

[3] See I8/370/2CAE(1).

Figure 1.1: Global Vaccination Coverage, 1980-2011

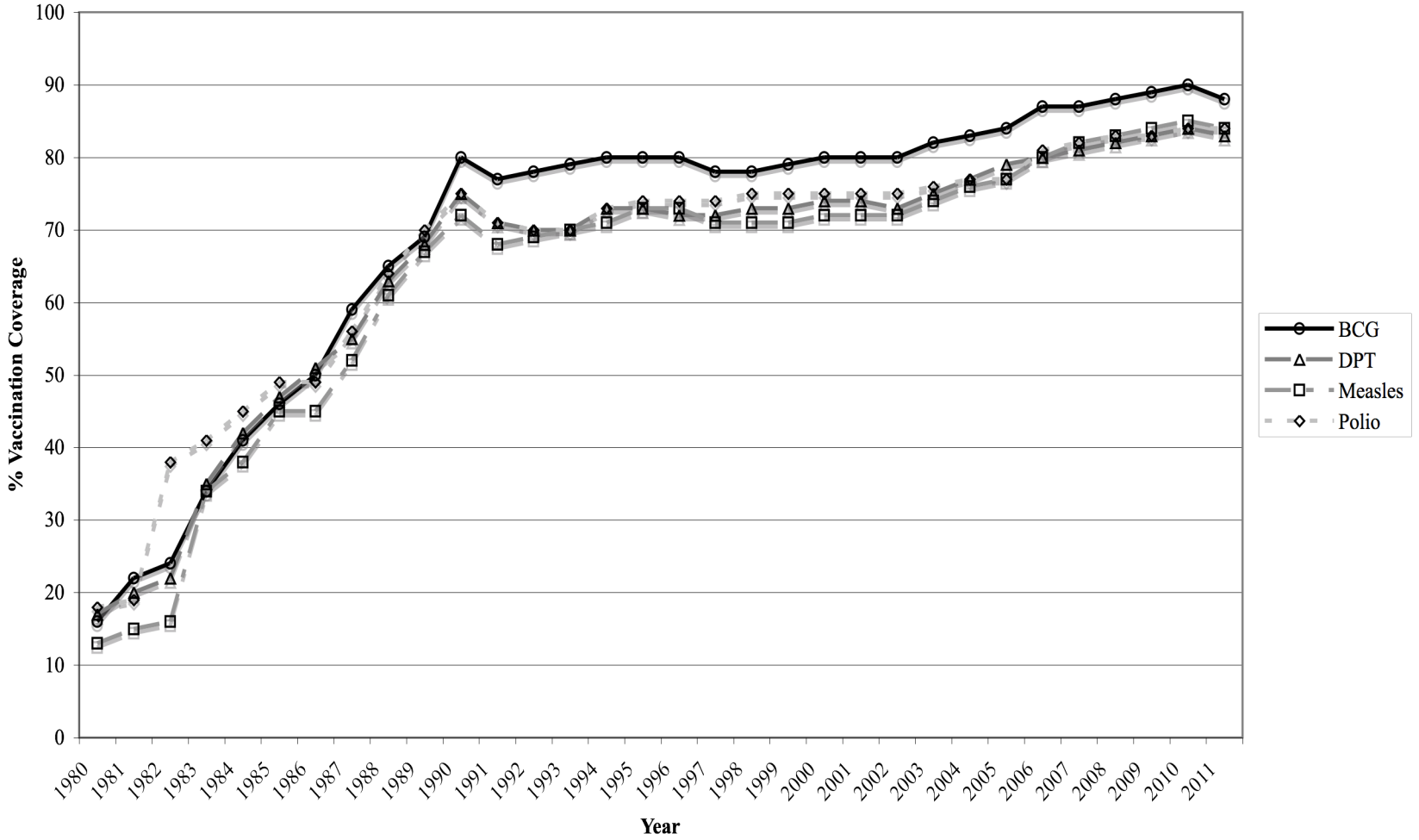

Table 1.1: Major Immunization Programs and Policy Shifts

Date	Program or Policy Shift
1959	Smallpox eradication program begins.
1967	Smallpox eradication effort intensified.
1974	Expanded Programme on Immunization (EPI) begins.
1977	EPI adopts Univseral Childhood Immunization goal.
	Last case of smallpox recorded in Somalia.
1980	Smallpox declared eradicated.
1986	EPI begins to focus more closely on measles, polio and neo-natal tetanus.
1988	Polio Eradication Initiative begins.
1989	EPI adopts polio eradication, neo-natal tetanus elimination and measles case reduction goals.
1990	Children's Vaccine Initiative (CVI) begins.
1992	Universal Childhood Immunization goal met.
	Hepatitis B Vaccine added to EPI.
	New efforts to promote yellow fever vaccination, where appropriate, begin.
1996	Hib (*Haemophilus influenzae* type B) vaccine added to EPI.
2000	Global Alliance for Vaccines and Immunization (GAVI) begins.

Figure 2.1: Global immunization coverage, 1980-2006

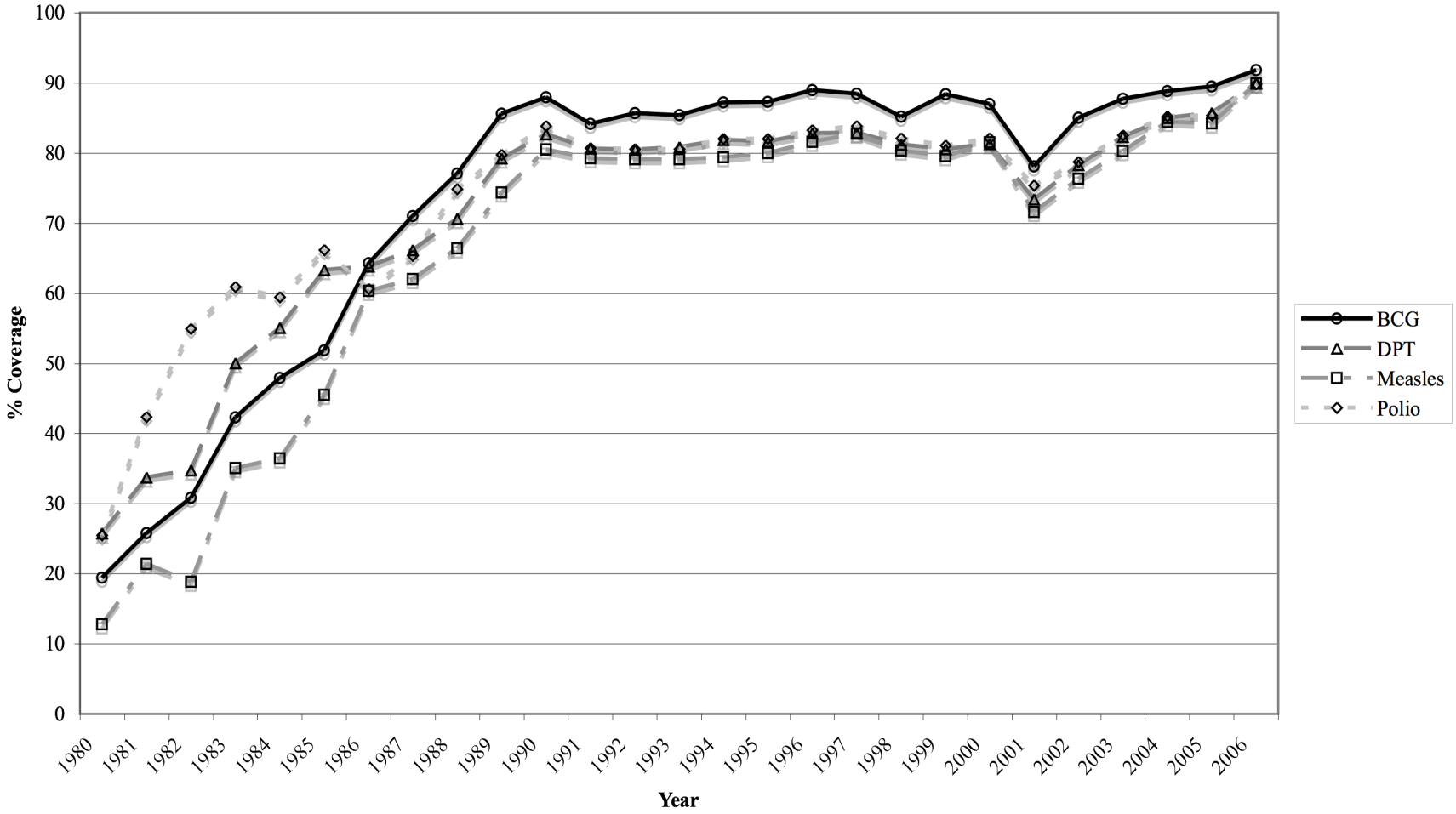

Table 2.1: Missing data frequency for raw and interpolated data

	Raw Data		**Interpolated Data**	
Variable	Mean	SD	Mean	SD
Polio Coverage	0.1919	0.3939	0.1226	0.3280
Measles Coverage	0.2028	0.4022	0.1333	0.3400
DPT Coverage	0.1984	0.3989	0.1343	0.3411
BCG Coverage	0.2251	0.4177	0.1507	0.3578
IGO Ties	0.4269	0.4947	0.1609	0.3675
INGO Ties	0.4266	0.4947	0.1593	0.3660
Polio Incidence	0.0997	0.2996	0.0845	0.2782
Measles Incidence	0.1343	0.3411	0.0970	0.2960
Pertussis Incidence	0.1995	0.3997	0.1011	0.3015
Infant Mortality Rate	0.6135	0.4870	0.0034	0.0579
GDP per capita	0.0751	0.2636	0.0751	0.2636
Population Density	0.0044	0.0660	0.0044	0.0660
Autocracy Index	0.1236	0.3291	0.0966	0.2955
Democracy Index	0.0811	0.2731	0.0811	0.2731
State Durability	0.0902	0.2866	NA	NA

Table 2.2: Comparison of raw and interpolated data

	Raw Data			Interpolated Data		
Variable	Mean	SD	N	Mean	SD	N
Polio Coverage	72.00	26.28	2400	71.28	26.67	2606
Measles Coverage	68.77	25.89	2350	68.13	25.96	2555
DPT Coverage	69.71	26.45	2363	69.02	26.82	2552
BCG Coverage	75.44	24.67	2114	74.40	25.23	2317
IGO Ties	46.66	17.96	1702	46.59	17.45	2492
INGO Ties	731.31	724.00	1703	771.15	761.12	2497
Polio Incidence	187.02	1592.40	2674	184.58	1579.33	2719
Measles Incidence	14741.76	49262.30	2552	14485.50	48406.05	2662
Pertussis Incidence	5891.83	27240.30	2360	5480.53	25880.31	2650
Infant Mortality Rate*	59.19	45.32	666	58.58	45.05	2960
GDP per capita	4656.68	7575.77	2747	4865.48	7965.91	3414
Population Density	83.79	107.65	2957	83.79	107.65	2957
Autocracy Index	3.00	3.37	2603	3.02	3.34	2683
Democracy Index	4.43	4.19	2729	4.43	4.19	2729

* Raw data for IMR includes only years 1980, 1985, 1990, 1995 and 2000

Table 2.3: Descriptive statistics

Variable	Mean	SD (overall)	SD(between	SD(within	Min	Max	N
Polio Coverage	71.28	26.67	21.10	16.67	1	99	2606
Measles Coverage	68.13	25.96	18.99	18.14	1	99	2555
DPT Coverage	69.02	26.82	21.02	17.01	1	99	2552
BCG Coverage	74.40	25.23	18.84	17.20	1	99	2317
IGO Ties	46.59	17.45	17.13	5.45	0	187	2492
INGO Ties	771.15	761.12	725.40	247.48	0	3811	2497
Polio Incidence	184.58	1579.33	1148.00	1033.24	0	38090	2719
Measles Incidence	14485.50	48406.05	30023.50	36991.14	0	1122285	2662
Pertussis Incidence	5480.53	25880.31	15370.91	20329.97	0	613648	2650
Infant Mortality Rate	58.58	45.05	44.15	9.58	3.1	192	2960
GDP per capita	4656.68	7575.77	7276.05	1235.33	56.5202	37991.73	2747
Population (/100,000)	374.85	1251.94	1249.83	127.77	2.19	12718.5	2970
Population Density	83.79	107.65	106.85	14.69	1.06	1009.92	2957
Youth Population (% of total)	35.25	10.59	10.45	1.93	14.20941	51.86	2970
Autocracy Index	3.02	3.34	2.69	2.02	0	10	2683
Democracy Index	4.43	4.19	3.66	2.03	0	10	2729
State Durability	22.72	30.29	28.07	9.44	0	192	2702
Armed Conflict Indicator	0.1165	0.3209	0.2298	0.2248	0	1	2970

Table 2.4a: Fixed effects pooled 21-year panel regression analyses of vaccination coverage, 1980-2001 (polio & measles vaccines)

	Polio Coverage			Measles Coverage		
	Model 1	**Model 2**	**Model 3**	**Model 1**	**Model 2**	**Model 3**
Lagged Dependent Variable	0.6254 **	0.6270 **	0.6217 **	0.5646 **	0.5656 **	0.5627 **
	0.0156	0.0157	0.0158	0.0171	0.0171	0.0171
World Society Ties						
IGO Ties	0.0979 *		0.1101 **	0.0829 *		0.0943 *
	0.0383		0.0390	0.0419		0.0427
INGO Ties		-0.0017	-0.0025		-0.0017	-0.0025
		0.0016	0.0016		0.0018	0.0018
Health Controls						
Disease Incidence (lagged)	0.0001	0.0002	0.0001	0.0000	0.0000	0.0000
	0.0003	0.0003	0.0003	0.0000	0.0000	0.0000
Infant Mortality Rate	-0.1400 **	-0.1412 **	-0.1353 **	-0.1937 **	-0.1940 **	-0.1887 **
	0.0360	0.0361	0.0361	0.0398	0.0399	0.0399
Social and Economic Controls						
GDP per capita	-0.0007 **	-0.0006 *	-0.0005 f	-0.0006 **	-0.0005 f	-0.0004
	0.0002	0.0003	0.0003	0.0002	0.0003	0.0003
Population (/100,000)	-0.0033	-0.0023	-0.0027	-0.0095 **	-0.0090 **	-0.0091 **
	0.0025	0.0025	0.0025	0.0025	0.0025	0.0025
Population Density	0.0186	0.0148	0.0150	0.0114	0.0082	0.0079
	0.0166	0.0167	0.0167	0.0182	0.0184	0.0184
Youth Population (% of Total)	-0.0214	-0.0912	-0.0467	-0.3834 *	-0.4460 *	-0.4192 *
	0.1519	0.1521	0.1526	0.1742	0.1760	0.1762
Political Controls						
Autocracy Index	0.3643	0.4247 f	0.4222 f	0.2697	0.3247	0.3199
	0.2254	0.2286	0.2282	0.2545	0.2574	0.2572
Democracy Index	0.1343	0.1768	0.1800	0.1392	0.1772	0.1826
	0.1961	0.1985	0.1981	0.2202	0.2227	0.2225
State Durability	0.0515 *	0.0516 *	0.0530 *	0.0792 **	0.0792 **	0.0801 **
	0.0254	0.0254	0.0254	0.0284	0.0285	0.0284
Armed Conflict Indicator	-2.8178 **	-2.8298 **	-2.7828 **	-3.4998 **	-3.5144 **	-3.4518 **
	0.8744	0.8757	0.8744	0.9620	0.9630	0.9625
Constant	33.1596 **	40.7908 **	34.6352 **	55.6884 **	62.5539 **	57.4455 **
	6.7704	6.4847	6.8315	7.7301	7.4962	7.8382
Observations	2295	2295	2295	2125	2125	2125
Adjusted R2	0.8200	0.8345	0.8307	0.6027	0.6169	0.6099

f p<.1, * p<.05, ** p<.01, *** p<.001

Table 2.4b: Fixed effects pooled 21-year panel regression analyses of vaccination coverage, 1980-2001 (DPT and BCG vaccines)

	DPT Coverage			BCG Coverage		
	Model 1	**Model 2**	**Model 3**	**Model 1**	**Model 2**	**Model 3**
Lagged Dependent Variable	0.6312 ***	0.6256 ***	0.6215 ***	0.6723 ***	0.6760 ***	0.6678 ***
	0.0167	0.0168	0.0169	0.0161	0.0160	0.0162
World Society Ties						
IGO Ties	0.0538		0.0753 f	0.1072 *		0.1263 **
	0.0381		0.0387	0.0436		0.0444
INGO Ties		-0.0044 **	-0.0050 **		-0.0034 f	-0.0045 *
		0.0016	0.0016		0.0020	0.0020
Health Controls						
Disease Incidence (lagged)	0.0000	0.0000	0.0000			
	0.0000	0.0000	0.0000			
Infant Mortality Rate	-0.1257 ***	-0.1226 ***	-0.1176 ***	-0.1028 **	-0.1017 **	-0.0961 *
	0.0359	0.0358	0.0359	0.0393	0.0394	0.0394
Social and Economic Controls						
GDP per capita	-0.0007 ***	-0.0003	-0.0003	-0.0005 f	-0.0002	-0.0001
	0.0002	0.0003	0.0003	0.0003	0.0003	0.0003
Population (/100,000)	-0.0086 ***	-0.0081 ***	-0.0080 ***	-0.0024	-0.0014	-0.0014
	0.0025	0.0025	0.0025	0.0019	0.0020	0.0019
Population Density	0.0128	0.0062	0.0063	0.0278	0.0209	0.0217
	0.0153	0.0154	0.0154	0.0182	0.0184	0.0184
Youth Population (% of Total)	-0.0124	-0.0870	-0.0649	-0.1796	-0.2889 f	-0.2457
	0.1529	0.1532	0.1535	0.1735	0.1755	0.1758
Political Controls						
Autocracy Index	0.3100	0.3952	0.4098 f	0.8746 ***	0.9679 ***	0.9726 ***
	0.2409	0.2425	0.2425	0.2500	0.2539	0.2535
Democracy Index	0.1632	0.2413	0.2534	0.5938 **	0.6691 **	0.6789 **
	0.2021	0.2038	0.2037	0.2160	0.2195	0.2191
State Durability	0.0295	0.0383	0.0367	-0.0102	-0.0113	-0.0097
	0.0303	0.0304	0.0304	0.0279	0.0279	0.0279
Armed Conflict Indicator	-3.3188 ***	-3.2586 ***	-3.2313 ***	-2.3333 *	-2.3445 *	-2.2878 **
	0.9128	0.9117	0.9111	0.9519	0.9527	0.9511
Constant	37.2321 ***	44.9689 ***	40.8508 ***	28.4533 ***	38.7778 ***	32.0667 ***
	6.8194	6.5776	6.9043	7.7698	7.5802	7.9256
Observations	1982	1982	1982	2060	2060	2060
Adjusted R2	0.6325	0.6346	0.6398	0.7660	0.7819	0.7812

f p<.1, * p<.05, ** p<.01, *** p<.001

Table 2.5: Fixed effects pooled 21-year panel regression analyses of vaccination coverage, 1980-2001, by income

	Polio Coverage		Measles Coverage		DPT Coverage		BCG Coverage	
	High Income	**Middle and**	**High Income**	**Middle and**	**High Income**	**Middle and**	**High Income**	**Middle and**
Lagged Dependent Variable	0.5948 ***	0.6093 ***	0.6554 ***	0.5430 ***	0.6029 ***	0.6089 ***	0.6303 ***	0.6678 ***
	0.0358	0.0183	0.0343	0.0198	0.0352	0.0198	0.0490	0.0175
World Society Ties								
IGO Ties	0.2134 *	0.1034 *	-0.0574	0.1159 *	0.1923 *	0.0867 *	0.2844 f	0.1303 **
	0.0908	0.0451	0.0977	0.0491	0.0971	0.0440	0.1603	0.0481
INGO Ties	-0.0026	-0.0024	-0.0003	-0.0035	-0.0112 ***	-0.0032	-0.0227 ***	-0.0016
	0.0027	0.0031	0.0030	0.0033	0.0030	0.0029	0.0063	0.0032
Health Controls								
Disease Incidence (lagged)	-0.0200	0.0001	0.0000	0.0000	-0.0001 *	0.0000		
	0.0984	0.0003	0.0000	0.0000	0.0001	0.0000		
Infant Mortality Rate	-0.9730 ***	-0.1085 **	-0.1435	-0.1888 ***	0.0834	-0.1079 **	-0.4387	-0.0885 *
	0.2663	0.0393	0.3416	0.0437	0.2950	0.0386	0.4376	0.0410
Social and Economic Controls								
GDP per capita	0.0001	-0.0014	-0.0005	-0.0009	0.0000	-0.0017	0.0001	-0.0014
	0.0003	0.0011	0.0003	0.0012	0.0003	0.0011	0.0004	0.0012
Population (/100,000)	-0.0070	-0.0037	-0.0120	-0.0098 ***	-0.0130	-0.0079 **	0.0998	-0.0023
	0.0104	0.0028	0.0104	0.0029	0.0101	0.0029	0.1210	0.0021
Population Density	-0.0576	0.0295	-0.0580	0.0223	-0.1172 **	0.0211	-0.4290 *	0.0309
	0.0414	0.0188	0.0434	0.0208	0.0407	0.0172	0.1788	0.0190
Youth Population (% of	0.5031	-0.2219	-0.1739	-0.6499 **	0.4417	-0.2708	0.2729	-0.3256
Total)	0.3407	0.1905	0.3574	0.2182	0.3586	0.1886	0.7421	0.1996
Political Controls								
Autocracy Index	-5.0367 *	0.5183 *	0.3840	0.4220	1.7784	0.4725 f	3.3054	0.9810 ***
	2.2706	0.2467	2.4099	0.2795	2.6709	0.2603	3.0782	0.2624
Democracy Index	-2.8568 **	0.3194	-0.1794	0.3310	1.4321	0.3483	2.2893 f	0.7209 **
	1.0227	0.2213	1.1105	0.2496	1.1289	0.2279	1.3647	0.2339
State Durability	0.3605	0.0591 *	0.1725	0.0791 *	0.1778	0.0325	-0.0409	-0.0045
	0.3309	0.0281	0.3364	0.0317	0.3615	0.0330	0.4487	0.0296
Armed Conflict Indicator	(dropped)	-2.8459 **	(dropped)	-3.4432 ***	(dropped)	-3.3283 ***	(dropped)	-2.2764 *
		0.9196		1.0210		0.9530		0.9638
Constant	42.1608 f	39.1337 ***	40.4879 *	67.5626 ***	16.7936	45.6245 ***	45.9316	34.1785 ***
	24.6299	9.0448	20.0766	10.2972	19.6618	9.0375	33.0940	9.3308
Observations	518	1777	417	1708	444	1538	275	1785
Adjusted R2	0.3023	0.7950	0.5701	0.5559	0.0897	0.6459	0.2249	0.7739

f p<.1, * p<.05, ** p<.01, *** p<.001

Figure 3.1: Coverage by dose, coverage gap and drop-out rate in WER articles, 1977-1985

Figure 3.2: EPI articles focusing on disease surveillance or specific disease, 1977-1986

Figure 4.1: Ratio of "global*" to "international*" references in PubMed, 1950-2010

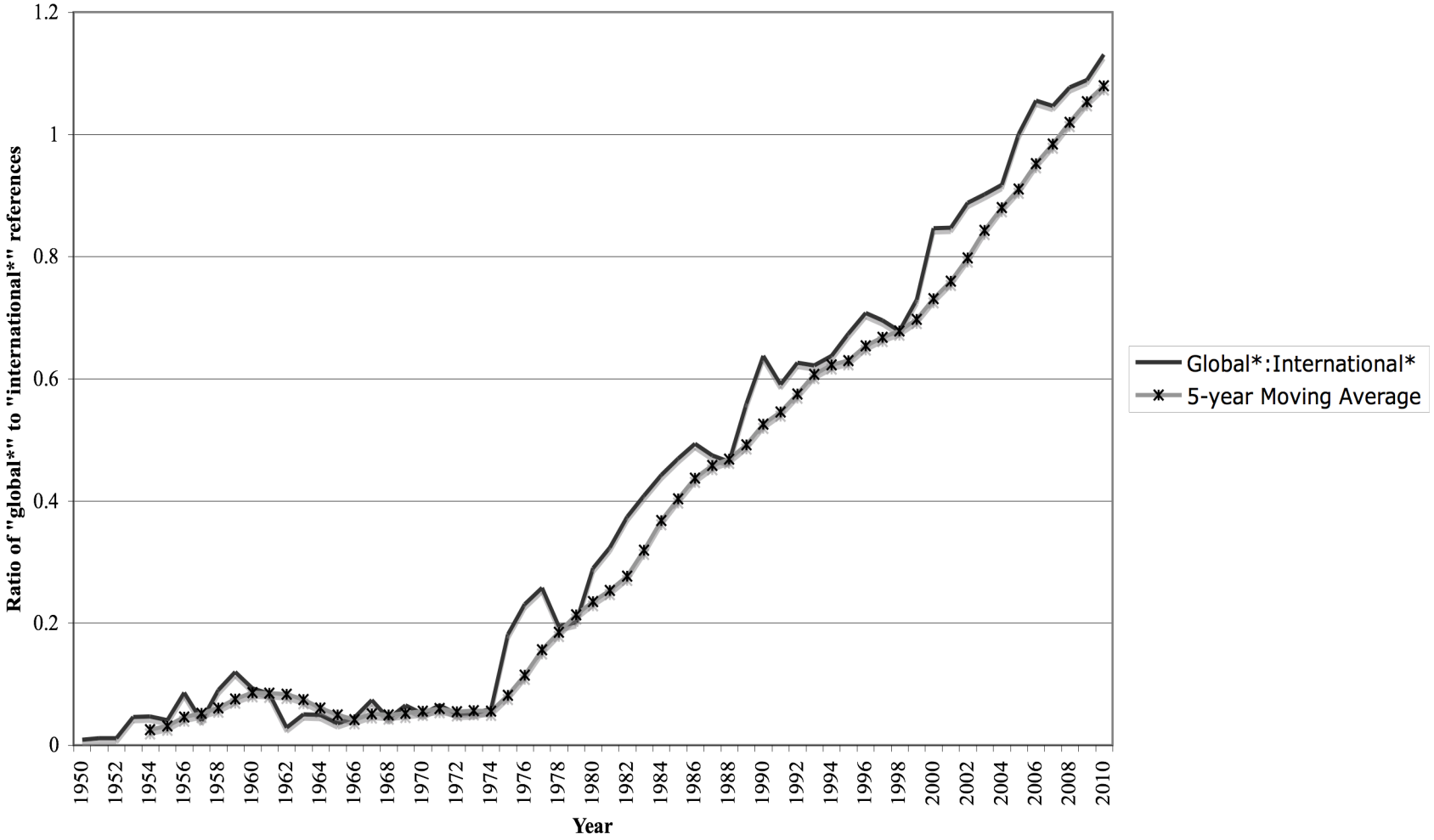

Table 4.1: WHA debate about immunization programs

Year	N	Context of Debate		Resolution	
1974	25	Budget		A27.57	"WHO Expanded Programme on Immunization"
1975	12	Report:	"Detailed Review of the Programme Budget for the Years 1976 and 1977: WHO Expanded Programme on Immunization"		
1976	39	Report:	"Expanded Programme on Immunization"	A29.63	"Expaned Programme on Immunization"
1977	38	Report:	"Expanded Programme on Immunization"	A30.53	"Expaned Programme on Immunization"
				A30.54	"Regional Production of Vaccines for the Expanded Programme on Immunization"
1978	32	Report:	"Expanded Programme on Immunization"	A31.53	"Expaned Programme on Immunization"
1979	17	Budget			
1981	22	Budget			
1982	30	Report:	"Expanded Programme on Immunization"	A35.31	"Expaned Programme on Immunization"
1983	18	Budget			
1985	20	Budget			
1986	34	Report:	"Expanded Programme on Immunization"	A39.30	"Expaned Programme on Immunization"
1987	16	Budget			
1988	32	Report:	"Declaration of Talloires"	A41.28	"Global Eradication of Poliomyelitis by the Year 2000"
1989	14	Report:	"Expanded Programme on Immunization"	A42.32	"Expaned Programme on Immunization"
1991	19	Report:	"Research and Development in the Field of Vaccines"	A44.4	"Research and Development in the Field of Children's Vaccines"
1992	37	Report:	"Expanded Programme on Immunization, and Vaccine Quality"	A45.17	"Immunization and Vaccine Quality"
1993	36	Report:	"Expanded Programme on Immunization: Eradication of Poliomyelitis"	A46.33	"Eradication of Poliomyelitis"
1995	11	Budget			
1997	33	Budget			
1999	45	Report:	"Eradication of Poliomyelitis"	A52.55	"Poliomyelitis Eradication"
2000	28	Report:	"Eradication of Poliomyelitis"	A53.12	"Global Alliance for Vaccines and Immunization"
2003	25	Report:	"Eradication of Poliomyelitis"		
2004	47	Report:	"Eradication of Poliomyelitis"		
2005	46	Report:	"Poliomyelitis"		
	43	Report:	"Draft Global Immunization Strategy"	A58.15	"Global Immunization Strategy"
2006	41	Report:	"Eradication of Poliomyelitis"	A59.1	"Eradication of Poliomyelitis"
2007	30	Report:	"Poliomyelitis: mechanism for management of potential risks to eradication"	A60.14	"Poliomyelitis: mechanism for management of potential risks to eradication"
	9	Report:	"Progress Report: on Technical and Health Matters", Section J: "Reducing Measles Mortality"		
2008	36	Report:	"Poliomyelitis: mechanisms for management of potential risks to eradication"	A61.1	"Poliomyelitis: mechanism for management of potential risks to eradication"
	49	Report:	"Global Immunization Strategy"	A61.15	"Global Immunization Strategy"
2009	12	Report:	"Progress Report: on technical matters and health matters" Section A: "Poliomyelitis: mechanism for management of potential risks to eradication."		

Table 4.2: Participation rates for frequent debate contributors

1974-1987		1988-1999		2000-2009	
India	100.0%	**USSR/Russia**	87.5%	China	100.0%
Netherlands	100.0%	China	87.5%	Oman	100.0%
USSR/Russia	91.7%	**USA**	75.0%	**Thailand**	100.0%
USA	83.3%	Netherlands	62.5%	Japan	87.5%
East Germany	66.7%	Lesotho	62.5%	**Nigeria**	87.5%
Czechoslovakia	58.3%	**India**	62.5%	**India**	87.5%
Chile	50.0%	Zambia	62.5%	**USA**	87.5%
Egypt	50.0%	Australia	50.0%	Greece	87.5%
Ghana	50.0%	Italy	50.0%	Bangladesh	87.5%
Indonesia	50.0%	Turkey	50.0%	Brazil	75.0%
Nigeria	50.0%	Japan	50.0%	Turkey	75.0%
Tanzania	50.0%	**Nigeria**	50.0%	Pakistan	75.0%
Thailand	50.0%	Sweden	50.0%	**USSR/Russia**	75.0%
UK	50.0%	Pakistan	50.0%	Botswana	75.0%
		Zimbabwe	50.0%	UK	75.0%
		France	50.0%	Iran	75.0%
		Swaziland	50.0%	Australia	62.5%
		Thailand	50.0%	Chad	62.5%
				Canada	62.5%
				Iraq	62.5%
				South Korea	62.5%
				Italy	50.0%
				Zambia	50.0%
				Mexico	50.0%
				Egypt	50.0%
				South Africa	50.0%
				United Arab Emirates	50.0%
				Barbados	50.0%
				Philippines	50.0%
				Cuba	50.0%
				Indonesia	50.0%
				Swaziland	50.0%

Table 4.3: Percent of WHA delegates who discussed broad immunization services versus polio eradication

		Immunization		Polio	
Year	N	Discussed	Not discussed	Discussed	Not discussed
1989	14	100.00%	0.00%	35.71%	64.29%
1992	37	86.49%	13.51%	32.43%	67.57%
1995	11	72.73%	27.27%	36.36%	63.64%
1997	33	63.64%	36.36%	75.76%	24.24%

Figure 4.2: Contributions to immunization accounts in Voluntary Fund for Health Promotion

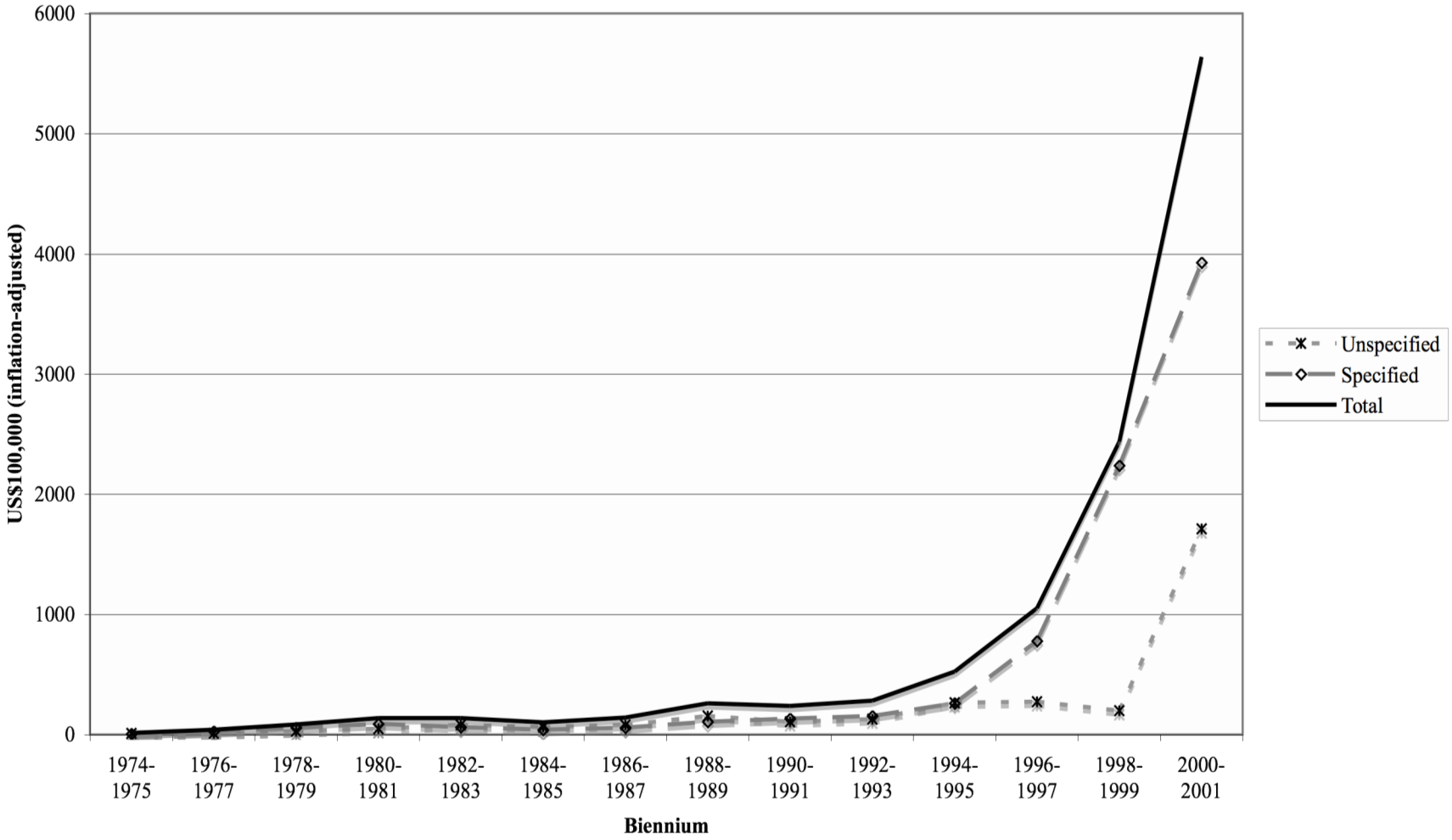

Figure 4.3: Contributions to Voluntary Fund for Health Promotion by purpose

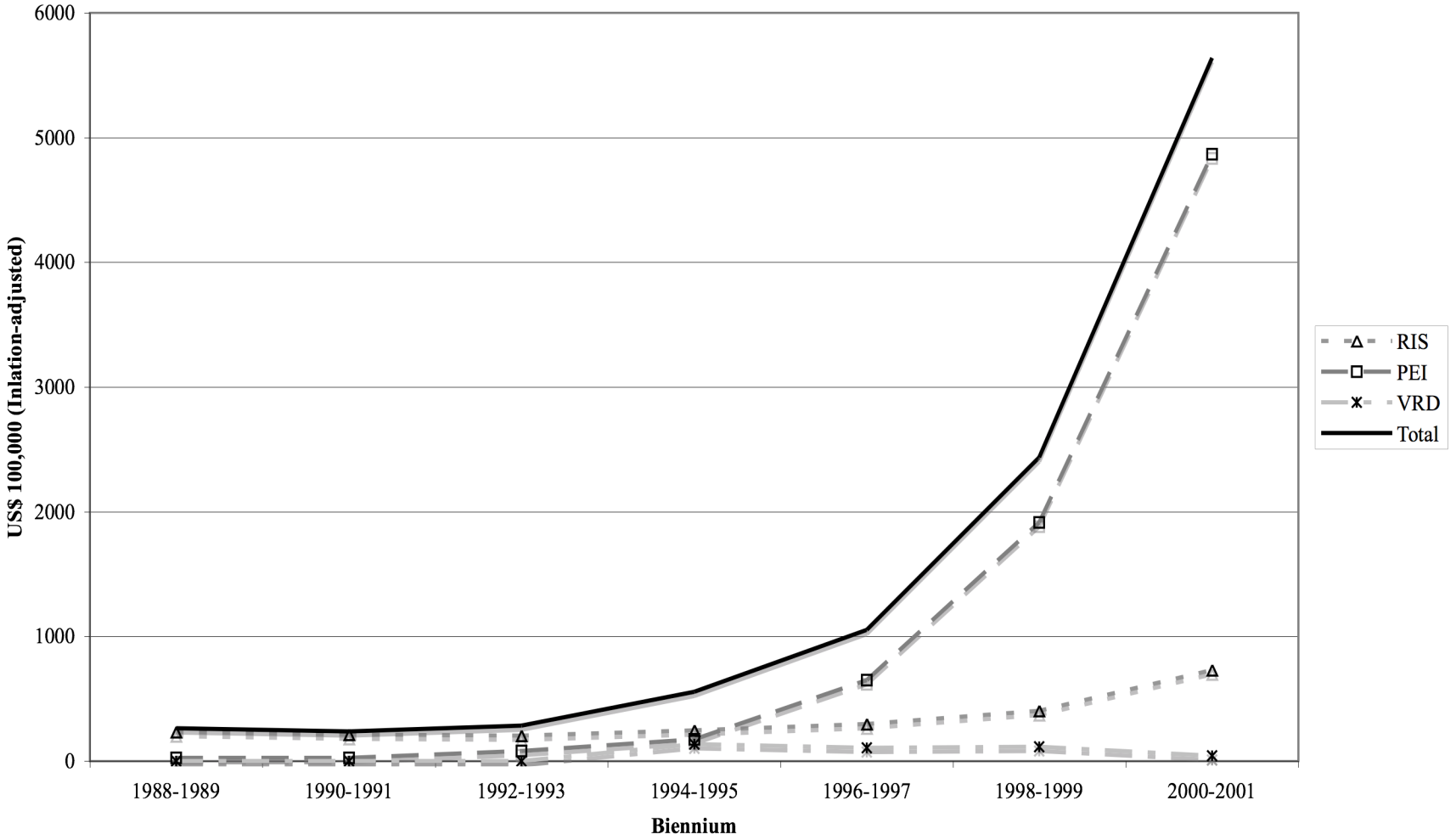

Figure 4.4: Contributions to Voluntary Fund, routine immunization and vaccine research

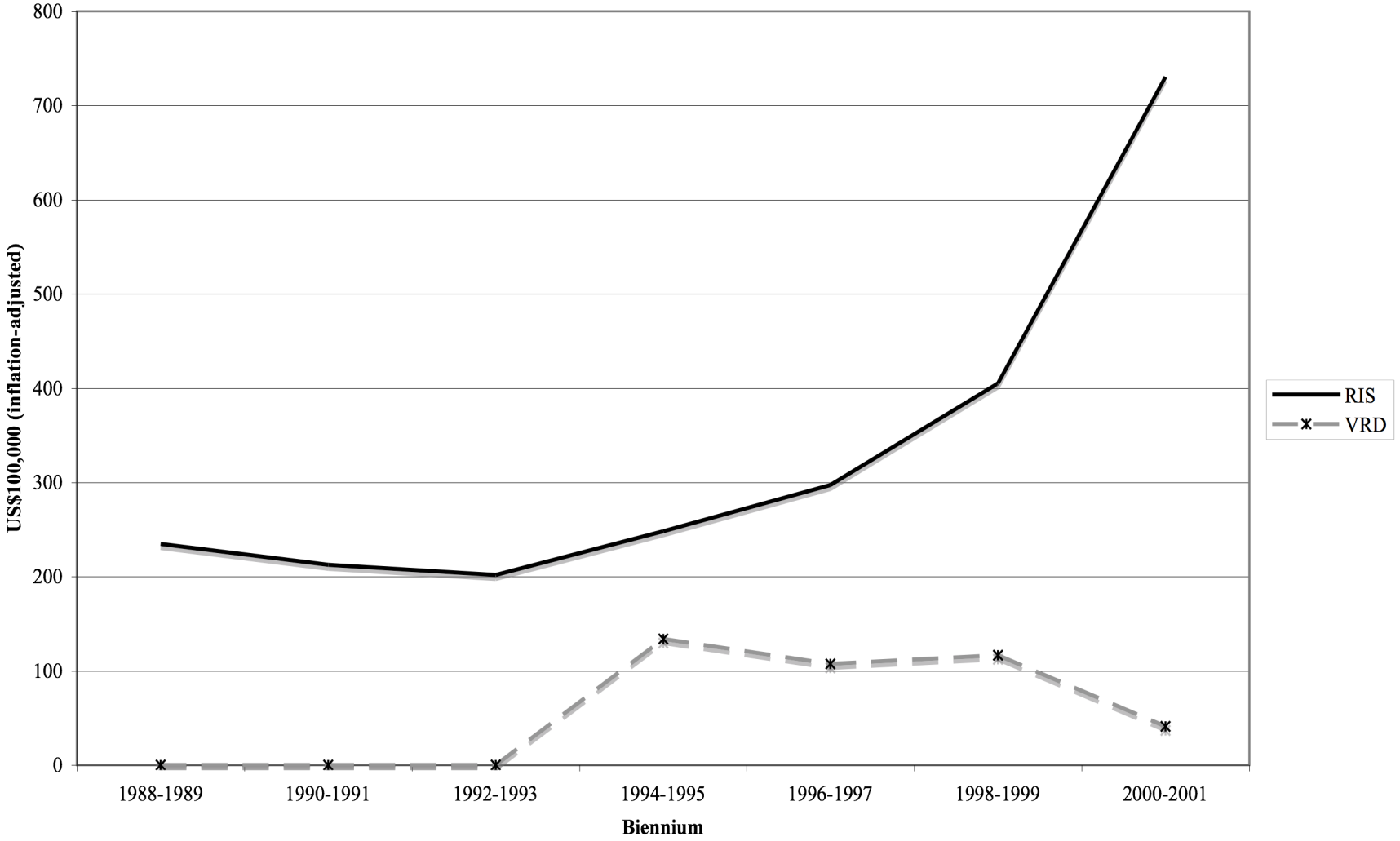

Table 5.1: Countries with Largest Negative Residuals, on Average

Model 1: Polio Coverage		**Model 2: Measles Coverage**		**Model 3: DPT Coverage**		**Model 4: BCG Coverage**		**Model 5: Coverage with All Vaccines**	
Country	*Average Residual*	*Country*	*Average Residual*	*Country*	*Average Residual*	*Country*	*Average Residual*	*Country*	*Average Residual*
Mauritania	-18.68	Gabon	-22.06	Mauritania	-17.40	Jordan	-26.89	Gabon	-53.10
Chad	-17.58	Cameroon	-15.91	Chad	-15.32	Cameroon	-10.07	Chad	-50.61
Cameroon	-14.69	Mauritania	-15.17	Gabon	-15.31	Gabon	-9.66	Mauritania	-50.52
CAR[1]	-11.93	Venezuela	-14.44	Cameroon	-13.10	Chad	-8.68	Cameroon	-48.67
Gabon	-11.91	Togo	-12.75	CAR[1]	-11.72	Nigeria	-8.02	Togo	-35.54
Haiti	-10.25	Kenya	-12.26	Laos	-10.95	Ghana	-7.55	CAR	-35.39
Ghana	-10.14	Chad	-11.49	Haiti	-9.93	Sudan	-7.36	Ghana	-34.24
Burkina Faso	-9.75	Senegal	-11.21	Ghana	-9.85	DRC[2]	-6.82	Congo	-32.93
Laos	-9.65	Syria	-11.00	Togo	-9.56	Congo	-6.57	Kenya	-32.73
Papua New Guinea	-9.61	Malaysia	-10.72	DRC[2]	-9.33	Botswana	-6.04	Haiti	-32.49

1 Central African Republic

2 Democratic Republic of the Congo

Table 5.2: Countries with Largest Positive Residuals, on Average

Model 1: Polio Coverage		**Model 2: Measles Coverage**		**Model 3: DPT Coverage**		**Model 4: BCG Coverage**		**Model 5: Coverage with All Vaccines**	
Country	*Average Residual*	*Country*	*Average Residual*	*Country*	*Average Residual*	*Country*	*Average Residual*	*Country*	*Average Residual*
China	45.07	China	90.83	China	63.19	India	22.61	China	232.06
India	42.02	India	79.24	India	56.49	China	22.33	India	203.97
Mexico	11.37	Mozambique	15.87	Tajikistan	9.54	Mozambique	8.93	Pakistan	34.39
Azerbaijan	8.81	Tajikistan	13.04	Pakistan	9.43	Tajikistan	8.56	Tajikistan	33.24
Argentina	8.57	Angola	12.81	Brazil	9.17	Sierra Leone	7.90	Brazil	30.04
Tajikistan	8.14	Malawi	12.34	Azerbaijan	8.90	Pakistan	7.59	Indonesia	27.91
Malawi	8.14	Pakistan	12.26	Russian Federation	8.51	Nepal	7.24	Azerbaijan	27.15
Pakistan	7.70	Sierra Leone	11.99	Indonesia	7.55	Gambia	7.00	Russia	26.69
Russia	7.31	Azerbaijan	10.22	Rwanda	7.49	Malawi	6.81	Malawi	25.24
Brazil	7.23	Brazil	10.10	Malawi	7.31	Rwanda	6.51	Mozambique	23.67

Table 5.3: Descriptive Statistics for Malawi and Cameroon

	Malawi		**Cameroon**		**All Developing Countries**		**African Countries Only**	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
IGO membership	41.83	3.52	57.78	4.79	41.04	20.01	40.81	13.51
INGO participation	210.33	41.52	320.22	54.57	489.93	535.45	244.98	169.37
Infant Mortality Rate	144.56	8.89	93.18	6.77	61.42	44.83	104.88	38.41
State Durability	21	3.32	25	3.32	25.03	27.70	18.83	17.00
Population (/100,000)	75.42	11.47	101.00	9.62	279.00	1020.00	98.13	145.00
Youth Population (%)	47.40	0.32	44.88	0.25	37.09	9.73	45.47	2.94
Population Density	80.16	12.20	21.76	2.07	109.88	326.10	60.44	88.05
GDP per capita	144.83	10.30	878.73	93.97	4454.35	6523.10	810.73	1087.29
Autocracy Index	9	0	7.91	0.30	4.40	3.43	6.37	2.56
Democracy Index	0	0	0	0	3.35	4.01	1.05	2.52
Armed Conflict Indicator	0	0	0	0	0.15	0.32	0.18	0.35

Figure 5.1 - Actual versus Predicted Vaccination Coverage in Malawi

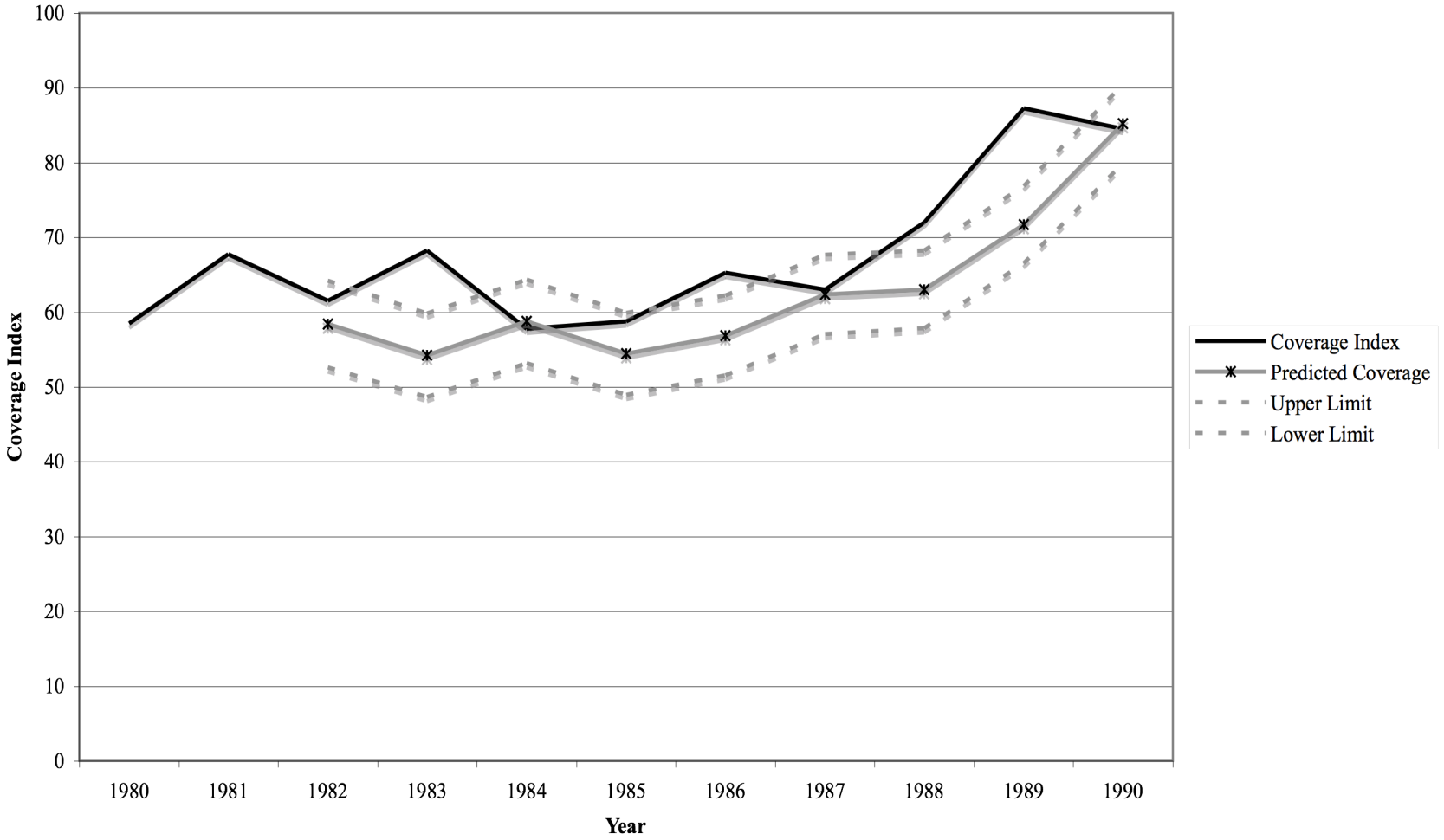

Figure 5.2 - Predicted versus Actual Vaccination Coverage in Cameroon

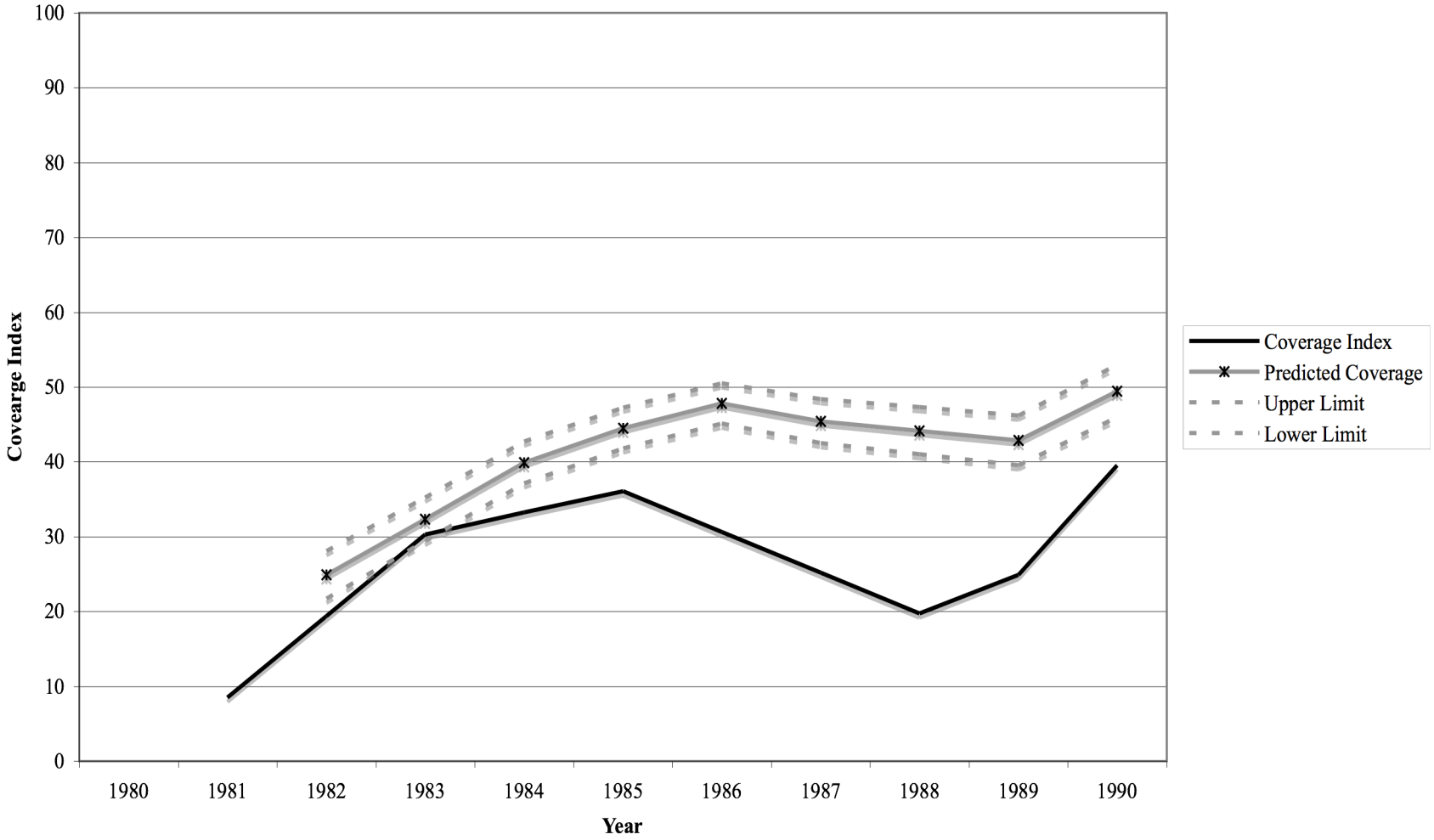

Figure 6.1 - Global vaccination coverage among one-year olds, 1980-2011

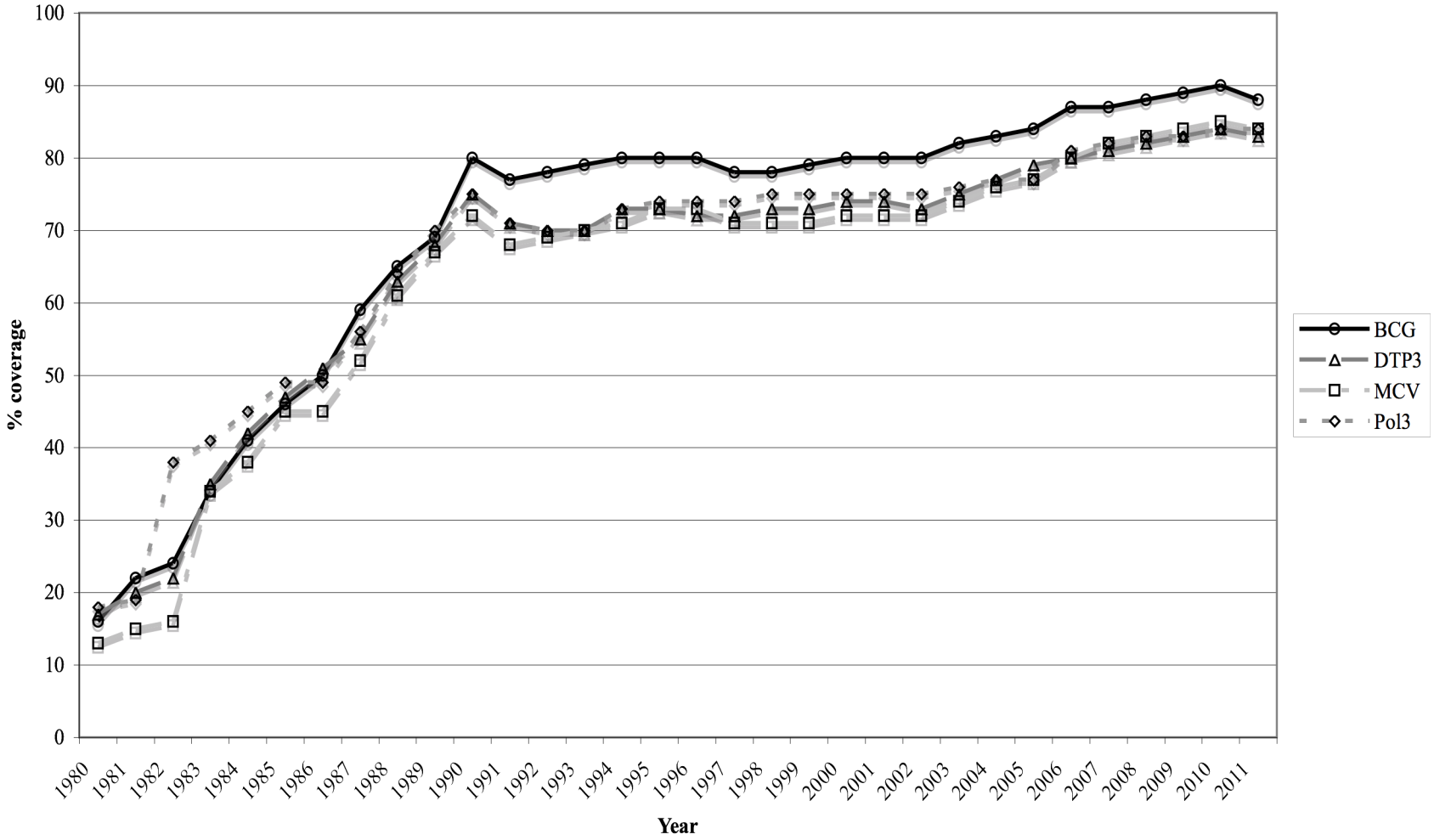

Figure 6.2 - Vaccination coverage among one-year olds in African Region, 1980-2011

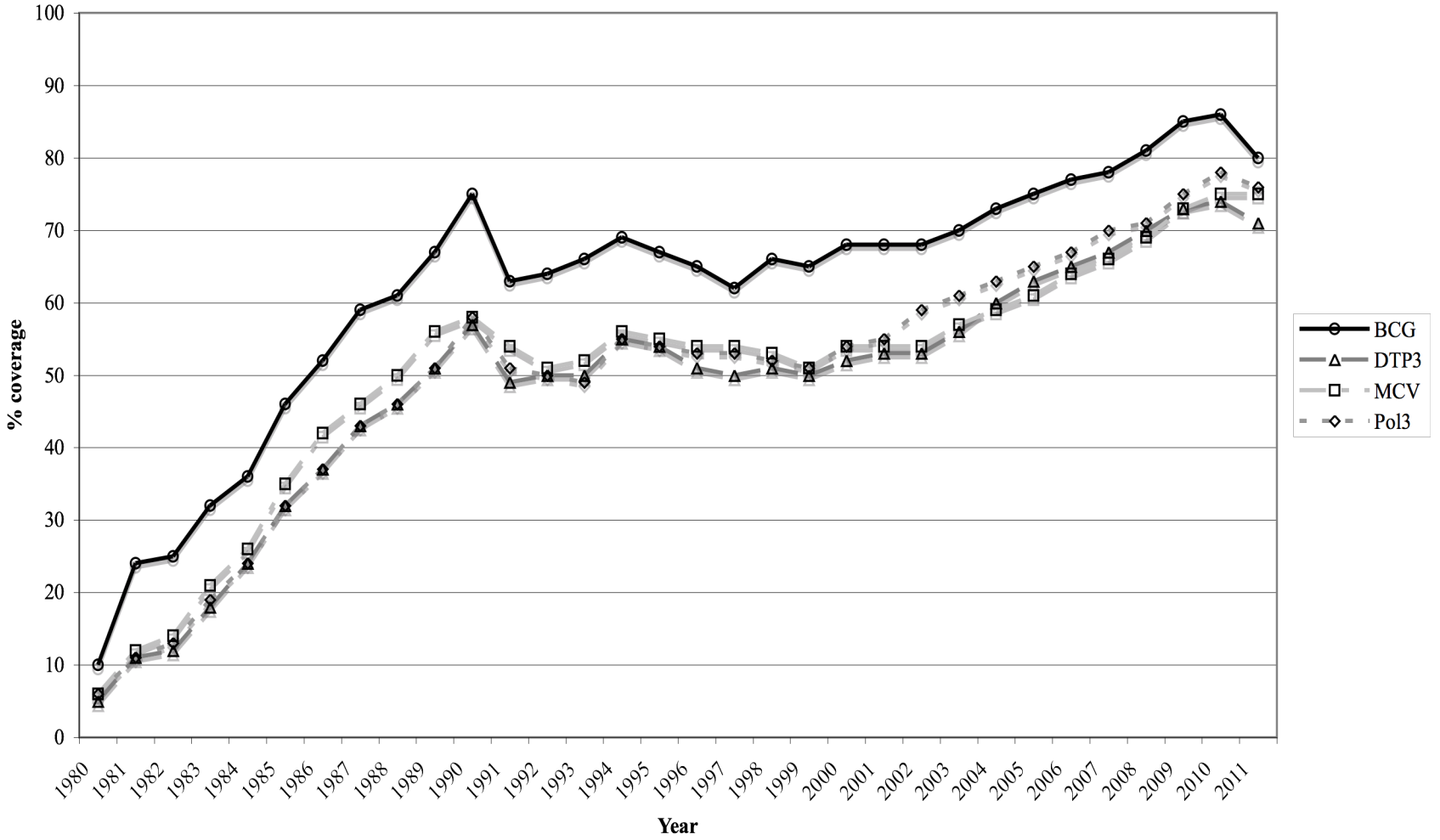

Figure 6.3 – Map of Cameroon

Map No. 4227 UNITED NATIONS
September 2004

Department of Peacekeeping Operations
Cartographic Section

Table 6.1: Vaccination Coverage in the Department of Noun, 1983/1984

	BCG	DPT1	DPT3	POL1	POL3	Measles	Fully Covered
Total	68.6	60	36.2	57.1	32.9	24.8	21.4
EEC[1] dispensary served by EEC mobile team	96.9	98	82.7	96.9	79.6	49	44.9
Village with state dispensary served by EEC mobile team	64.6	56.6	43.4	55.6	43.4	30.3	24.2
Village without dispensary served by EEC mobile team	80	77.2	50	75	46.8	39.1	27.2
EEC fixed vaccination center	78.8	67.7	39.4	63.6	35.3	31.3	23.2
Village without vaccination center	61.3	45	25	41.3	18.8	12.5	10
Foumban[2]	70.7	53.2	39.6	50	36	23.4	12.6

1 Evangelical Church of Cameroon, in other words Njisse Hospital and its mobile team.
2 Foumban is the main population center in the department and seat of departmental government, including SDMPR

Figure 6.4 – Map of Malawi

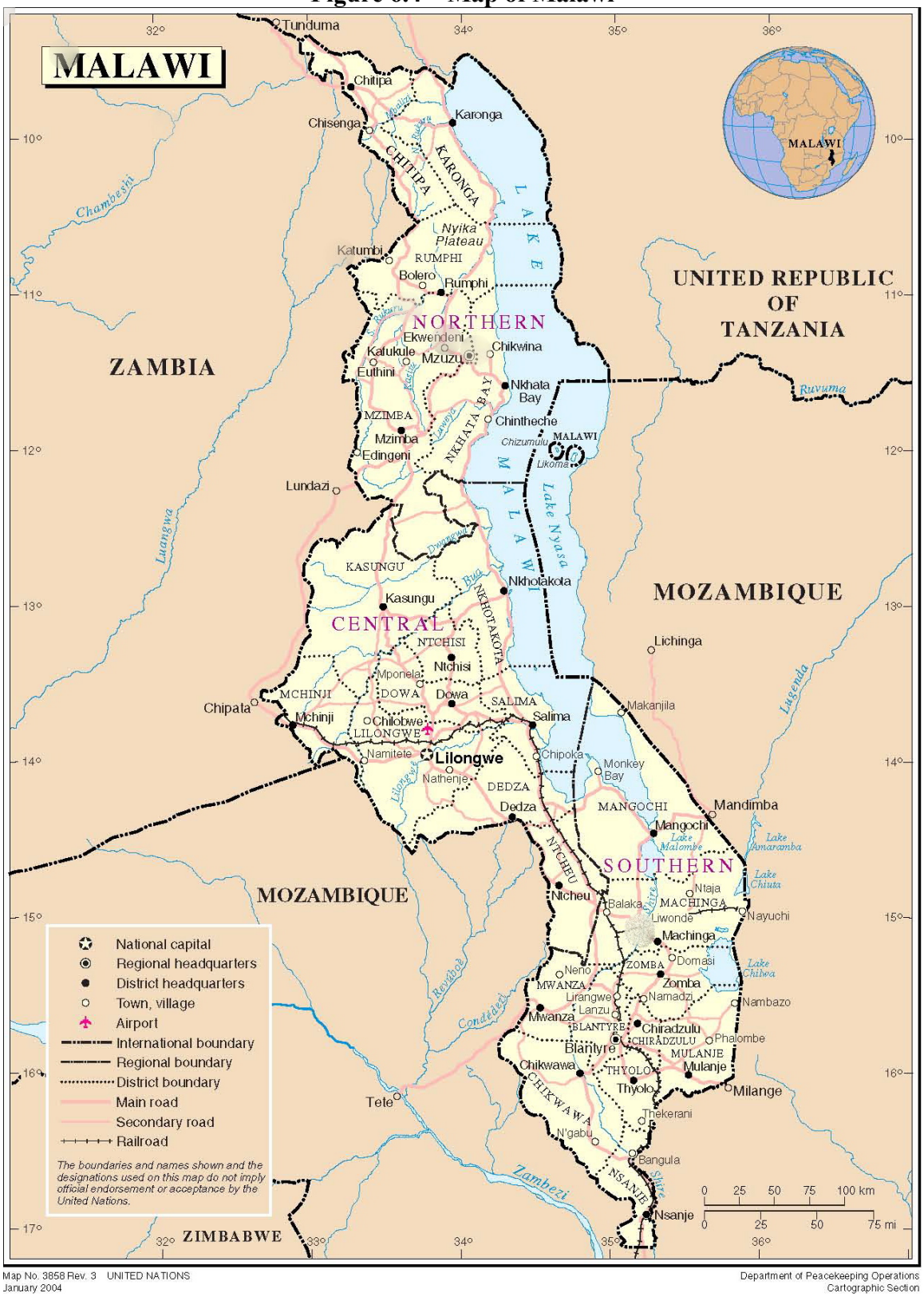

Table 6.2: Vaccination Coverage in Malawi, 1980-1988

	1980	1982	1984	1985	1988
BCG	72%	87%	72%	73%	80%
Pol1	80%	91%	82%	85%	84%
Pol3	40%	72%	68%	56%	72%
DPT1	77%	88%	84%	83%	84%
DPT3	47%	69%	66%	54%	72%
Measles	61%	70%	64%	52%	71%
Fully Vaccinated	29%	50%	55%	35%	58%

Table 6.3: Fixed versus Mobile Under-5 clinics in Malawi

	Fixed		Mobile	
	%	N	%	N
1977	37.38%	317	62.62%	531
1980	35.15%	355	64.85%	655
1982*	37.65%	153	62.35%	253.33
1983	37.77%	406	62.23%	669.00
1985	35.22%	393	64.78%	723

* Number of monthly clinics based on reports of daily, weekly, bi-weekly, monthly and 3-monthly clinics held by health centers visited by evaluation team.

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